

Bericht

2024PAV01486

Schattenwurfprognose

Standort: ***Himmelreich, Nordrhein-Westfalen,***
Deutschland

Kunde:

Windpark Himmelreich GmbH & Co. KG
Zur Egge 17
34431 Marsberg-Meerhof



Husum, 25/02/2025

Version	Datum	Veränderung	Kommentar
0	25/02/2025	-	Erstausgabe

Haftungsausschluss

Die vorliegenden Berechnungsergebnisse in diesem Bericht wurden von der PAVANA GmbH gemäß dem Stand der Technik nach bestem Wissen und Gewissen erstellt. Für die physikalische Einhaltung der abgeschätzten Ergebnisse werden seitens der PAVANA GmbH keine Garantien übernommen. Eine auszugweise Vervielfältigung dieses Berichtes ist nur mit schriftlicher Zustimmung der PAVANA GmbH erlaubt.

Bericht-Nr.: 2024PAV01486

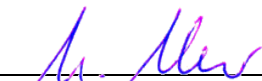
Datum des Auftrags: 08/07/2024

Kunde: Windpark Himmelreich GmbH & Co. KG
Zur Egge 17
34431 Marsberg-Meerhof

Auftragnehmer: PAVANA GmbH
Haus der Zukunftsenergien
Otto-Hahn-Straße 12 – 16
D – 25813 Husum

Aufgabe: Schattenwurfprognose für eine Windenergieanlage des Typs Enercon E-115 auf 149 m Nabenhöhe, zwei Windenergieanlagen des Typs Enercon E-138 EP3 E3 auf 160 m Nabenhöhe sowie zwölf Windenergieanlagen des Typs Enercon E-160 EP5 E3 R1 auf 166,6 m Nabenhöhe

Verfasser:



Kirsten Ulner
Senior Wind & Site

Prüfer:

Dipl.-Ing. Lars Levermann
Head of Pavana GmbH

Freigabe:

Dipl.-Ing. Lars Levermann
Head of Pavana GmbH

Husum, 25/02/25

Inhaltsverzeichnis

1	AUFGABENSTELLUNG	5
2	STANDORTDATEN	6
2.1	Immissionsorte	7
2.2	Vorbelastung	11
2.3	Zusatzbelastung	12
3	ERGEBNISSE DER IMMISSIONSBERECHNUNG	13
3.1	Astronomisch maximal mögliche Beschattungsdauer	13
3.2	Meteorologisch wahrscheinlich Beschattungsdauer	14
4	ZUSAMMENFASSUNG	15
5	QUALITÄT DER PROGNOSE	17
6	THEORETISCHE GRUNDLAGEN	18

Anhang

Vorwort

Die vorliegende Schattenwurfprognose für den Standort *Himmelreich (Nordrhein-Westfalen)* wurde von der PAVANA GmbH gemäß dem Stand der Technik nach bestem Wissen und Gewissen erstellt.

Für die physikalische Einhaltung der prognostizierten Ergebnisse der Schattenwurfberechnung werden seitens der PAVANA GmbH keine Garantien übernommen. Sie basieren auf den Empfehlungen der Bund/Länder-Arbeitsgemeinschaft für Immissionsschutz (LAI)¹ sowie den von der PAVANA GmbH und dem WEA-Hersteller gestellten Standort- und Anlagendaten.

1 Aufgabenstellung

Die Windpark Himmelreich GmbH & Co. KG plant am Standort *Himmelreich (Nordrhein-Westfalen)* östlich der Ortschaft *Fürstenberg* und südwestlich von *Meerhof* die Errichtung von einer Windenergieanlage des Typs Enercon E-115 auf 149,0 m Nabenhöhe, zwei Windenergieanlagen des Typs Enercon E-138 EP3 E3 auf 160 m Nabenhöhe sowie zwölf Windenergieanlagen des Typs Enercon E-160 EP5 E3 R1 auf 166,6 m Nabenhöhe. Es soll eine Ermittlung und Bewertung des periodischen Schattenwurfes für die zu erwartenden optischen Immissionen durch die geplanten WEA durchgeführt werden.

Durch den sich bewegenden Anlagenrotor können störende optische Beeinträchtigungen in der Umgebung verursacht werden. Dieser Effekt ist rechtlich als Immission im Sinne von § 3 (2) des Bundesimmissionsschutzgesetzes anzusehen.

Die Prognose des Schattenwurfs im Umfeld von WEA stützt sich auf eine standortbezogene Berechnung des veränderlichen astronomischen Sonnenstandes. Aufgrund des hiesigen scheinbaren Sonnenlaufes sind insbesondere in westlicher und östlicher Richtung zu einer WEA grundsätzlich große Schattenreichweiten möglich. Ziel ist daher die sichere Begrenzung der Einwirkdauer derartiger Immissionen in schutzwürdigen Wohn- und Arbeitsbereichen.

Die Grenzwerte an den jeweiligen Immissionspunkten, ggf. unter kumulativer Berücksichtigung der Beiträge aller einwirkender WEA, dürfen 30 Stunden pro Jahr sowie 30 Minuten pro Tag für die astronomisch maximal mögliche Beschattungsdauer nicht überschreiten (worst case).

Die Berechnung wird mit der Software WindPRO 4.1.254 (EMD), Modul SHADOW, durchgeführt.

Eine weitere Berechnungsgrundlage für die Schattenwurfprognose ist das Digitale Geländehöhenmodell DGM SRTM.

¹ Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windkraftanlagen, Aktualisierung 2019 (WKA-Schattenwurf-Hinweise), 23.01.2020

2 Standortdaten

Abbildung 1 stellt den Standort sowie die geplanten und die bestehenden WEA dar. Einige WEA, die keinen Einfluss auf die untersuchten Immissionsorte haben, werden in der Berechnung nicht weiter berücksichtigt. Eine Berechnung hierzu ist dem Anhang hinzugefügt.

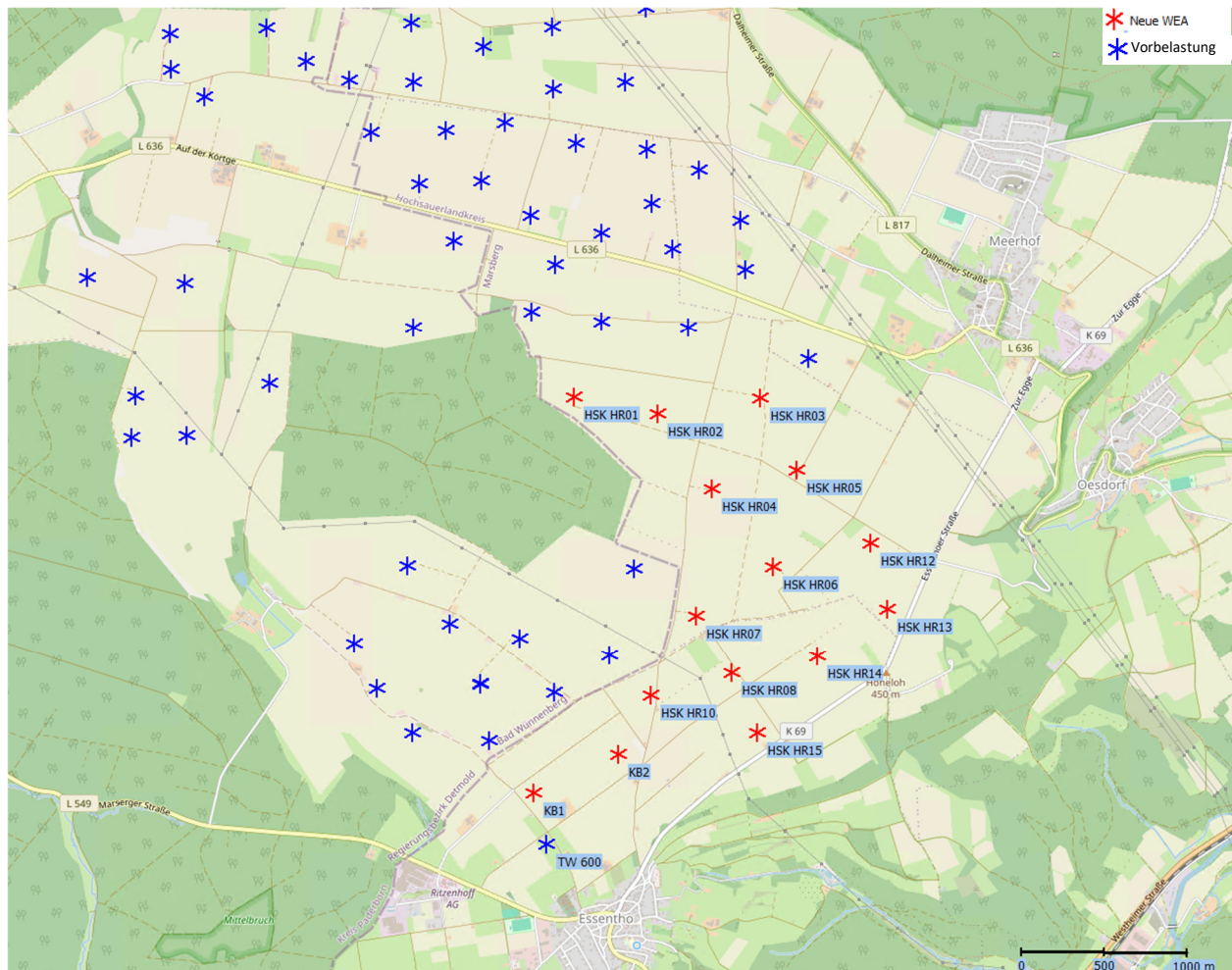


Abbildung 1: WEA-Standorte am Standort *Himmelreich*, Nordrhein-Westfalen (© OpenStreetMap, EMD International A/S)

2.1 Immissionsorte

Für die Berechnung der Schattenimmissionen am Standort *Himmelreich* wurden innerhalb des Beschattungsbereichs die in der Umgebung des Standortes liegenden Immissionsorte exemplarisch ausgewählt, an denen erhöhte potenzielle Schattenimmissionen möglich sind. Als nicht erheblich belästigend wird der periodische Schattenwurf an einem Immissionsort angesehen, wenn die astronomisch maximal mögliche Beschattungsdauer nicht mehr als 30 Std. pro Kalenderjahr und darüber hinaus nicht mehr als 30 Minuten pro Kalendertag beträgt.

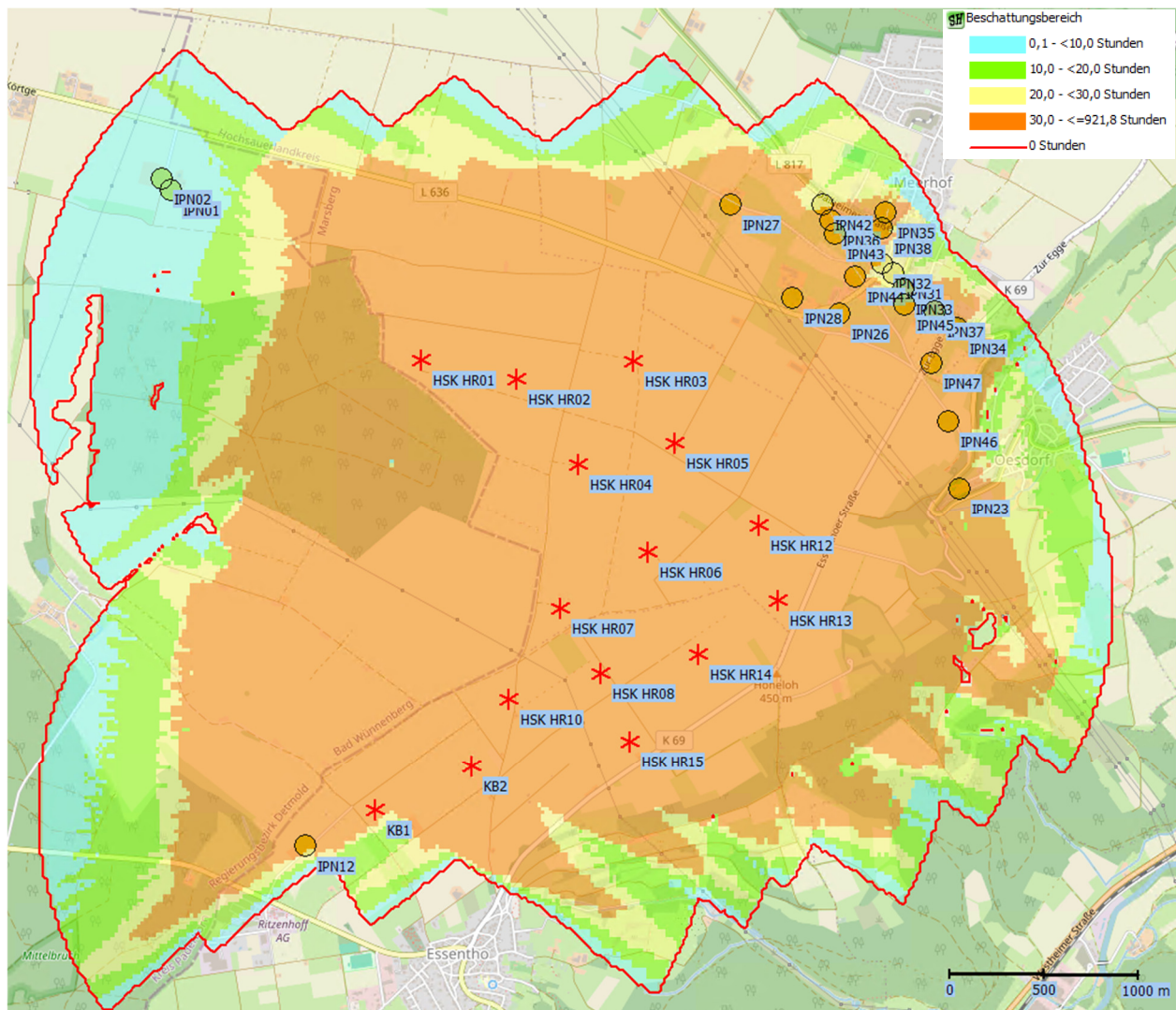


Abbildung 2: Beschattungsbereich der neu geplanten WEA (© OpenStreetMap, EMD International A/S)

In der Umgebung der geplanten Windenergieanlagen wurden 21 Immissionsorte (im folgenden IO genannt) mit Hilfe von topografischen Karten und Satellitendaten definiert. In nachfolgender Tabelle 1 sind die Koordinaten und die Beschreibungen der Immissionsorte angegeben.

Tabelle 1: Koordinaten der Rezeptoren (UTM ETRS89 Z32)

IO	Beschreibung	X [m]	Y [m]
IPN01	Bad Wünnenberg, Auf der Körtge 6	486.786	5.707.423
IPN02	Bad Wünnenberg, Auf der Körtge 4	486.736	5.707.479
IPN12	Essentho, In den Stricken 30	487.495	5.703.938
IPN23	Oesdorf, Zum Kesselberg 15	490.974	5.705.828
IPN26	Meerhof, Sintfeldstraße 28	490.333	5.706.752
IPN27	Meerhof, Im Kesperbusch 1	489.760	5.707.341
IPN28	Meerhof, Sintfeldstraße 33	490.088	5.706.836
IPN31	Meerhof, Taubenweg 2	490.620	5.706.966
IPN32	Meerhof, Laurentiusstraße 10	490.561	5.707.019
IPN33	Meerhof, Dalheimer Straße 1	490.672	5.706.887
IPN34	Meerhof, Zur Egge 29	490.960	5.706.676
IPN35	Meerhof, Elsterweg 2	490.578	5.707.293
IPN36	Meerhof, Drosselgasse 18	490.290	5.707.254
IPN37	Meerhof, Zur Egge 19	490.839	5.706.768
IPN38	Meerhof, Dalheimer Straße 20	490.561	5.707.211
IPN42	Meerhof, Drosselgasse 24	490.244	5.707.335
IPN43	Meerhof, Drosselgasse 14	490.312	5.707.184
IPN44	Meerhof, Drosselgasse 2	490.417	5.706.950
IPN45	Meerhof, Zur Egge 3	490.681	5.706.800
IPN46	Oesdorf, Zum Kesselberg 20	490.912	5.706.180
IPN47	Meerhof, Zur Egge 25	490.820	5.706.494

Die Lage und Dokumentation der Immissionsorte sind den nachfolgenden topographische Karten (Abbildung 3 bis Abbildung 6) zu entnehmen.

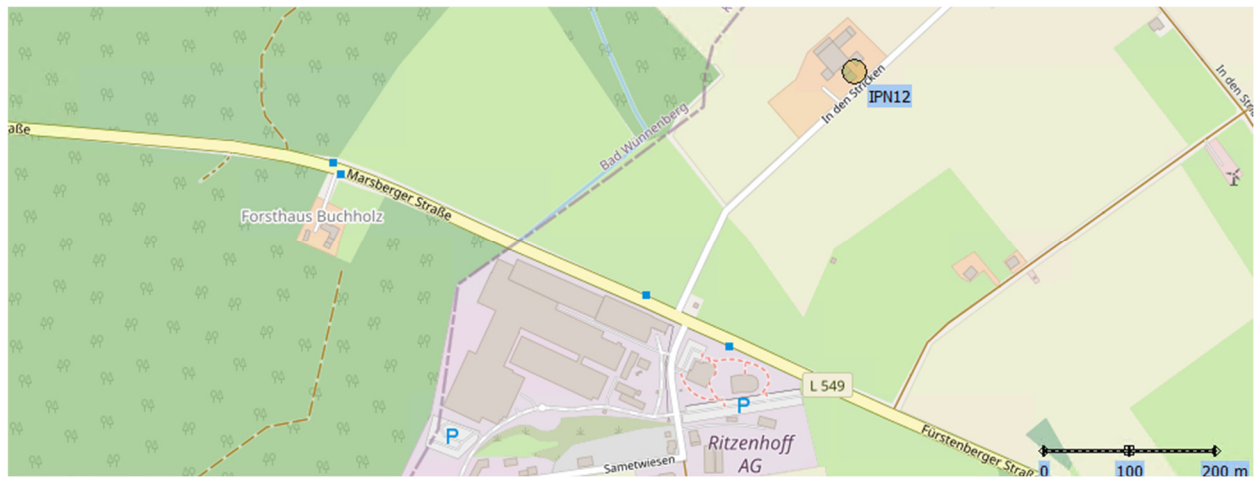


Abbildung 3: Immissionsort IPN12 (© OpenStreetMap, EMD International A/S)



Abbildung 4: Immissionsorte IPN01 und IPN02 (© OpenStreetMap, EMD International A/S)

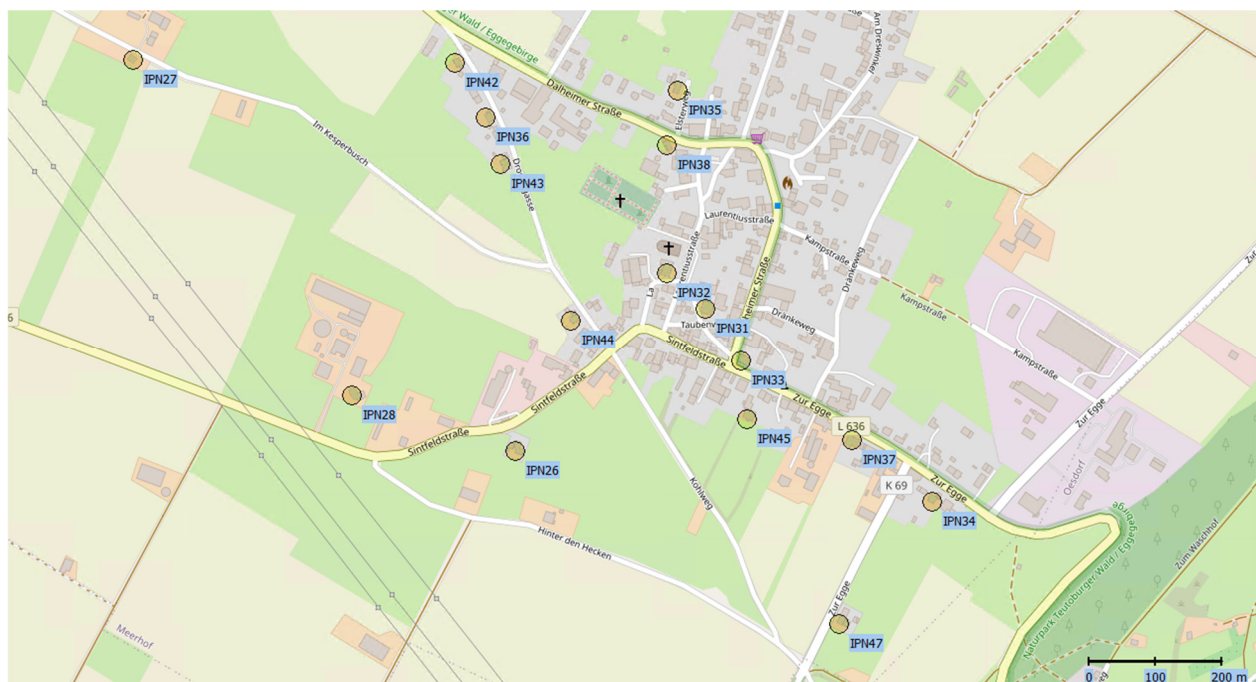


Abbildung 5: Immissionsorte IPN26-IPN28, IPN31-IPN38, IPN42-IPN45, IPN47 (© OpenStreetMap, EMD International A/S)

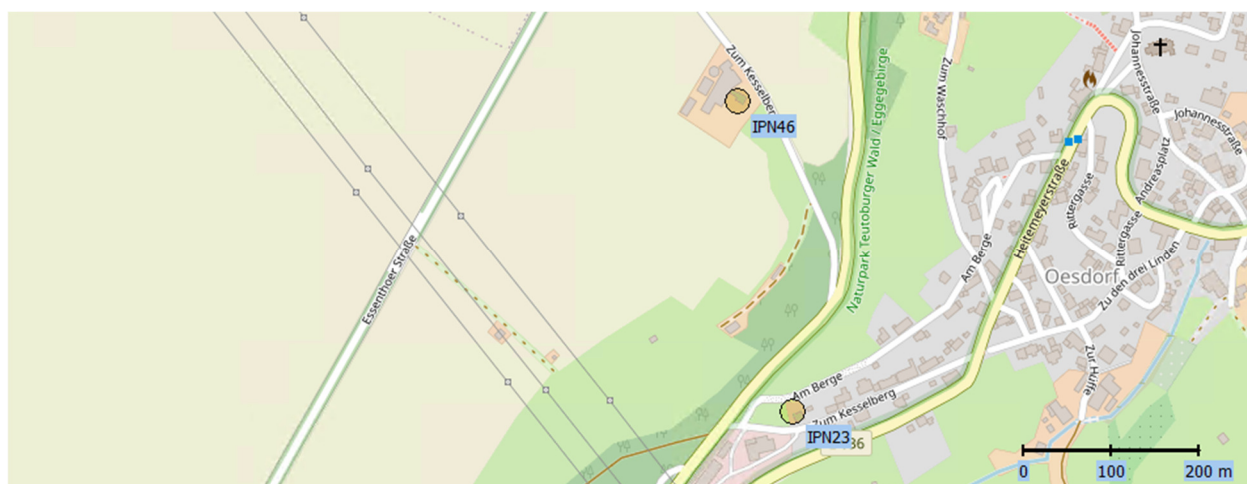


Abbildung 6: Immissionsorte IPN23 und IPN46 (© OpenStreetMap, EMD International A/S)

2.2 Vorbelastung

In der näheren Umgebung des Standorts *Himmelreich, Nordrhein-Westfalen* befinden sich bereits zahlreiche Windenergieanlagen, welche auf eine Vorbelastung im Beschattungsbereich der neu geplanten WEA untersucht werden. Es wurden 25 Windenergieanlagen als relevant für die untersuchten Immissionsorte identifiziert und als Vorbelastungs-WEA betrachtet. Alle weiteren am Standort bestehenden WEA haben keine Einwirkung auf die untersuchten Immissionsorte und werden nicht berücksichtigt. Eine entsprechende Berechnung zum Nachweis befindet sich im Anhang. Die Koordinaten und Kenndaten der Bestandsanlagen sind in Tabelle 2 aufgeführt.

Tabelle 2: Koordinaten und Kenndaten der bestehenden WEA (UTM ETRS89 - Zone 32)

Bez. / Nr.	WEA-Typ	X [m]	Y [m]	Z [m]	RD [m]	NH [m]	max. Blatttiefe [m]	min. Blatttiefe bei 90% Radius [m]	mittlere Blatttiefe [m]	Beschattungsbereich [m]
HSK 8694 TLF	E-126 EP4 TES-4.200	489.214	5.706.973	395,9	127,0	135,0	4,75	1,45	3,10	2.108
HSK 9974491.31 Kaesperb	E-66/18.70	487.658	5.707.330	380,0	70,0	98,0	3,30	1,07	2,19	1.486
HSK 9990371 D3	E-115-3.000	488.945	5.708.387	376,4	115,7	135,4	4,53	1,55	3,04	2.067
HSK Heu12	N149/5.7	487.995	5.708.375	360,0	149,0	164,0	3,49	0,89	2,19	1.805
HSK ME01	E-126 EP3-4.000	488.806	5.706.938	398,9	127,0	135,3	4,02	1,12	2,57	1.746
HSK ME02	E-126 EP3-4.000	488.279	5.706.974	390,0	127,0	135,3	4,02	1,12	2,57	1.746
HSK ME03	E-126 EP3-4.000	487.856	5.707.032	389,9	127,0	135,3	4,02	1,12	2,57	1.746
HSK ME05	E-138 EP3 E2-4.200	487.852	5.707.613	379,2	138,0	160,0	3,96	1,02	2,49	1.689
HSK ME06	E-138 EP3 E2-4.200	488.281	5.707.505	378,6	138,0	160,0	3,96	1,02	2,49	1.689
HSK ME07	E-138 EP3 E2-4.200	488.710	5.707.414	384,7	138,0	160,0	3,96	1,02	2,49	1.689
HSK ME08a	E-126 EP3-4.000	489.122	5.707.583	382,8	127,0	135,3	4,02	1,12	2,57	1.746
HSK ME08b	E-126 EP3-4.000	489.152	5.707.285	389,7	127,0	135,3	4,02	1,12	2,57	1.746
HSK ME09	E-138 EP3 E2-4.200	488.875	5.707.885	376,9	138,0	160,0	3,96	1,02	2,49	1.689
HSK ME10	E-138 EP3 E2-4.200	488.556	5.708.014	370,0	138,0	160,0	3,96	1,02	2,49	1.689
HSK ME11	E-138 EP3 E2-4.200	488.126	5.708.050	369,7	138,0	160,0	3,96	1,02	2,49	1.689
HSK ME17	E-138 EP3 E2-4.200	487.559	5.707.825	371,5	138,0	160,0	3,96	1,02	2,49	1.689
HSK ME18	E-138 EP3 E2-4.200	488.584	5.707.684	377,4	138,0	160,0	3,96	1,02	2,49	1.689

Bez. / Nr.	WEA-Typ	X [m]	Y [m]	Z [m]	RD [m]	NH [m]	max. Blatttiefe [m]	min. Blatttiefe bei 90% Radius [m]	mittlere Blatttiefe [m]	Beschattungsbereich [m]
HSK ME20	E-138 EP3 E2-4.200	488.004	5.707.318	380,0	138,0	160,0	3,96	1,02	2,49	1.689
PD 40634-18 (03) (V)	N149/4.0-4.5-4.500	486.272	5.706.606	382,4	149,0	164,0	4,15	1,17	2,66	1.805
PD 40639-23 (WEA 01)	N149/5.X-5.700	485.763	5.707.208	363,6	149,0	164,0	4,15	1,17	2,66	1.805
PD 40640-23 (WEA 02)	N163/6.X-7.000	485.172	5.707.245	360,0	163,0	164,0	4,15	1,11	2,63	1.784
PD 41610-23 Fü1	E-138 EP3 E3-4.260	487.387	5.707.465	377,0	138,3	160,0	3,93	1,04	2,49	1.686
PD 41610-23 Fü2	E-160 EP5 E3-5.560	487.141	5.706.941	380,0	160,0	166,6	4,13	1,12	2,63	1.781
HSK TW 600	Tacke TW600	487.937	5.703.817	441,7	43,0	50,0	2,00	0,70	1,35	918

2.3 Zusatzbelastung

Die Koordinaten und Kenndaten der neu geplanten WEA sind Tabelle 3 zu entnehmen.

Tabelle 3: Koordinaten und Kenndaten der geplanten WEA (UTM ETRS89 - Zone 32)

Bez. / Nr.	WEA-Typ	X [m]	Y [m]	Z [m]	RD [m]	NH [m]	max. Blatttiefe [m]	min. Blatttiefe bei 90% Radius [m]	mittlere Blatttiefe [m]	Beschattungsbereich [m]
HSK HR01	E-115	488.113	5.706.517	400,0	115,7	149,0	4,53	1,55	3,04	2.066
HSK HR02	E-160 EP5 E3 R1	488.618	5.706.413	410,0	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR03	E-160 EP5 E3 R1	489.237	5.706.505	402,7	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR04	E-160 EP5 E3 R1	488.944	5.705.964	423,6	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR05	E-160 EP5 E3 R1	489.456	5.706.076	418,4	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR06	E-160 EP5 E3 R1	489.315	5.705.493	430,0	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR07	E-160 EP5 E3 R1	488.851	5.705.198	426,8	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR08	E-160 EP5 E3 R1	489.063	5.704.850	426,4	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR10	E-160 EP5 E3 R1	488.571	5.704.712	421,9	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR12	E-160 EP5 E3 R1	489.901	5.705.630	424,2	160,0	166,6	4,13	1,12	2,63	1.781

HSK HR13	E-160 EP5 E3 R1	490.007	5.705.235	437,8	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR14	E-160 EP5 E3 R1	489.581	5.704.952	440,0	160,0	166,6	4,13	1,12	2,63	1.781
HSK HR15	E-138 EP3 E3	489.218	5.704.487	444,2	138,3	160,0	3,93	1,04	2,49	1.686
KB1	E-160 EP5 E3	487.863	5.704.130	444,1	160	160	4,13	1,12	2,63	1.781
KB2	E-138 EP3 E3	488.376	5.704.361	431,9	138,3	160,0	3,93	1,04	2,49	1.686

3 Ergebnisse der Immissionsberechnung

3.1 Astronomisch maximal mögliche Beschattungsdauer

Für einen vertikalen Rezeptor im „Gewächshaus-Modus“ (Öffnungswinkel 360°, 10 cm x 10 cm) mit einer Bezugshöhe über Grund von 2 m wurde die astronomisch maximal mögliche Beschattungsdauer (worst case) berechnet. Dies bedeutet, dass Stillstandzeiten der WEA, die Windrichtung und Bewölkung nicht berücksichtigt werden. Die einzuhaltenden Immissionsrichtwerte betragen:

- Max. 30 Stunden astronomisch maximal mögliche Beschattung pro Jahr
- Max. 30 Minuten astronomisch maximal mögliche Beschattung pro Tag

Für die Beurteilung des Schattenwurfs an den ausgewählten Immissionspunkten wird die Zusatzbelastung berechnet. Die Ergebnisse der „worst case“ Schattenwurfberechnung für die maximale, jährliche Schattenwurfdauer und die maximale, tägliche Schattenwurfdauer sind in Tabelle 4 aufgeführt. Überschreitungen der Richtwerte sind **fett** hervorgehoben.

Tabelle 4: Astronomisch maximal mögliche Beschattungsdauer für die Vor-, Zusatz- und Gesamtbelastung

IO	Jährliche Beschattungsdauer (worst case)			Tägliche Beschattungsdauer (worst case)		
	Vorbelastung	Zusatzbelastung	Gesamtbelastung	Vorbelastung	Zusatzbelastung	Gesamtbelastung
	[Std/Jahr]	[Std/Jahr]	[Std/Jahr]	[Std/Tag]	[Std/Tag]	[Std/Tag]
IPN01	292:28	5:46	298:14	1:19	0:17	1:19
IPN02	276:10	5:30	281:40	1:16	0:17	1:16
IPN12	7:38	36:12	43:50	0:22	0:35	0:35
IPN23	0:00	45:03	45:03	0:00	0:33	0:33
IPN26	38:55	73:30	112:25	0:26	0:55	0:55
IPN27	213:22	64:19	275:27	1:24	0:47	1:24
IPN28	67:34	101:14	168:48	0:34	1:04	1:04
IPN31	18:18	25:12	43:30	0:21	0:26	0:26
IPN32	20:22	28:23	48:45	0:22	0:27	0:27
IPN33	16:57	30:33	47:30	0:20	0:26	0:26
IPN34	3:14	41:09	44:23	0:15	0:26	0:26
IPN35	23:25	34:01	57:26	0:21	0:24	0:24
IPN36	53:35	36:34	90:09	0:37	0:30	0:37

IPN37	4:18	43:50	48:08	0:17	0:27	0:27
IPN38	19:32	35:56	55:28	0:21	0:25	0:25
IPN42	59:37	28:07	87:44	0:41	0:29	0:41
IPN43	51:15	42:38	93:53	0:34	0:30	0:34
IPN44	32:52	44:23	77:15	0:24	0:46	0:46
IPN45	17:15	39:56	57:11	0:20	0:27	0:27
IPN46	4:43	69:30	74:13	0:16	0:50	0:50
IPN47	4:29	54:15	58:44	0:17	0:31	0:31

Die detaillierten Ergebnisse sind den beiliegenden Ausdrucken der Berechnungssoftware sowie den Schattenwurf-Übersichtskarten zu entnehmen.

3.2 Meteorologisch wahrscheinlich Beschattungsdauer

Um die tatsächlich auftretenden Beschattungszeiten abzuschätzen, werden folgende statische Daten berücksichtigt:

- anhand der Windstatistik (DWD-Station Bad Lippspringe) und der Anlaufgeschwindigkeit werden die Betriebsstunden der WEA pro Monat abgeschätzt
- anhand der Windrichtungsverteilung (DWD-Station Bad Lippspringe) wird die Größe und Ausrichtung des Rotorschattens ermittelt
- die Sonnenscheinwahrscheinlichkeit (mittlere tägliche Sonnenscheindauer pro Monat) wurde der Sonnenschein-Datenbank Bad Lippspringe entnommen

Die berechnete meteorologisch wahrscheinliche Beschattungsdauer pro Jahr kann lediglich als grobe Abschätzung der tatsächlich auftretenden Beschattungsdauer (real case) dienen. Die meteorologischen Eingangsdaten sind mit erheblichen Unsicherheiten behaftet, da sowohl die Sonnenscheindauer als auch die Windrichtungsverteilung naturgemäß einer hohen Schwankungsbreite unterliegt.

Tabelle 5: Meteorologisch wahrscheinliche Beschattungsdauer für die Vor-, Zusatz- und Gesamtbelastung

IO	Abschätzung der jährlichen Beschattungsdauer (real case)		
	Vorbelastung	Zusatzbelastung	Gesamtbelastung
	Std./Jahr	Std./Jahr	Std./Jahr
IPN01	57:38	0:59	58:37
IPN02	53:51	0:54	54:45
IPN12	1:25	9:05	10:30
IPN23	0:00	9:13	9:13
IPN26	9:29	12:29	21:59
IPN27	48:52	8:26	56:53
IPN28	16:39	16:04	32:43
IPN31	4:25	4:28	8:53
IPN32	4:52	4:47	9:39
IPN33	4:07	5:12	9:20
IPN34	0:47	6:18	7:06

IPN35	5:03	4:51	9:55
IPN36	12:23	5:17	17:40
IPN37	1:00	6:43	7:44
IPN38	4:19	5:15	9:35
IPN42	13:29	3:57	17:27
IPN43	12:14	6:15	18:29
IPN44	7:58	7:35	15:33
IPN45	4:17	6:26	10:44
IPN46	1:13	12:49	14:03
IPN47	1:06	8:31	9:37

Die detaillierten Ergebnisse sind den beiliegenden Ausdrucken der Berechnungssoftware zu entnehmen.

4 Zusammenfassung

Für den Standort *Himmelreich* wurde für den verursachten Schattenwurf durch 15 geplante WEA eine Schattenimmissionsprognose durchgeführt.

Die Beurteilung der vorliegenden Berechnungsergebnisse erfolgt nach den Hinweisen zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (LAI)². Darin wird davon ausgegangen, dass pro Jahr max. 30 Std. bzw. pro Tag max. 30 Min. des Schattenwurfes zumutbar sind.

An den Immissionsorten IPN01, IPN02, IPN26, IPN27, IPN28, IPN36 und IPN42 bis IPN 44 werden die Richtwerte bereits durch die Vorbelastung überschritten. Dabei wurde eine mögliche Begrenzung der Beschattungszeiten der Vorbelastungs-WEA durch eine Abschaltautomatik nicht berücksichtigt. Jede weitere Belastung durch periodischen Schattenwurf durch die neu geplanten WEA an diesen Immissionsorten ist zu vermeiden.

An den Immissionsorten IPN23, IPN31 bis IPN35, sowie IPN 37, IPN38 und IPN45 bis IPN47 werden die Richtwerte durch die neu geplanten WEA überschritten.

Am Immissionsort IPN12 werden die Richtwerte eingehalten.

Zur Einhaltung der Richtwerte bzw. der Vermeidung zusätzlicher Belastung bei bereits überschrittenen Richtwerten wird empfohlen, den Betrieb der neu geplanten WEA HR01 – HR06, HR12, HR13 und HR14 sowie KB2 über ein geeignetes Abschaltmodul zu steuern.

Unter Berücksichtigung der Begrenzung der Beschattungszeiten von WEA HR01 – HR06, HR12, HR13 und HR13 sowie KB2 wird eine zusätzliche Überschreitung der Richtwerte an den Immissionsorten vermieden.

² Hinweise zur Ermittlung und Beurteilung der optischen von Windenergieanlagen Aktualisierung 2019 (WEA-Schattenwurf-Hinweise) Stand 23.01.2020

Tabelle 6: Berechnung der Beschattungszeiten unter Berücksichtigung der Steuerung der WEA HR01 – HR06, HR12, HR13 und HR14 sowie KB2 durch ein Abschaltmodul

IO	Astronomische max. mögliche Beschattungsdauer		
	[Std./Jahr]	[Std./Tag]	Vermiedene Std./Jahr
IPN01*	292:28	1:19	5:46
IPN02*	276:10	1:16	5:30
IPN12	7:38	0:22	36:12
IPN23	0:00	0:00	45:03
IPN26*	38:55	0:26	73:30
IPN27*	213:22	1:24	62:05
IPN28*	67:34	0:34	101:14
IPN31	18:18	0:21	25:12
IPN32	20:22	0:22	28:23
IPN33	16:57	0:20	30:33
IPN34	3:14	0:15	41:09
IPN35	23:25	0:21	34:01
IPN36*	53:35	0:37	36:34
IPN37	4:18	0:17	43:50
IPN38	19:32	0:21	35:56
IPN42*	59:37	0:41	28:07
IPN43*	51:15	0:34	42:38
IPN44*	32:52	0:24	44:23
IPN45	17:15	0:20	39:56
IPN46	4:43	0:16	69:30
IPN47	4:29	0:17	54:15

* An diesem Immissionsort werden die Richtwerte bereits durch die Vorbelastung überschritten. Eine weitere Überschreitung wird durch die Abschaltung verhindert

Bei der Bewertung der astronomisch maximal möglichen Beschattungsdauer ist zu beachten, dass sie jeweils eine worst-case Annahme darstellen und in der Realität wesentlich geringere Schattenwurfzeiten auftreten. Die berechneten Abschaltzeiten stellen lediglich den Zeitraum dar, in der die jeweilige WEA abgeschaltet wird, wenn die Bedingungen für Schattenwurf tatsächlich auftreten, d.h. durch eine entsprechend hohe Bestrahlungsstärke (mehr als 120 W/m²) Schattenwurf zu erwarten ist.

Die Immissionsorte wurden exemplarisch ausgewählt, sodass nicht jeder potenzielle Immissionsort im Abschaltkalender dargestellt ist. Die Immissionsorte wurden so gewählt, dass in allen Richtungen des auftretenden Schattenwurfs die jeweils am stärksten beschatteten sensiblen Orte betrachtet werden. Die Einhaltung der maximal zulässigen Beschattungsdauer am jeweiligen Immissionsort wird durch die Programmierung einer an der WEA installierten Abschaltautomatik gewährleistet. Im Zuge der Programmierung dieses Abschaltmoduls müssen die Koordinaten der Immissionsorte mittels präziser Lagebestimmung erfasst und in der Software hinterlegt werden. Dabei sind auch besondere örtlichen Gegebenheiten wie Dachfenster oder Terrassen zu berücksichtigen. Alle Änderungen an Koordinaten, Typ sowie Nabenhöhe oder Abmessungen und Lage der Rezeptoren führen zu abweichenden Ergebnissen.

5 Qualität der Prognose

Das Berechnungsverfahren nach den „Hinweisen zur Ermittlung und Beurteilung der optischen Immissionen von Windkraftanlagen“ des Länderausschuss für Immissionsschutz, LAI 2019 legt der Schattenwurfprognose günstige Mitwindsituationen zu Grunde. Es gilt die Annahme einer minimal relevanten Sonnenhöhe von 3° , sodass der Schattenwurf für Sonnenstände unter 3° Erhöhung über Horizont nicht in die Berechnung eingeht. Nicht berücksichtigt werden Lufttrübung, Sonnenausdehnung und Flügelform. Die Berechnungen der Schattenprognose beinhaltet nach sachverständiger Erfahrung ausreichend Sicherheit.

6 Theoretische Grundlagen

Der Sonnenstand bildet die Grundlage für die Berechnung des Schattenwurfs. Der Stand der Sonne ist im Wesentlichen von der Erdrotation, der Neigung der Erdachse und der elliptischen Laufbahn der Erde um die Sonne abhängig. Weiterhin müssen für jeden beliebigen Standort die geographischen, jahreszeitlichen und tageszeitlichen Daten berücksichtigt werden.

Im Allgemeinen wird beim Schattenwurf zwischen Kern- und Halbschatten unterschieden. Der Kernbereich eines Schattens entspricht dem Bereich, in dem die direkten Sonnenstrahlen durch ein Hindernis vollständig verdeckt werden. Der Halbschatten ist der Bereich, auf den nur ein Teil des Sonnenlichts auftritt. Da Windenergieanlagen schmale Rotorblätter besitzen, ist der Kernschatten nur sehr kurz und wird in den Berechnungen nicht berücksichtigt.

Der Verlauf des periodischen Schattenwurfs (Abbildung 7) wird über den Sonnenstand, den Standort bzw. die Standorte der WEA und die Lage der maßgeblichen Immissionspunkte ermittelt. Dazu sind die Koordinaten der WEA und Immissionspunkten sowie die Ausmaße der WEA (Nabenhöhe und Rotordurchmesser) notwendig.

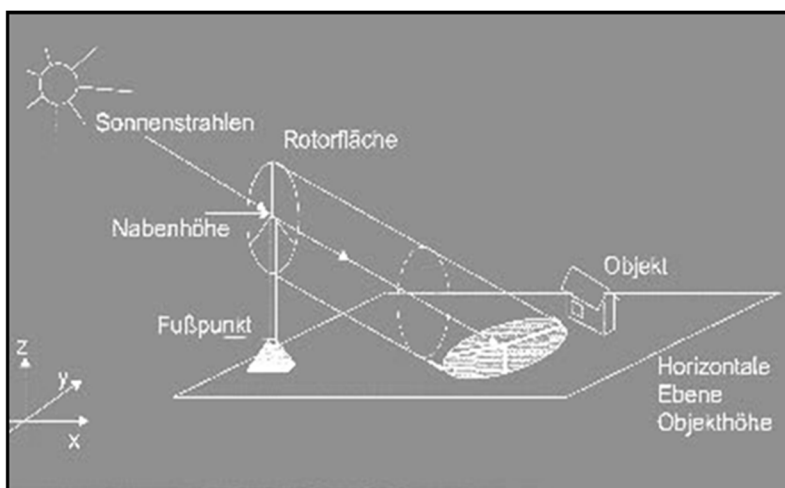


Abbildung 7: Schattenwurf des Rotors

Zur Ermittlung des Schattenwurfs an einem Immissionsort wird dort ein virtueller Schattenrezeptor mit den Ausmaßen der zu untersuchenden Fläche platziert. Bei der Simulation des Sonnenstandes über ein Jahr registriert der virtuelle Rezeptor den Schattenwurf in diesem Zeitraum. Die Simulation des Verlaufs der Sonne wird mit der Software WindPRO (Modul SHADOW) mit einer zeitlichen Auflösung von zwei Minuten von Sonnenaufgang bis Sonnenuntergang über das ganze Jahr durchgeführt. Unter Berücksichtigung einer minimalen Sonnenhöhe, der Koordinaten, der Lage und Größe des Rezeptors sowie der WEA-Daten wird so über die Simulation ermittelt, ob am Rezeptor ein Schattenwurf durch eine oder mehrere Windenergieanlagen auftritt. Tritt ein Schlagschatten auf, werden für diesen das Datum, der Beginn, das Ende und die Dauer sowie die verursachende WEA des Schattens angegeben. Daraus werden wiederum über ein ganzes Jahr die Anzahl der Schattentage und die gesamte Schattenwurfdauer berechnet.

Anhang

- Schattenwurfkarten der astronomisch maximal möglichen Beschattungsdauer (2 Seiten)
- Ausdrücke der Berechnungssoftware (71 Seiten)

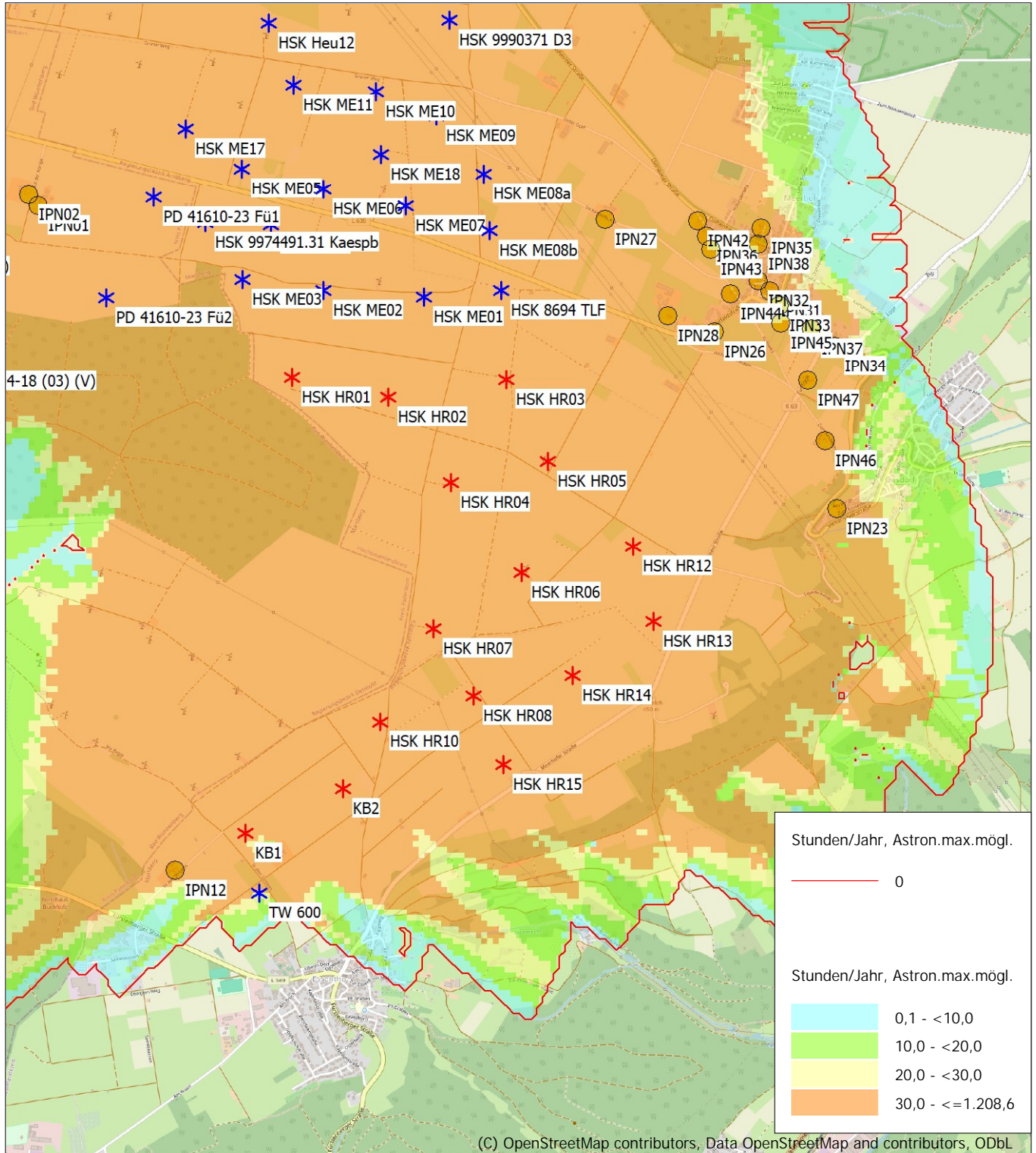
Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
18.02.2025 10:30/4.1.254

SHADOW - Karte

Berechnung: 2024PAV01486 Gesamtbelastung Schattenkarte



Karte: EMD OpenStreetMap , Maßstab 1:30.000, Mitte: UTM (north)-ETRS89 Zone: 32 Ost: 489.299 Nord: 5.705.466
* Existierende WEA Schattenrezeptor
Höhe der Schattenkarte: Höhenlinien: CONTOURLINE_ONLINEDATA_2.wpo (1)
Zeitschritt: 4 Minuten, Schrittweite: 14 Tag(e), Kartenauflösung: 30 m, Sichtbarkeit Auflösung: 15 m, Augenhöhe: 1,5 m

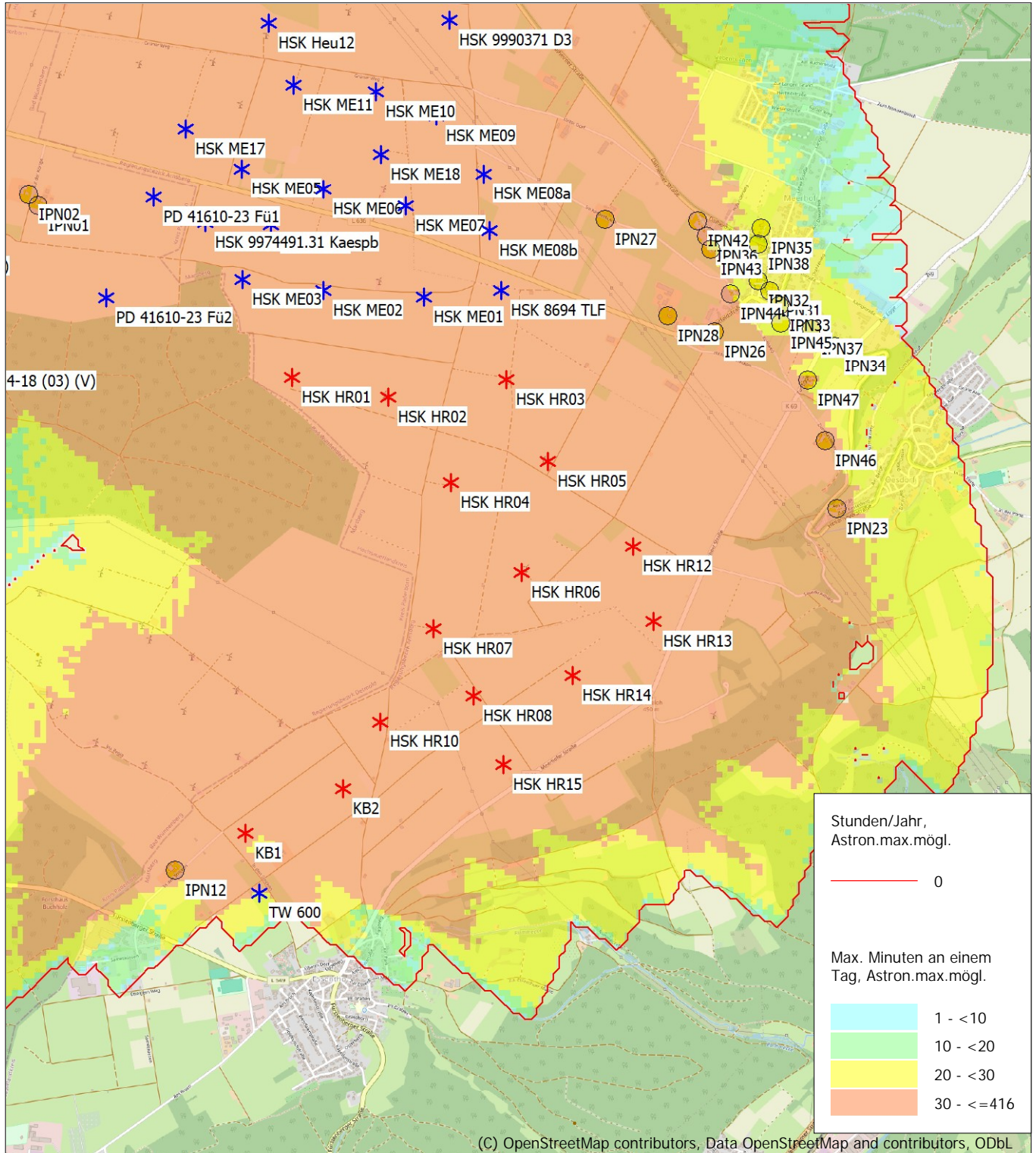
Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
18.02.2025 10:30/4.1.254

SHADOW - Karte

Berechnung: 2024PAV01486 Gesamtbelastung Schattenkarte



Karte: EMD OpenStreetMap , Maßstab 1:30.000, Mitte: UTM (north)-ETRS89 Zone: 32 Ost: 489.299 Nord: 5.705.466
* Existierende WEA Schattenrezeptor
Höhe der Schattenkarte: Höhenlinien: CONTOURLINE_ONLINEDATA_2.wpo (1)
Zeitschritt: 4 Minuten, Schrittweite: 14 Tag(e), Kartenauflösung: 30 m, Sichtbarkeit Auflösung: 15 m, Augenhöhe: 1,5 m

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 WEA ohne Einwirkung
Annahmen für Schattenwurfberechnung

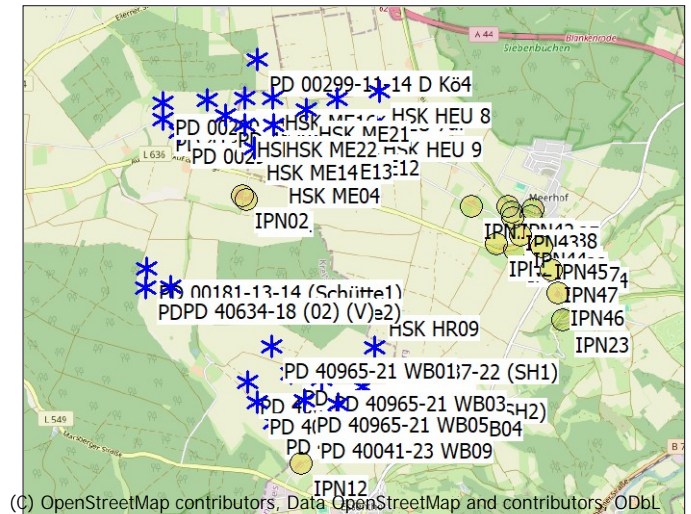
Beschattungsbereich der WEA
Schatten nur relevant, wo Rotorblatt mind. 20% der Sonne verdeckt
Siehe WEA-Tabelle

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

Die dargestellten Zeiten sind die astronomisch maximal mögliche
Beschattungsdauer, berechnet unter folgenden Annahmen:
Die Sonne scheint täglich von Sonnenauf- bis -untergang
Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
Die Windenergieanlage/n ist/sind immer in Betrieb

Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der
Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf
den folgenden Annahmen:
DHM: Höhenlinien: CONTOURLINE_ONLINEDATA_2.wpo (1)
Rasterauflösung: 1,0 m

Alle Koordinatenangaben in:
UTM (north)-ETRS89 Zone: 32



* Existierende WEA

Maßstab 1:100.000
Schattenrezeptor

WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ			Nennleistung	Rotor-durchmesser	NH	Schattendaten	
					Aktuell	Hersteller	Typ				Beschatt.-Bereich	U/min
			[m]					[kW]	[m]	[m]	[m]	[U/min]
HSK 9140533.39 34 Eul	486.760	5.708.784	351,1	ENERCON E-...	Ja	ENERCON	E-82-2.000	2.000	82,0	98,3	1.550	19,5
HSK HEU 7	487.986	5.708.752	363,0	N-149 (07)	Ja	NORDEX	N149/4.0-4.5-4.500	4.500	149,0	164,0	1.805	10,7
HSK HEU 8	488.551	5.708.863	370,0	N-149 (08)	Ja	NORDEX	N149/4.0-4.5-4.500	4.500	149,0	164,0	1.805	10,7
HSK HEU 9	488.429	5.708.414	366,4	N-149 (09)	Ja	NORDEX	N149/4.0-4.5-4.500	4.500	149,0	164,0	1.805	10,7
HSK HR09	488.496	5.706.061	420,0	ENERCON E-...	Nein	ENERCON	E-92 2,3 MW-2.350	2.350	92,0	138,4	1.513	17,0
HSK ME04	487.180	5.707.808	371,0	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME12	487.700	5.708.176	366,6	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME13	487.343	5.708.129	367,8	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME14	486.891	5.708.115	365,0	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME15	486.757	5.708.431	360,0	E-92-1600	Ja	ENERCON	E-92 2,3 MW-2.350	2.350	92,0	138,4	1.513	16,0
HSK ME16	487.133	5.708.778	350,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME21	487.570	5.708.630	360,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME22	487.145	5.708.417	360,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
PD 00181-13-14 (Schütte1)	485.460	5.706.529	383,1	Enercon E 82...	Ja	ENERCON	E-82-2.350	2.350	82,0	138,4	1.547	19,5
PD 00181-13-14 (Schütte2)	485.439	5.706.277	388,2	Enercon E 82...	Ja	ENERCON	E-82-2.350	2.350	82,0	138,4	1.547	19,5
PD 00299-11-14 A K01	485.678	5.708.715	340,1	ENERCON E-...	Ja	ENERCON	E-82-2.350	2.350	82,0	138,4	1.547	19,5
PD 00299-11-14 B K02	486.259	5.708.748	350,0	ENERCON E-...	Ja	ENERCON	E-82-2.350	2.350	82,0	138,4	1.547	19,5
PD 00299-11-14 C K03	485.887	5.708.332	351,4	ENERCON E-...	Ja	ENERCON	E-82-2.350	2.350	82,0	138,4	1.547	19,5
PD 00299-11-14 D K04	486.930	5.709.284	350,0	ENERCON E-...	Ja	ENERCON	E-82 E2-2.300	2.300	82,0	138,4	1.599	18,0
PD 40041-23 WB06	486.781	5.705.033	404,0	ENERCON E-12...	Nein	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	12,4
PD 40041-23 WB08	487.131	5.704.490	420,0	Enercon E-13...	Ja	ENERCON	E-138 EP3 E3-4.260	4.260	138,3	160,0	1.686	11,1
PD 40041-23 WB09	487.597	5.704.446	430,7	Enercon E-16...	Nein	ENERCON	E-160 EP5 E3-5.560	5.560	160,0	166,6	1.781	9,6
PD 40634-18 (02) (V)	485.773	5.706.289	374,1	Nordex N117...	Ja	NORDEX	N117/3600-3.600	3.600	116,8	141,0	1.486	12,6
PD 40637-22 (SH1)	488.473	5.705.480	424,6	Enercon E-11...	Nein	ENERCON	E-115 EP3 E3-4.200	4.200	115,7	149,0	1.618	12,9
PD 40637-22 (SH2)	488.324	5.704.959	420,0	Enercon E-11...	Nein	ENERCON	E-115 EP3 E3-4.200	4.200	115,7	149,0	1.618	12,9
PD 40965-21 WB01	487.106	5.705.501	407,7	Enercon E-13...	Nein	ENERCON	E-138 EP3 E2-4.200	4.200	138,3	160,0	1.679	11,1
PD 40965-21 WB03	487.781	5.705.060	412,9	Enercon E-13...	Nein	ENERCON	E-138 EP3 E2-4.200	4.200	138,3	160,0	1.679	11,1
PD 40965-21 WB05	487.540	5.704.786	417,8	Enercon E-13...	Nein	ENERCON	E-138 EP3 E2-4.200	4.200	138,3	160,0	1.679	11,1
PD 40965-21 WB07	486.919	5.704.759	400,0	Enercon E-13...	Nein	ENERCON	E-138 EP3 E2-4.200	4.200	138,3	130,1	1.681	11,1
PD 40966-21 WB02	487.360	5.705.150	410,0	Enercon E-13...	Nein	ENERCON	E-138 EP3 E2-4.200	4.200	138,3	130,1	1.681	11,1
PD 40967-21 WB04	487.992	5.704.732	430,0	Enercon E-16...	Nein	ENERCON	E-160 EP5 E2-5.500	5.500	160,0	166,6	1.781	9,4
PD 41383-16 K05	485.682	5.708.501	343,9	Enercon E-82...	Ja	ENERCON	E-82-2.350	2.350	82,0	138,4	1.547	19,5
PD 41383-16 K06	486.498	5.708.544	357,4	Enercon E-115	Nein	ENERCON	E-115-3.000	3.000	115,7	149,0	2.066	12,4

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 WEA ohne Einwirkung
Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr. [m]
				[m]	[m]	[m]	[m]	[°]		
IPN01	Bad Wünnenberg, Auf der Körtge 6	486.786	5.707.423	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN02	Bad Wünnenberg, Auf der Körtge 4	486.736	5.707.479	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN12	Essentho, In den Stricken 30	487.495	5.703.938	431,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN23	Oesdorf, Zum Kesselberg 15	490.974	5.705.828	359,2	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN26	Meerhof, Sintfeldstraße 28	490.333	5.706.752	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN27	Meerhof, Im Kesperbusch 1	489.760	5.707.341	390,6	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN28	Meerhof, Sintfeldstraße 33	490.088	5.706.836	407,5	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN31	Meerhof, Taubenweg 2	490.620	5.706.966	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN32	Meerhof, Laurentiusstraße 10	490.561	5.707.019	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN33	Meerhof, Dalheimer Straße 1	490.672	5.706.887	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN34	Meerhof, Zur Egge 29	490.960	5.706.676	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN35	Meerhof, Elsterweg 2	490.578	5.707.293	411,5	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN36	Meerhof, Drosselgasse 18	490.290	5.707.254	401,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN37	Meerhof, Zur Egge 19	490.839	5.706.768	415,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN38	Meerhof, Dalheimer Straße 20	490.561	5.707.211	411,5	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN42	Meerhof, Drosselgasse 24	490.244	5.707.335	400,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN43	Meerhof, Drosselgasse 14	490.312	5.707.184	402,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN44	Meerhof, Drosselgasse 2	490.417	5.706.950	405,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN45	Meerhof, Zur Egge 3	490.681	5.706.800	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN46	Oesdorf, Zum Kesselberg 20	490.912	5.706.180	411,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN47	Meerhof, Zur Egge 25	490.820	5.706.494	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer		
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag
		[h/a]	[d/a]	[h/d]
IPN01	Bad Wünnenberg, Auf der Körtge 6	0:00	0	0:00
IPN02	Bad Wünnenberg, Auf der Körtge 4	0:00	0	0:00
IPN12	Essentho, In den Stricken 30	0:00	0	0:00
IPN23	Oesdorf, Zum Kesselberg 15	0:00	0	0:00
IPN26	Meerhof, Sintfeldstraße 28	0:00	0	0:00
IPN27	Meerhof, Im Kesperbusch 1	0:00	0	0:00
IPN28	Meerhof, Sintfeldstraße 33	0:00	0	0:00
IPN31	Meerhof, Taubenweg 2	0:00	0	0:00
IPN32	Meerhof, Laurentiusstraße 10	0:00	0	0:00
IPN33	Meerhof, Dalheimer Straße 1	0:00	0	0:00
IPN34	Meerhof, Zur Egge 29	0:00	0	0:00
IPN35	Meerhof, Elsterweg 2	0:00	0	0:00
IPN36	Meerhof, Drosselgasse 18	0:00	0	0:00
IPN37	Meerhof, Zur Egge 19	0:00	0	0:00
IPN38	Meerhof, Dalheimer Straße 20	0:00	0	0:00
IPN42	Meerhof, Drosselgasse 24	0:00	0	0:00
IPN43	Meerhof, Drosselgasse 14	0:00	0	0:00
IPN44	Meerhof, Drosselgasse 2	0:00	0	0:00
IPN45	Meerhof, Zur Egge 3	0:00	0	0:00
IPN46	Oesdorf, Zum Kesselberg 20	0:00	0	0:00
IPN47	Meerhof, Zur Egge 25	0:00	0	0:00

Gesamtdauer Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [h/a]
HSK 9140533.39 34	Eul ENERCON E-82 2000 82.0 !-! NH: 98,3 m (Ges:139,3 m) (21)	0:00
	HSK HEU 7 N-149 (07)	0:00
	HSK HEU 8 N-149 (08)	0:00
	HSK HEU 9 N-149 (09)	0:00
	HSK HR09 ENERCON E-92 2,3 MW 2350 92.0 !-! NH: 138,4 m (Ges:184,4 m) (175)	0:00
	HSK ME04 E-126 EP3	0:00
	HSK ME12 E-138 EP3	0:00
	HSK ME13 E-138 EP3	0:00
	HSK ME14 E-126 EP3	0:00
	HSK ME15 E-92-1600	0:00

(Fortsetzung nächste Seite)...

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 WEA ohne Einwirkung

...(Fortsetzung von vorheriger Seite)

Nr.	Name	Maximal [h/a]
	HSK ME16 E-138 EP3	0:00
	HSK ME21 E-138 EP3	0:00
	HSK ME22 E-138 EP3	0:00
PD 00181-13-14 (Schütte1)	Enercon E 82 E2	0:00
PD 00181-13-14 (Schütte2)	Enercon E 82 E2	0:00
PD 00299-11-14 A Kö1	ENERCON E-82 E2	0:00
PD 00299-11-14 B Kö2	ENERCON E-82 E2	0:00
PD 00299-11-14 C Kö3	ENERCON E-82 E2	0:00
PD 00299-11-14 D Kö4	ENERCON E-82 E2	0:00
PD 40041-23 WB06	Enercon E-126 EP3	0:00
PD 40041-23 WB08	Enercon E-138 EP3 E3	0:00
PD 40041-23 WB09	Enercon E-160 EP5 E3	0:00
PD 40634-18 (02) (V)	Nordex N117/3600	0:00
PD 40637-22 (SH1)	Enercon E-115 EP3 E3	0:00
PD 40637-22 (SH2)	Enercon E-115 EP3 E3	0:00
PD 40965-21 WB01	Enercon E-138 EP3 E2	0:00
PD 40965-21 WB03	Enercon E-138 EP3 E2	0:00
PD 40965-21 WB05	Enercon E-138 EP3 E2	0:00
PD 40965-21 WB07	Enercon E-138 EP3 E2	0:00
PD 40966-21 WB02	Enercon E-138 EP3 E2	0:00
PD 40967-21 WB04	Enercon E-160 EP5 E2	0:00
PD 41383-16 Kö5	Enercon E-82 E2	0:00
PD 41383-16 Kö6	Enercon E-115	0:00

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
25.02.2025 08:54/4.1.264

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Vorbelastung
Annahmen für Schattenwurfberechnung

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

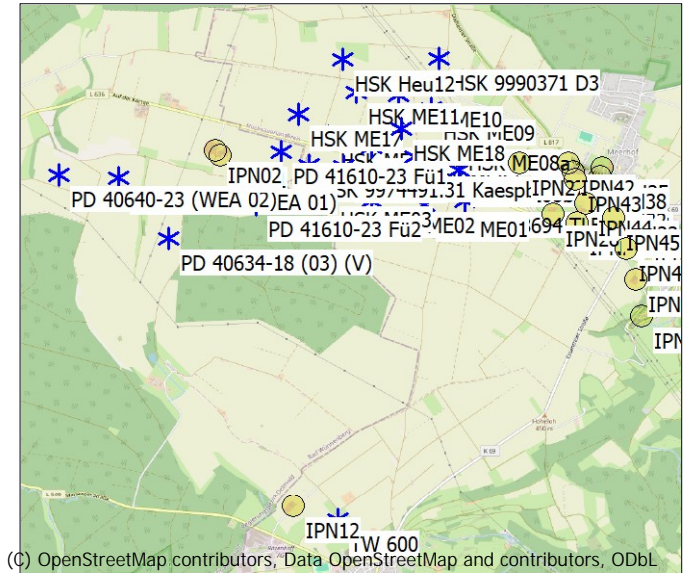
Minimale relevante Sonnenhöhe über Horizont 3 °
Tage zwischen Berechnungen 1 Tag(e)
Berechnungszeitsprung 1 Minuten

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

Monatliche Aggregation der met. wahrsch. Reduzierung
Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf den folgenden Annahmen:
DHM: Höhenlinien: CONTOURLINE_ONLINEDATA_2.wpo (1)
Rasterauflösung: 1,0 m

Alle Koordinatenangaben in:
UTM (north)-ETRS89 Zone: 32



Maßstab 1:75.000
* Existierende WEA * Schattenrezeptor

WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ	Hersteller	Typ	Nennleistung	Rotor-durchmesser	NH	Schattendaten	
											Beschatt.-Bereich	U/min
			[m]		Aktuell			[kW]	[m]	[m]	[m]	[U/min]
HSK 8694 TLF	489.214	5.706.973	398,7	ENERCON E-126 EP4 TES-4.200	Ja	ENERCON	E-126 EP4 TES-4.200	4.200	127,0	135,0	2.108	11,6
HSK 9974491.31 Kaespb	487.658	5.707.330	380,0	ENERCON E-126 EP3	Nein	ENERCON	E-66/18.70-1.800	1.800	70,0	98,0	1.486	22,0
HSK 9990371 D3	488.945	5.708.387	376,6	ENERCON E-126 EP3	Nein	ENERCON	E-115-3.000	3.000	115,7	135,4	2.067	12,4
HSK Heu12	487.995	5.708.375	360,0	NORDEX N149/5.7-5.700	Ja	NORDEX	N149/5.7-5.700	5.700	149,0	164,0	1.805	10,7
HSK ME01	488.806	5.706.938	398,8	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME02	488.279	5.706.974	390,0	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME03	487.856	5.707.032	387,8	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME05	487.852	5.707.613	378,5	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME06	488.281	5.707.505	380,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME07	488.710	5.707.414	385,2	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME08a	489.122	5.707.583	384,6	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME08b	489.152	5.707.285	390,0	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME09	488.875	5.707.885	376,7	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME10	488.556	5.708.014	370,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME11	488.126	5.708.050	369,7	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME17	487.559	5.707.825	373,7	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME18	488.584	5.707.684	378,2	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME20	488.004	5.707.318	380,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
PD 40634-18 (03) (V)	486.272	5.706.606	383,7	Nordex N149/5.7-5.700	Ja	NORDEX	N149/4.0-4.5-4.500	4.500	149,0	164,0	1.805	10,7
PD 40639-23 (WEA 01)	485.763	5.707.208	363,1	Nordex N149/5.7-5.700	Ja	NORDEX	N149/5.7-5.700	5.700	149,0	164,0	1.805	10,7
PD 40640-23 (WEA 02)	485.172	5.707.245	360,0	Nordex N163/6.X-7.000	Ja	NORDEX	N163/6.X-7.000	7.000	163,0	164,0	1.784	10,7
PD 41610-23 Fü1	487.387	5.707.465	375,5	Enercon E138/5.7-5.700	Ja	ENERCON	E-138 EP3 E3-4.260	4.260	138,3	160,0	1.686	11,1
PD 41610-23 Fü2	487.141	5.706.941	380,0	Enercon E-160 EP5 E3-5.560	Nein	ENERCON	E-160 EP5 E3-5.560	5.560	160,0	166,6	1.781	9,6
TW 600	487.937	5.703.817	441,8	TW 600	Nein	TACKE	TW 600-600/200	600	43,0	50,0	918	27,0

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI)	
										ü.Gr.	ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]	[m]
IPN01	Bad Wünnenberg, Auf der Körtege 6	486.786	5.707.423	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"		2,1
IPN02	Bad Wünnenberg, Auf der Körtege 4	486.736	5.707.479	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"		2,1
IPN12	Essentho, In den Stricken 30	487.495	5.703.938	430,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"		2,1
IPN23	Oesdorf, Zum Kesselberg 15	490.974	5.705.828	359,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"		2,1
IPN26	Meerhof, Sintfeldstraße 28	490.333	5.706.752	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"		2,1
IPN27	Meerhof, Im Kesperbusch 1	489.760	5.707.341	391,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"		2,1

(Fortsetzung nächste Seite)...

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
25.02.2025 08:54/4.1.264

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Vorbelastung

...(Fortsetzung von vorheriger Seite)

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI)
				[m]	[m]	[m]	[m]	[°]		[m]
IPN28	Meerhof, Sintfeldstraße 33	490.088	5.706.836	406,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN31	Meerhof, Taubenweg 2	490.620	5.706.966	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN32	Meerhof, Laurentiusstraße 10	490.561	5.707.019	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN33	Meerhof, Dalheimer Straße 1	490.672	5.706.887	409,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN34	Meerhof, Zur Egge 29	490.960	5.706.676	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN35	Meerhof, Elsterweg 2	490.578	5.707.293	411,5	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN36	Meerhof, Drosselgasse 18	490.290	5.707.254	402,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN37	Meerhof, Zur Egge 19	490.839	5.706.768	415,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN38	Meerhof, Dalheimer Straße 20	490.561	5.707.211	411,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN42	Meerhof, Drosselgasse 24	490.244	5.707.335	400,9	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN43	Meerhof, Drosselgasse 14	490.312	5.707.184	402,2	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN44	Meerhof, Drosselgasse 2	490.417	5.706.950	401,8	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN45	Meerhof, Zur Egge 3	490.681	5.706.800	410,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN46	Oesdorf, Zum Kesselberg 20	490.912	5.706.180	411,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN47	Meerhof, Zur Egge 25	490.820	5.706.494	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1

Berechnungsergebnisse

Schattenrezeptor

		astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer	
Nr.	Name	Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr	
		[h/a]	[d/a]	[h/d]	[h/a]	
IPN01	Bad Wünnenberg, Auf der Körtge 6	292:28	365	1:19	57:38	
IPN02	Bad Wünnenberg, Auf der Körtge 4	276:10	365	1:16	53:51	
IPN12	Essentho, In den Stricken 30	7:38	28	0:22	1:25	
IPN23	Oesdorf, Zum Kesselberg 15	0:00	0	0:00	0:00	
IPN26	Meerhof, Sintfeldstraße 28	38:55	146	0:26	9:29	
IPN27	Meerhof, Im Kesperbusch 1	213:22	258	1:24	48:52	
IPN28	Meerhof, Sintfeldstraße 33	67:34	164	0:34	16:39	
IPN31	Meerhof, Taubenweg 2	18:18	84	0:21	4:25	
IPN32	Meerhof, Laurentiusstraße 10	20:22	87	0:22	4:52	
IPN33	Meerhof, Dalheimer Straße 1	16:57	82	0:20	4:07	
IPN34	Meerhof, Zur Egge 29	3:14	19	0:15	0:47	
IPN35	Meerhof, Elsterweg 2	23:25	121	0:21	5:03	
IPN36	Meerhof, Drosselgasse 18	53:35	148	0:37	12:23	
IPN37	Meerhof, Zur Egge 19	4:18	24	0:17	1:00	
IPN38	Meerhof, Dalheimer Straße 20	19:32	100	0:21	4:19	
IPN42	Meerhof, Drosselgasse 24	59:37	153	0:41	13:29	
IPN43	Meerhof, Drosselgasse 14	51:15	148	0:34	12:14	
IPN44	Meerhof, Drosselgasse 2	32:52	120	0:24	7:58	
IPN45	Meerhof, Zur Egge 3	17:15	85	0:20	4:17	
IPN46	Oesdorf, Zum Kesselberg 20	4:43	29	0:16	1:13	
IPN47	Meerhof, Zur Egge 25	4:29	25	0:17	1:06	

Gesamtdauer Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [h/a]	Erwartet [h/a]
HSK 8694	TLF ENERCON E-126 EP4 TES 4200 127.0 !O! NH: 135,0 m (Ges:198,5 m) (53)	119:15	25:58
HSK 9974491.31	Kaespb ENERCON E-66/18.70 1800 70.0 !O! NH: 98,0 m (Ges:133,0 m) (104)	9:27	1:53
HSK 9990371 D3	ENERCON E-115 3000 115.7 !O! NH: 135,4 m (Ges:193,3 m) (16)	5:20	1:07
HSK Heu12	NORDEX N149/5.7 5700 149.0 !O! NH: 164,0 m (Ges:238,5 m) (349)	2:25	0:32
HSK ME01	E-126 EP3	44:13	9:15
HSK ME02	E-126 EP3	13:49	2:35
HSK ME03	E-126 EP3	14:17	2:39
HSK ME05	E-138 EP3	25:10	6:34
HSK ME06	E-138 EP3	19:27	4:33
HSK ME07	E-138 EP3	37:16	9:12
HSK ME08a	E-126 EP3	109:16	26:49
HSK ME08b	E-126 EP3	116:26	27:32
HSK ME09	E-138 EP3	40:27	9:45
HSK ME10	E-138 EP3	25:14	5:51
HSK ME11	E-138 EP3	24:41	6:44
HSK ME17	E-138 EP3	56:37	14:19

(Fortsetzung nächste Seite)...

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
25.02.2025 08:54/4.1.264

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Vorbelastung

...(Fortsetzung von vorheriger Seite)

Nr.	Name	Maximal [h/a]	Erwartet [h/a]
	HSK ME18 E-138 EP3	15:08	3:53
	HSK ME20 E-138 EP3	15:18	3:08
	PD 40634-18 (03) (V) Nordex N149/4.5	57:04	6:29
	PD 40639-23 (WEA 01) Nordex N149/5.X	27:44	5:29
	PD 40640-23 (WEA 02) Nordex N163/6.X	12:23	2:31
	PD 41610-23 Fü1 Enercon E138 EP3 E3	75:57	19:54
	PD 41610-23 Fü2 Enercon E-160 EP5 E5	88:51	12:30
	TW 600 TW 600	7:38	1:25

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

Die Berechnung der Gesamtsumme für einen Rezeptor arbeitet mit einer gemittelten Richtungskorrektur für alle WEA, die an einem gegebenen Tag zur Beschattung beitragen. Wenn der Schattenwurf durch mehrere WEA an einem Tag nicht gleichzeitig stattfindet, kann die so ermittelte Summe geringfügig von der Summe der Beschattungszeiten abweichen, die für die individuellen WEA berechnet werden.

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
19.02.2025 08:06/4.1.254

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Zusatzbelastung
Annahmen für Schattenwurfberechnung

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) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Monatliche Aggregation der met. wahrsch. Reduzierung

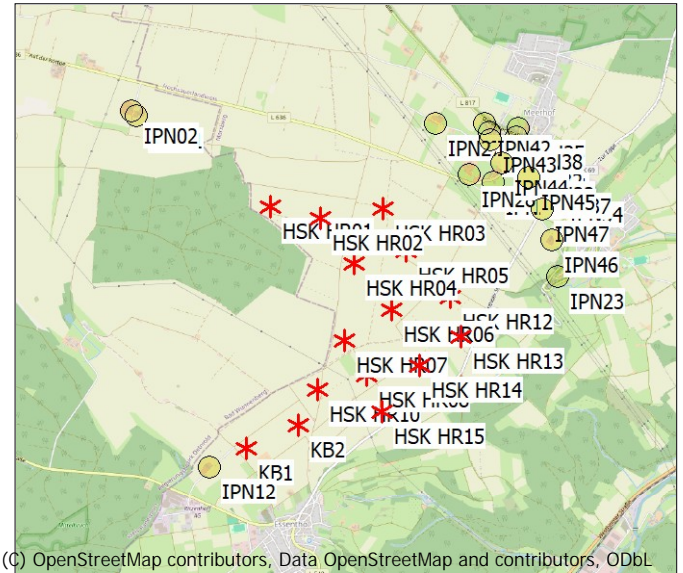
Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf den folgenden Annahmen:

DHM: Höhenlinien: CONTOURLINE_ONLINEDATA_2.wpo (1)

Rasterauflösung: 1,0 m

Alle Koordinatenangaben in:

UTM (north)-ETRS89 Zone: 32



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Maßstab 1:75.000

* Existierende WEA

● Schattenrezeptor

WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ	Ak-tuell	Hersteller	Typ	Nenn-leistung	Rotor-durch-messer	NH	Schattendaten	Beschatt.-Bereich	U/min
			[m]						[kW]	[m]	[m]	[m]	[m]	[U/min]
HSK HR01	488.113	5.706.517	400,0	ENERCON E-115 30...	Nein		ENERCON	E-115-3.000	3.000	115,7	149,0	2.066		12,4
HSK HR02	488.618	5.706.413	410,0	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR03	489.237	5.706.505	404,9	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR04	488.944	5.705.964	423,3	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR05	489.456	5.706.076	418,4	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR06	489.315	5.705.493	430,0	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR07	488.851	5.705.198	426,9	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR08	489.063	5.704.850	425,3	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR10	488.571	5.704.712	422,4	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR12	489.901	5.705.630	424,1	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR13	490.007	5.705.235	437,6	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR14	489.581	5.704.952	440,2	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	166,6	1.781		9,6
HSK HR15	489.218	5.704.487	443,5	ENERCON E-138 EP...	Ja		ENERCON	E-138 EP3 E3-4.260	4.260	138,3	160,0	1.686		11,1
KB1	487.863	5.704.130	444,9	ENERCON E-160 EP...	Ja		ENERCON	E-160 EP5 E3 R1-5.560	5.560	160,0	160,0	1.781		9,6
KB2	488.376	5.704.361	433,0	ENERCON E-138 EP...	Ja		ENERCON	E-138 EP3 E3-4.260	4.260	138,3	160,0	1.686		11,1

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
IPN01	Bad Wünnenberg, Auf der Körtge 6	486.786	5.707.423	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN02	Bad Wünnenberg, Auf der Körtge 4	486.736	5.707.479	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN12	Essentho, In den Stricken 30	487.495	5.703.938	430,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN23	Oesdorf, Zum Kesselberg 15	490.974	5.705.828	359,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN26	Meerhof, Sintfeldstraße 28	490.333	5.706.752	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN27	Meerhof, Im Kesperbusch 1	489.760	5.707.341	391,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN28	Meerhof, Sintfeldstraße 33	490.088	5.706.836	406,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN31	Meerhof, Taubenweg 2	490.620	5.706.966	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN32	Meerhof, Laurentiusstraße 10	490.561	5.707.019	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN33	Meerhof, Dalheimer Straße 1	490.672	5.706.887	409,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN34	Meerhof, Zur Egge 29	490.960	5.706.676	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN35	Meerhof, Elsterweg 2	490.578	5.707.293	411,5	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN36	Meerhof, Drosselgasse 18	490.290	5.707.254	402,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN37	Meerhof, Zur Egge 19	490.839	5.706.768	415,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1

(Fortsetzung nächste Seite)...

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnert / ulner@pavana-wind.com
Berechnet:
19.02.2025 08:06/4.1.254

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Zusatzbelastung

...(Fortsetzung von vorheriger Seite)

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
IPN38	Meerhof, Dalheimer Straße 20	490.561	5.707.211	411,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN42	Meerhof, Drosselgasse 24	490.244	5.707.335	400,9	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN43	Meerhof, Drosselgasse 14	490.312	5.707.184	402,2	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN44	Meerhof, Drosselgasse 2	490.417	5.706.950	401,8	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN45	Meerhof, Zur Egge 3	490.681	5.706.800	410,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN46	Oesdorf, Zum Kesselberg 20	490.912	5.706.180	411,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN47	Meerhof, Zur Egge 25	490.820	5.706.494	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1

Berechnungsergebnisse

Schattenrezeptor

		astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
Nr.	Name	Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
IPN01	Bad Wünnenberg, Auf der Körtge 6	5:46	26	0:17	0:59
IPN02	Bad Wünnenberg, Auf der Körtge 4	5:30	26	0:17	0:54
IPN12	Essentho, In den Stricken 30	36:12	71	0:35	9:05
IPN23	Oesdorf, Zum Kesselberg 15	45:03	111	0:33	9:13
IPN26	Meerhof, Sintfeldstraße 28	73:30	154	0:55	12:29
IPN27	Meerhof, Im Kesperbusch 1	64:19	124	0:47	8:26
IPN28	Meerhof, Sintfeldstraße 33	101:14	161	1:04	16:04
IPN31	Meerhof, Taubenweg 2	25:12	75	0:26	4:28
IPN32	Meerhof, Laurentiusstraße 10	28:23	84	0:27	4:47
IPN33	Meerhof, Dalheimer Straße 1	30:33	101	0:26	5:12
IPN34	Meerhof, Zur Egge 29	41:09	138	0:26	6:18
IPN35	Meerhof, Elsterweg 2	34:01	102	0:24	4:51
IPN36	Meerhof, Drosselgasse 18	36:34	97	0:30	5:17
IPN37	Meerhof, Zur Egge 19	43:50	127	0:27	6:43
IPN38	Meerhof, Dalheimer Straße 20	35:56	109	0:25	5:15
IPN42	Meerhof, Drosselgasse 24	28:07	83	0:29	3:57
IPN43	Meerhof, Drosselgasse 14	42:38	104	0:30	6:15
IPN44	Meerhof, Drosselgasse 2	44:23	103	0:46	7:35
IPN45	Meerhof, Zur Egge 3	39:56	116	0:27	6:26
IPN46	Oesdorf, Zum Kesselberg 20	69:30	174	0:50	12:49
IPN47	Meerhof, Zur Egge 25	54:15	159	0:31	8:31

Gesamtdauer Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal	Erwartet
		[h/a]	[h/a]
HSK HR01	ENERCON E-115 3000 115.7 !O! NH: 149,0 m (Ges:206,9 m) (358)	13:23	2:28
HSK HR02	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (359)	31:23	5:32
HSK HR03	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (357)	173:56	30:36
HSK HR04	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (356)	33:13	5:50
HSK HR05	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (355)	174:13	27:06
HSK HR06	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (353)	37:00	5:35
HSK HR07	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (354)	0:00	0:00
HSK HR08	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (351)	0:00	0:00
HSK HR10	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (350)	0:00	0:00
HSK HR12	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (352)	110:18	16:30
HSK HR13	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (360)	53:12	7:57
HSK HR14	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (361)	9:25	1:54
HSK HR15	ENERCON E-138 EP3 E3 4260 138.3 !O! NH: 160,0 m (Ges:229,1 m) (362)	0:00	0:00
KB1	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 160,0 m (Ges:240,0 m) (284)	0:00	0:00
KB2	ENERCON E-138 EP3 E3 4260 138.3 !O! NH: 160,0 m (Ges:229,1 m) (363)	36:12	9:05

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

Die Berechnung der Gesamtsumme für einen Rezeptor arbeitet mit einer gemittelten Richtungskorrektur für alle WEA, die an einem gegebenen Tag zur Beschattung beitragen. Wenn der Schattenwurf durch mehrere WEA an einem Tag nicht gleichzeitig stattfindet, kann die so ermittelte Summe geringfügig von der Summe der Beschattungszeiten abweichen, die für die individuellen WEA berechnet werden.

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

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

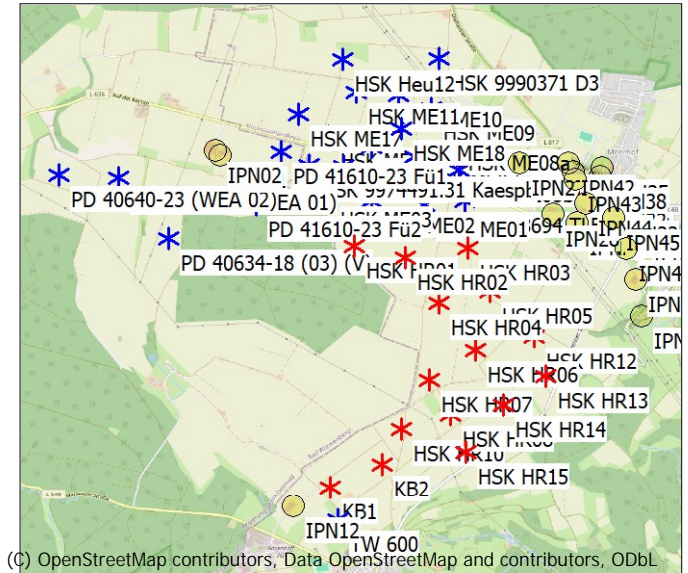
Minimale relevante Sonnenhöhe über Horizont 3 °
Tage zwischen Berechnungen 1 Tag(e)
Berechnungszeitsprung 1 Minuten

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

Monatliche Aggregation der met. wahrsch. Reduzierung
Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf den folgenden Annahmen:
DHM: Höhenlinien: CONTOURLINE_ONLINEDATA_2.wpo (1)
Rasterauflösung: 1,0 m

Alle Koordinatenangaben in:
UTM (north)-ETRS89 Zone: 32



WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ	Hersteller	Typ	Nennleistung	Rotor-durchmesser	NH	Schattendaten	
											Beschatt.-Bereich	U/min
			[m]		Aktuell			[kW]	[m]	[m]	[m]	[U/min]
HSK 8694 TLF	489.214	5.706.973	398,7	ENERCON E-126 EP4 TES-4.200	Ja	ENERCON	E-126 EP4 TES-4.200	4.200	127,0	135,0	2.108	11,6
HSK 9974491.31 Kaespb	487.658	5.707.330	380,0	ENERCON E-126 EP3-4.000	Nein	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK 9990371 D3	488.945	5.708.387	376,6	ENERCON E-126 EP3-4.000	Nein	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK Heu12	487.995	5.708.375	360,0	NORDEX N149/5.7-5.700	Ja	NORDEX	N149/5.7-5.700	5.700	149,0	164,0	1.805	10,7
HSK HR01	488.113	5.706.517	400,0	ENERCON E-126 EP3-4.000	Nein	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR02	488.618	5.706.413	410,0	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR03	489.237	5.706.505	404,9	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR04	488.944	5.705.964	423,3	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR05	489.456	5.706.076	418,4	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR06	489.315	5.705.493	430,0	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR07	488.851	5.705.198	426,9	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR08	489.063	5.704.850	425,3	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR10	488.571	5.704.712	422,4	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR12	489.901	5.705.630	424,1	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR13	490.007	5.705.235	437,6	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR14	489.581	5.704.952	440,2	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK HR15	489.218	5.704.487	443,5	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME01	488.806	5.706.938	398,8	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME02	488.279	5.706.974	390,0	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME03	487.856	5.707.032	387,8	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME05	487.852	5.707.613	378,5	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME06	488.281	5.707.505	380,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME07	488.710	5.707.414	385,2	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME08a	489.122	5.707.583	384,6	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME08b	489.152	5.707.285	390,0	E-126 EP3	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
HSK ME09	488.875	5.707.885	376,7	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME10	488.556	5.708.014	370,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME11	488.126	5.708.050	369,7	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME17	487.559	5.707.825	373,7	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME18	488.584	5.707.684	378,2	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
HSK ME20	488.004	5.707.318	380,0	E-138 EP3	Ja	ENERCON	E-138 EP3 E2-4.200	4.200	138,0	160,0	1.689	10,8
KB1	487.863	5.704.130	444,9	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
KB2	488.376	5.704.361	433,0	ENERCON E-126 EP3-4.000	Ja	ENERCON	E-126 EP3-4.000	4.000	127,0	135,3	1.746	10,8
PD 40634-18 (03) (V)	486.272	5.706.606	383,7	Nordex N149/5.7-5.700	Ja	NORDEX	N149/5.7-5.700	5.700	149,0	164,0	1.805	10,7
PD 40639-23 (WEA 01)	485.763	5.707.208	363,1	Nordex N149/5.7-5.700	Ja	NORDEX	N149/5.7-5.700	5.700	149,0	164,0	1.805	10,7
PD 40640-23 (WEA 02)	485.172	5.707.245	360,0	Nordex N163/6.X-7.000	Ja	NORDEX	N163/6.X-7.000	7.000	163,0	164,0	1.784	10,7
PD 41610-23 Fü1	487.387	5.707.465	375,5	Enercon E138/6.X-7.000	Ja	ENERCON	E-138 EP3 E3-4.260	4.260	138,3	160,0	1.686	11,1

(Fortsetzung nächste Seite)...

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281

Kirsten Ullner / ullner@pavana-wind.com

Berechnet:

17.02.2025 23:00/4.1.254

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Gesamtbelastung

...(Fortsetzung von vorheriger Seite)

	Ost	Nord	Z	Beschreibung	WEA-Typ Ak- tu- ell	Hersteller	Typ	Nenn- leistung	Rotor- durch- messer	NH	Schattendaten Beschatt.- Bereich	U/min
			[m]					[kW]	[m]	[m]	[m]	[U/min]
PD 41610-23 Fü2	487.141	5.706.941	380,0	Enercon E-16...	Nein	ENERCON	E-160 EP5 E3-5.560	5.560	160,0	166,6	1.781	9,6
TW 600	487.937	5.703.817	441,8	TW 600	Nein	TACKE	TW 600-600/200	600	43,0	50,0	918	27,0

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
				[m]	[m]	[m]	[m]	[°]		[m]
IPN01	Bad Wünnenberg, Auf der Körtge 6	486.786	5.707.423	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN02	Bad Wünnenberg, Auf der Körtge 4	486.736	5.707.479	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN12	Essentho, In den Stricken 30	487.495	5.703.938	430,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN23	Oesdorf, Zum Kesselberg 15	490.974	5.705.828	359,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN26	Meerhof, Sintfeldstraße 28	490.333	5.706.752	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN27	Meerhof, Im Kesperbusch 1	489.760	5.707.341	391,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN28	Meerhof, Sintfeldstraße 33	490.088	5.706.836	406,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN31	Meerhof, Taubenweg 2	490.620	5.706.966	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN32	Meerhof, Laurentiusstraße 10	490.561	5.707.019	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN33	Meerhof, Dalheimer Straße 1	490.672	5.706.887	409,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN34	Meerhof, Zur Egge 29	490.960	5.706.676	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN35	Meerhof, Elsterweg 2	490.578	5.707.293	411,5	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN36	Meerhof, Drosselgasse 18	490.290	5.707.254	402,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN37	Meerhof, Zur Egge 19	490.839	5.706.768	415,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN38	Meerhof, Dalheimer Straße 20	490.561	5.707.211	411,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN42	Meerhof, Drosselgasse 24	490.244	5.707.335	400,9	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN43	Meerhof, Drosselgasse 14	490.312	5.707.184	402,2	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN44	Meerhof, Drosselgasse 2	490.417	5.706.950	401,8	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN45	Meerhof, Zur Egge 3	490.681	5.706.800	410,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN46	Oesdorf, Zum Kesselberg 20	490.912	5.706.180	411,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN47	Meerhof, Zur Egge 25	490.820	5.706.494	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1

Berechnungsergebnisse

Schattenrezeptor

		astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
Nr.	Name	Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
IPN01	Bad Wünnenberg, Auf der Körtge 6	298:14	365	1:19	58:37
IPN02	Bad Wünnenberg, Auf der Körtge 4	281:40	365	1:16	54:45
IPN12	Essentho, In den Stricken 30	43:50	99	0:35	10:30
IPN23	Oesdorf, Zum Kesselberg 15	45:03	111	0:33	9:13
IPN26	Meerhof, Sintfeldstraße 28	112:25	300	0:55	21:59
IPN27	Meerhof, Im Kesperbusch 1	275:27	351	1:24	56:53
IPN28	Meerhof, Sintfeldstraße 33	168:48	325	1:04	32:43
IPN31	Meerhof, Taubenweg 2	43:30	159	0:26	8:53
IPN32	Meerhof, Laurentiusstraße 10	48:45	171	0:27	9:39
IPN33	Meerhof, Dalheimer Straße 1	47:30	183	0:26	9:20
IPN34	Meerhof, Zur Egge 29	44:23	157	0:26	7:06
IPN35	Meerhof, Elsterweg 2	57:26	223	0:24	9:55
IPN36	Meerhof, Drosselgasse 18	90:09	245	0:37	17:40
IPN37	Meerhof, Zur Egge 19	48:08	151	0:27	7:44
IPN38	Meerhof, Dalheimer Straße 20	55:28	209	0:25	9:35
IPN42	Meerhof, Drosselgasse 24	87:44	236	0:41	17:27
IPN43	Meerhof, Drosselgasse 14	93:53	252	0:34	18:29
IPN44	Meerhof, Drosselgasse 2	77:15	223	0:46	15:33
IPN45	Meerhof, Zur Egge 3	57:11	201	0:27	10:44
IPN46	Oesdorf, Zum Kesselberg 20	74:13	203	0:50	14:03
IPN47	Meerhof, Zur Egge 25	58:44	184	0:31	9:37

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Gesamtbelastung

Gesamtdauer Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [h/a]	Erwartet [h/a]
HSK 8694 TLF	ENERCON E-126 EP4 TES 4200 127.0 !O! NH: 135,0 m (Ges:198,5 m) (53)	119:15	25:58
HSK 9974491.31	Kaespb ENERCON E-66/18.70 1800 70.0 !O! NH: 98,0 m (Ges:133,0 m) (104)	9:27	1:53
HSK 9990371 D3	ENERCON E-115 3000 115.7 !O! NH: 135,4 m (Ges:193,3 m) (16)	5:20	1:07
HSK Heu12	NORDEX N149/5.7 5700 149.0 !O! NH: 164,0 m (Ges:238,5 m) (349)	2:25	0:32
HSK HR01	ENERCON E-115 3000 115.7 !O! NH: 149,0 m (Ges:206,9 m) (358)	13:23	2:28
HSK HR02	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (359)	31:23	5:32
HSK HR03	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (357)	173:56	30:36
HSK HR04	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (356)	33:13	5:50
HSK HR05	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (355)	174:13	27:06
HSK HR06	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (353)	37:00	5:35
HSK HR07	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (354)	0:00	0:00
HSK HR08	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (351)	0:00	0:00
HSK HR10	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (350)	0:00	0:00
HSK HR12	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (352)	110:18	16:30
HSK HR13	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (360)	53:12	7:57
HSK HR14	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (361)	9:25	1:54
HSK HR15	ENERCON E-138 EP3 E3 4260 138.3 !O! NH: 160,0 m (Ges:229,1 m) (362)	0:00	0:00
HSK ME01	E-126 EP3	44:13	9:15
HSK ME02	E-126 EP3	13:49	2:35
HSK ME03	E-126 EP3	14:17	2:39
HSK ME05	E-138 EP3	25:10	6:34
HSK ME06	E-138 EP3	19:27	4:33
HSK ME07	E-138 EP3	37:16	9:12
HSK ME08a	E-126 EP3	109:16	26:49
HSK ME08b	E-126 EP3	116:26	27:32
HSK ME09	E-138 EP3	40:27	9:45
HSK ME10	E-138 EP3	25:14	5:51
HSK ME11	E-138 EP3	24:41	6:44
HSK ME17	E-138 EP3	56:37	14:19
HSK ME18	E-138 EP3	15:08	3:53
HSK ME20	E-138 EP3	15:18	3:08
KB1	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 160,0 m (Ges:240,0 m) (284)	0:00	0:00
KB2	ENERCON E-138 EP3 E3 4260 138.3 !O! NH: 160,0 m (Ges:229,1 m) (363)	36:12	9:05
PD 40634-18 (03) (V)	Nordex N149/4.5	57:04	6:29
PD 40639-23 (WEA 01)	Nordex N149/5.X	27:44	5:29
PD 40640-23 (WEA 02)	Nordex N163/6.X	12:23	2:31
PD 41610-23 Fü1	Enercon E138 EP3 E3	75:57	19:54
PD 41610-23 Fü2	Enercon E-160 EP5 E5	88:51	12:30
TW 600	TW 600	7:38	1:25

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

Die Berechnung der Gesamtsumme für einen Rezeptor arbeitet mit einer gemittelten Richtungskorrektur für alle WEA, die an einem gegebenen Tag zur Beschattung beitragen. Wenn der Schattenwurf durch mehrere WEA an einem Tag nicht gleichzeitig stattfindet, kann die so ermittelte Summe geringfügig von der Summe der Beschattungszeiten abweichen, die für die individuellen WEA berechnet werden.

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281

Kirsten Ullner / ullner@pavana-wind.com

Berechnet:

17.02.2025 23:18/4.1.254

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul

...(Fortsetzung von vorheriger Seite)

	Ost	Nord	Z	Beschreibung	WEA-Typ			Nennleistung	Rotor-durchmesser	NH	Schattendaten	
					Ak-tuell	Hersteller	Typ				Beschatt.-Bereich	U/min
			[m]					[kW]	[m]	[m]	[m]	[U/min]
PD 41610-23 Fü2	487.141	5.706.941	380,0	Enercon E-16...	Nein	ENERCON	E-160 EP5 E3-5.560	5.560	160,0	166,6	1.781	9,6
TW 600	487.937	5.703.817	441,8	TW 600	Nein	TACKE	TW 600-600/200	600	43,0	50,0	918	27,0

Schattenrezeptor-Eingabe

Nr.	Name	Ost	Nord	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI)
				[m]	[m]	[m]	[m]	[°]		ü.Gr. [m]
IPN01	Bad Wünnenberg, Auf der Körtge 6	486.786	5.707.423	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN02	Bad Wünnenberg, Auf der Körtge 4	486.736	5.707.479	370,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN12	Essentho, In den Stricken 30	487.495	5.703.938	430,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN23	Oesdorf, Zum Kesselberg 15	490.974	5.705.828	359,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN26	Meerhof, Sintfeldstraße 28	490.333	5.706.752	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN27	Meerhof, Im Kesperbusch 1	489.760	5.707.341	391,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN28	Meerhof, Sintfeldstraße 33	490.088	5.706.836	406,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN31	Meerhof, Taubenweg 2	490.620	5.706.966	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN32	Meerhof, Laurentiusstraße 10	490.561	5.707.019	410,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN33	Meerhof, Dalheimer Straße 1	490.672	5.706.887	409,1	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN34	Meerhof, Zur Egge 29	490.960	5.706.676	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN35	Meerhof, Elsterweg 2	490.578	5.707.293	411,5	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN36	Meerhof, Drosselgasse 18	490.290	5.707.254	402,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN37	Meerhof, Zur Egge 19	490.839	5.706.768	415,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN38	Meerhof, Dalheimer Straße 20	490.561	5.707.211	411,7	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN42	Meerhof, Drosselgasse 24	490.244	5.707.335	400,9	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN43	Meerhof, Drosselgasse 14	490.312	5.707.184	402,2	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN44	Meerhof, Drosselgasse 2	490.417	5.706.950	401,8	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN45	Meerhof, Zur Egge 3	490.681	5.706.800	410,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN46	Oesdorf, Zum Kesselberg 20	490.912	5.706.180	411,4	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1
IPN47	Meerhof, Zur Egge 25	490.820	5.706.494	420,0	0,1	0,1	2,0	90,0	"Gewächshaus-Modus"	2,1

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer			Vermiedene Stunden pro Jahr	Vermiedene Tage pro Jahr
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag		
		[h/a]	[d/a]	[h/d]		
IPN01*	Bad Wünnenberg, Auf der Körtge 6	292:28	365	1:19	5:46	
IPN02*	Bad Wünnenberg, Auf der Körtge 4	276:10	365	1:16	5:30	
IPN12*	Essentho, In den Stricken 30	7:38	28	0:22	36:12	71
IPN23*	Oesdorf, Zum Kesselberg 15	0:00	0	0:00	45:03	111
IPN26*	Meerhof, Sintfeldstraße 28	38:55	146	0:26	73:30	154
IPN27*	Meerhof, Im Kesperbusch 1	213:22	258	1:24	62:05	93
IPN28*	Meerhof, Sintfeldstraße 33	67:34	164	0:34	101:14	161
IPN31*	Meerhof, Taubenweg 2	18:18	84	0:21	25:12	75
IPN32*	Meerhof, Laurentiusstraße 10	20:22	87	0:22	28:23	84
IPN33*	Meerhof, Dalheimer Straße 1	16:57	82	0:20	30:33	101
IPN34*	Meerhof, Zur Egge 29	3:14	19	0:15	41:09	138
IPN35*	Meerhof, Elsterweg 2	23:25	121	0:21	34:01	102
IPN36*	Meerhof, Drosselgasse 18	53:35	148	0:37	36:34	97
IPN37*	Meerhof, Zur Egge 19	4:18	24	0:17	43:50	127
IPN38*	Meerhof, Dalheimer Straße 20	19:32	100	0:21	35:56	109
IPN42*	Meerhof, Drosselgasse 24	59:37	153	0:41	28:07	83
IPN43*	Meerhof, Drosselgasse 14	51:15	148	0:34	42:38	104
IPN44*	Meerhof, Drosselgasse 2	32:52	120	0:24	44:23	103
IPN45*	Meerhof, Zur Egge 3	17:15	85	0:20	39:56	116
IPN46*	Oesdorf, Zum Kesselberg 20	4:43	29	0:16	69:30	174
IPN47*	Meerhof, Zur Egge 25	4:29	25	0:17	54:15	159

* Rezeptoren, an denen Schattenwurf durch Abschaltung reduziert ist.

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
17.02.2025 23:18/4.1.254

SHADOW - Hauptergebnis

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul

Gesamtdauer Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [h/a]	Angehalten wg. Schattenabschaltung [h/a]
HSK 8694 TLF	ENERCON E-126 EP4 TES 4200 127.0 !O! NH: 135,0 m (Ges:198,5 m) (53)	119:15	
HSK 9974491.31 Kaespb	ENERCON E-66/18.70 1800 70.0 !O! NH: 98,0 m (Ges:133,0 m) (104)	9:27	
HSK 9990371 D3	ENERCON E-115 3000 115.7 !O! NH: 135,4 m (Ges:193,3 m) (16)	5:20	
HSK Heu12	NORDEX N149/5.7 5700 149.0 !O! NH: 164,0 m (Ges:238,5 m) (349)	2:25	
HSK HR01	ENERCON E-115 3000 115.7 !O! NH: 149,0 m (Ges:206,9 m) (358)	0:00	13:23
HSK HR02	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (359)	0:00	31:23
HSK HR03	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (357)	0:00	173:56
HSK HR04	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (356)	0:00	33:13
HSK HR05	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (355)	0:00	174:13
HSK HR06	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (353)	0:00	37:00
HSK HR07	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (354)	0:00	
HSK HR08	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (351)	0:00	
HSK HR10	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (350)	0:00	
HSK HR12	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (352)	0:00	110:18
HSK HR13	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (360)	0:00	53:12
HSK HR14	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (361)	0:00	9:25
HSK HR15	ENERCON E-138 EP3 E3 4260 138.3 !O! NH: 160,0 m (Ges:229,1 m) (362)	0:00	
HSK ME01	E-126 EP3	44:13	
HSK ME02	E-126 EP3	13:49	
HSK ME03	E-126 EP3	14:17	
HSK ME05	E-138 EP3	25:10	
HSK ME06	E-138 EP3	19:27	
HSK ME07	E-138 EP3	37:16	
HSK ME08a	E-126 EP3	109:16	
HSK ME08b	E-126 EP3	116:26	
HSK ME09	E-138 EP3	40:27	
HSK ME10	E-138 EP3	25:14	
HSK ME11	E-138 EP3	24:41	
HSK ME17	E-138 EP3	56:37	
HSK ME18	E-138 EP3	15:08	
HSK ME20	E-138 EP3	15:18	
KB1	ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 160,0 m (Ges:240,0 m) (284)	0:00	
KB2	ENERCON E-138 EP3 E3 4260 138.3 !O! NH: 160,0 m (Ges:229,1 m) (363)	0:00	36:12
PD 40634-18 (03) (V)	Nordex N149/4.5	57:04	
PD 40639-23 (WEA 01)	Nordex N149/5.X	27:44	
PD 40640-23 (WEA 02)	Nordex N163/6.X	12:23	
PD 41610-23 Fü1	Enercon E138 EP3 E3	75:57	
PD 41610-23 Fü2	Enercon E-160 EP5 E5	88:51	
TW 600	TW 600	7:38	

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

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR01 - ENERCON E-115 3000 115.7 !O! NH: 149,0 m (Ges:206,9 m) (358)
Schattenabschaltung für spez. WEA

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierte Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:18/4.1.254

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR02 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (359)

Schattenabschaltung für spez. WEA

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
17.02.2025 23:18/4.1.254

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR03 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (357)

Schattenabschaltung für spez. WEA

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
17.02.2025 23:18/4.1.254

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR03 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (357)

Schattenabschaltung für spez. WEA

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

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR04 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (356)
Schattenabschaltung für spez. WEA

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
17.02.2025 23:18/4.1.254

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR05 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (355)

Schattenabschaltung für spez. WEA

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
17.02.2025 23:18/4.1.254

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR06 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (353)

Schattenabschaltung für spez. WEA

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:18/4.1.254

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR12 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (352)

Schattenabschaltung für spez. WEA

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

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR13 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (360)
Schattenabschaltung für spez. WEA

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

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: HSK HR14 - ENERCON E-160 EP5 E3 R1 5560 160.0 !O! NH: 166,6 m (Ges:246,6 m) (361)
Schattenabschaltung für spez. WEA

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1											15:55-16:10	
2											15:57-16:08	
3											16:02-16:04	
4												
5												
6												
7												
8		16:31-16:35										
9		16:28-16:40										
10		16:26-16:41										
11		16:25-16:43										
12		16:24-16:44										
13		16:23-16:44										
14		16:23-16:45										
15		16:23-16:45										
16		16:22-16:45										
17		16:23-16:45										
18		16:23-16:45								17:03-17:06		
19		16:23-16:44								16:59-17:10		
20		16:24-16:43								16:57-17:12		
21		16:25-16:42								16:55-17:13		
22		16:27-16:41								16:54-17:14		
23		16:28-16:38								16:54-17:15		
24										16:52-17:14		
25										15:52-16:14		
26										15:52-16:15		
27										15:52-16:14		
28										15:53-16:14		
29										15:53-16:14		
30										15:54-16:13		
31										15:55-16:12		

SHADOW - Schattenabschaltung: WEA-Abschaltkalender

Berechnung: 2024PAV01486 Gesamtbelastung mit Abschaltmodul WEA: KB2 - ENERCON E-138 EP3 E3 4260 138.3 !OI NH: 160,0 m (Ges:229,1 m) (363)
Schattenabschaltung für spez. WEA

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1						06:06-06:39	06:11-06:46					
2						06:06-06:39	06:12-06:46					
3						06:06-06:39	06:11-06:46					
4						06:06-06:40	06:12-06:46					
5						06:06-06:40	06:12-06:47					
6						06:06-06:41	06:13-06:47					
7						06:06-06:40	06:12-06:46					
8						06:06-06:41	06:12-06:46					
9						06:07-06:42	06:13-06:47					
10						06:07-06:41	06:13-06:47					
11						06:07-06:42	06:14-06:47					
12						06:07-06:42	06:14-06:47					
13						06:07-06:41	06:14-06:47					
14						06:07-06:42	06:15-06:46					
15						06:07-06:42	06:15-06:46					
16						06:08-06:42	06:15-06:46					
17					06:18-06:25	06:08-06:43	06:17-06:46					
18					06:15-06:28	06:08-06:43	06:17-06:46					
19					06:12-06:29	06:08-06:43	06:18-06:45					
20					06:11-06:31	06:09-06:44	06:18-06:45					
21					06:10-06:32	06:09-06:44	06:19-06:44					
22					06:09-06:34	06:09-06:44	06:20-06:44					
23					06:09-06:35	06:09-06:44	06:21-06:42					
24					06:08-06:35	06:10-06:45	06:22-06:41					
25					06:08-06:36	06:10-06:45	06:23-06:39					
26					06:07-06:37	06:10-06:44	06:26-06:38					
27					06:07-06:37	06:10-06:45						
28					06:07-06:38	06:10-06:45						
29					06:06-06:38	06:11-06:46						
30					06:06-06:38	06:11-06:45						
31					06:06-06:38							

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281

Kirsten Ulner / ulner@pavana-wind.com

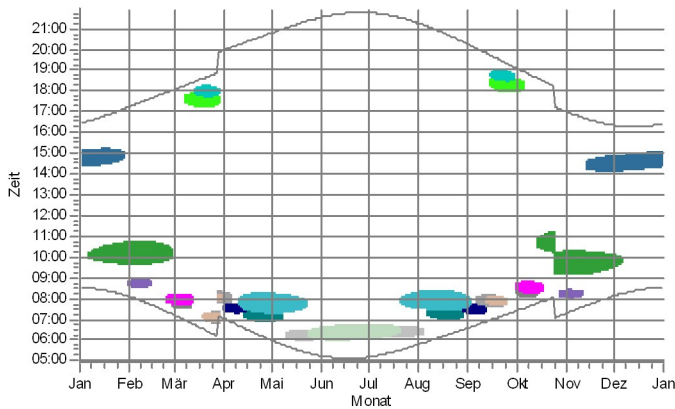
Berechnet:

17.02.2025 23:00/4.1.254

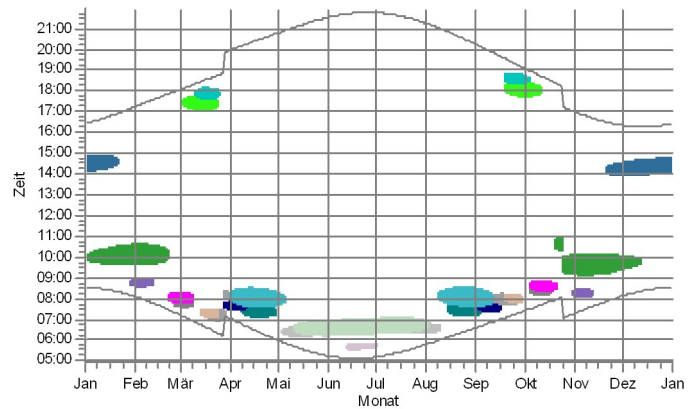
SHADOW - Grafischer Kalender

Berechnung: 2024PAV01486 Gesamtbelastung

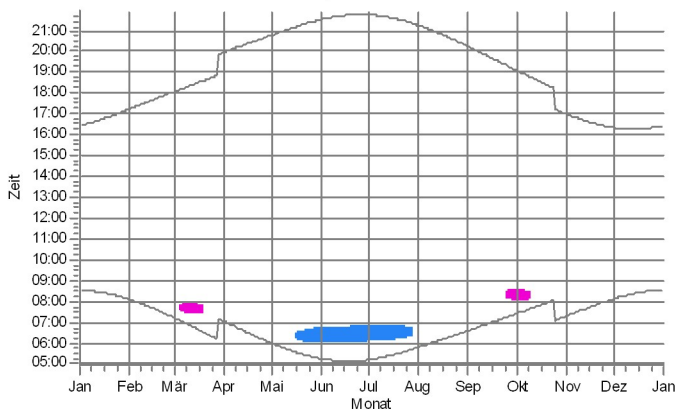
IPN01: Bad Wünnenberg, Auf der Körtge 6



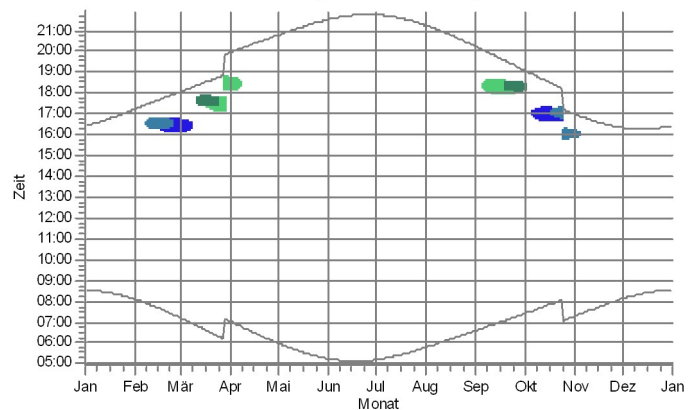
IPN02: Bad Wünnenberg, Auf der Körtge 4



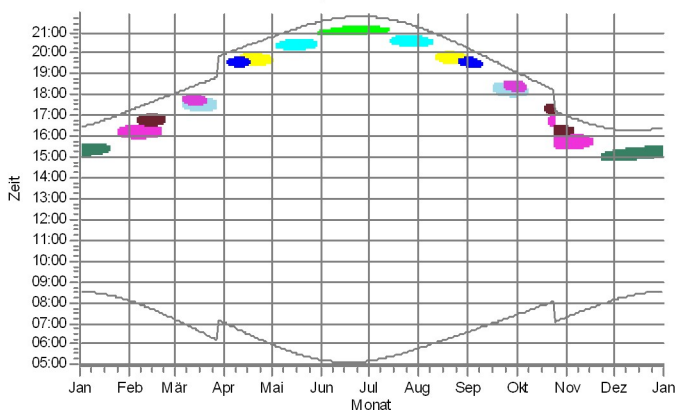
IPN12: Essentho, In den Stricken 30



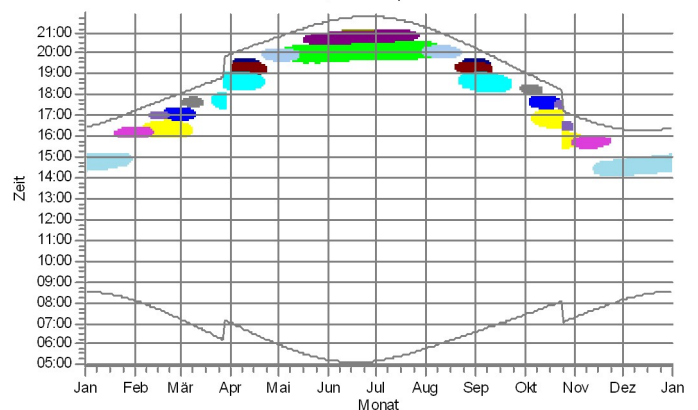
IPN23: Oesdorf, Zum Kesselberg 15



IPN26: Meerhof, Sintfeldstraße 28



IPN27: Meerhof, Im Kesperbusch 1



WEA

HSK 8694 TLF: ENERCON E-126 EP4 TES 4200 127.0 IOI NH: 135.0 m (Ges:198.5 m) (53)
HSK ME01: E-126 EP3
HSK ME02: E-126 EP3
HSK ME03: E-126 EP3
HSK ME05: E-138 EP3
HSK ME06: E-138 EP3
HSK ME07: E-138 EP3
HSK ME08a: E-126 EP3
HSK ME09: E-138 EP3
HSK ME10: E-138 EP3
HSK ME11: E-138 EP3

HSK ME08b: E-126 EP3
HSK ME17: E-138 EP3
HSK ME18: E-138 EP3
HSK ME20: E-138 EP3
HSK 9974491.31 Kaesp: ENERCON E-66/18.70 1800 70.0 IOI NH: 98.0 m (Ges:133.0 m) (104)
PD 40639-23 (WEA 01): Nordex N149/5.X
PD 41610-23 Fu1: Enercon E138 EP3 E3
PD 41610-23 Fu2: Enercon E-160 EP5 E5
PD 40640-23 (WEA 02): Nordex N163/6.X
PD 40634-18 (03) (V): Nordex N149/4.5
TW 600: TW 600

HSK Heu12: NORDEX N149/5.7 5700 149.0 IOI NH: 164.0 m (Ges:238.5 m) (349)
HSK HR12: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (352)
HSK HR06: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (353)
HSK HR05: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (355)
HSK HR04: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (356)
HSK HR03: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (357)
HSK HR01: ENERCON E-115 3000 115.7 IOI NH: 149.0 m (Ges:206.9 m) (358)
HSK HR02: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (359)
HSK HR14: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (361)
KBZ: ENERCON E-138 EP3 E3 4260 138.3 IOI NH: 160.0 m (Ges:229.1 m) (363)

Projekt:

Marsberg-Meerhof

Beschreibung:

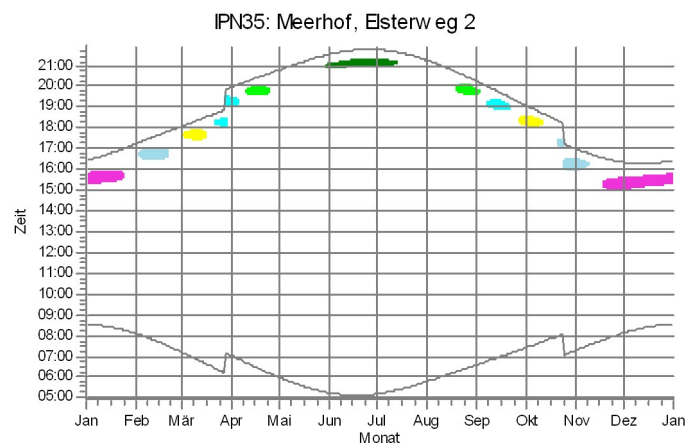
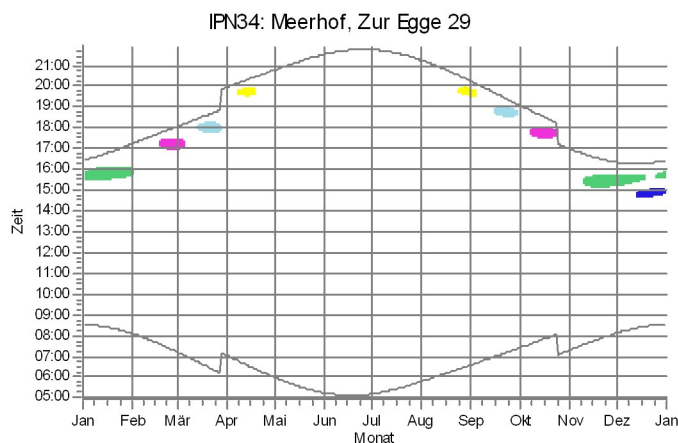
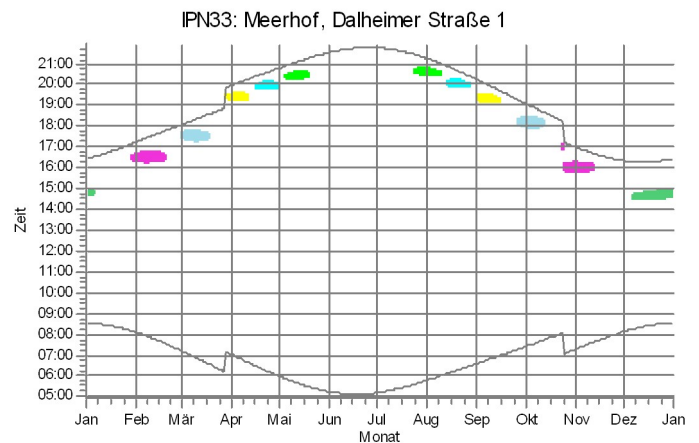
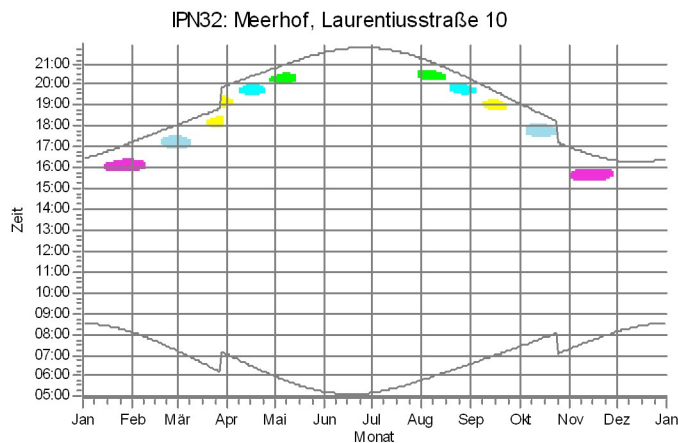
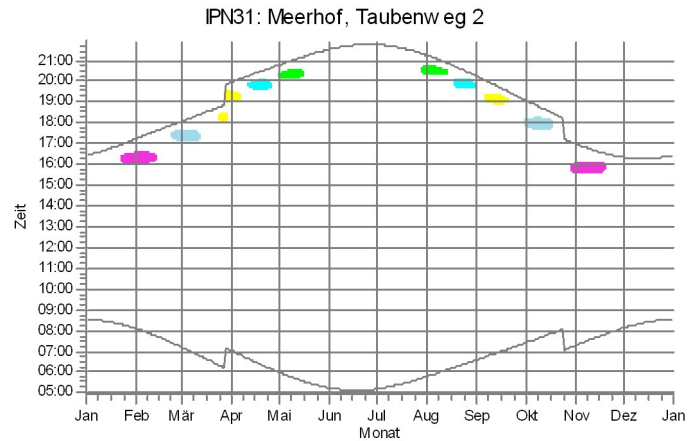
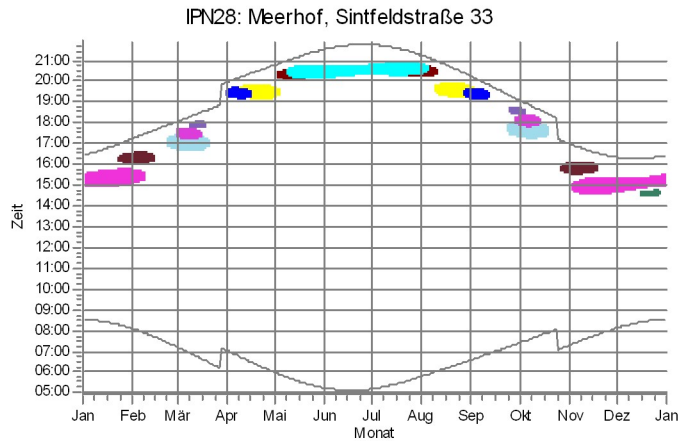
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Grafischer Kalender

Berechnung: 2024PAV01486 Gesamtbelastung



WEA

HSK 9990371 D3: ENERCON E-115 3000 115.7 IOI NH: 135,4 m (Ges:193,3 m) (16)
HSK 8694 TLF: ENERCON E-126 EP4 TES 4200 127.0 IOI NH: 135,0 m (Ges:198,5 m) (53)
HSK MED1: E-126 EP3
HSK MED7: E-138 EP3
HSK MED8a: E-126 EP3

HSK MED8b: E-126 EP3
HSK HR12: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166,6 m (Ges:246,6 m) (352)
HSK HR06: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166,6 m (Ges:246,6 m) (353)
HSK HR05: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166,6 m (Ges:246,6 m) (355)
HSK HR04: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166,6 m (Ges:246,6 m) (356)

HSK HR03: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166,6 m (Ges:246,6 m) (357)
HSK HR01: ENERCON E-115 3000 115.7 IOI NH: 149,0 m (Ges:206,9 m) (358)
HSK HR02: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166,6 m (Ges:246,6 m) (359)
HSK HR13: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166,6 m (Ges:246,6 m) (360)

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

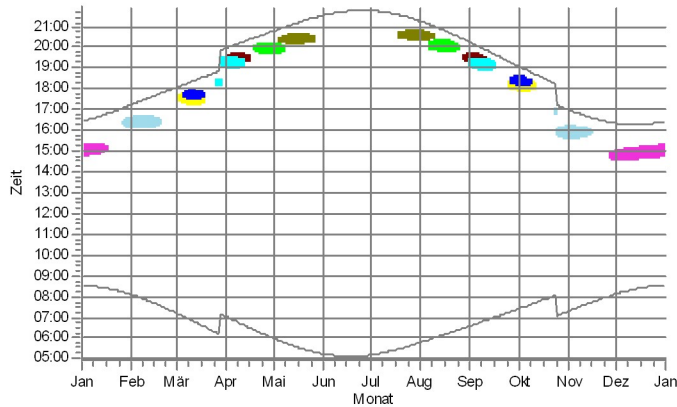
Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

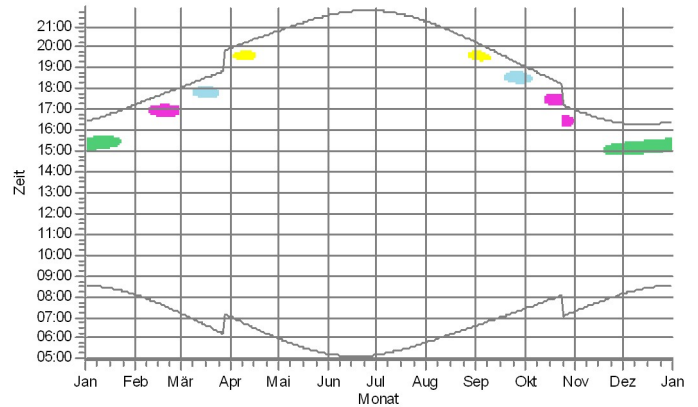
SHADOW - Grafischer Kalender

Berechnung: 2024PAV01486 Gesamtbelastung

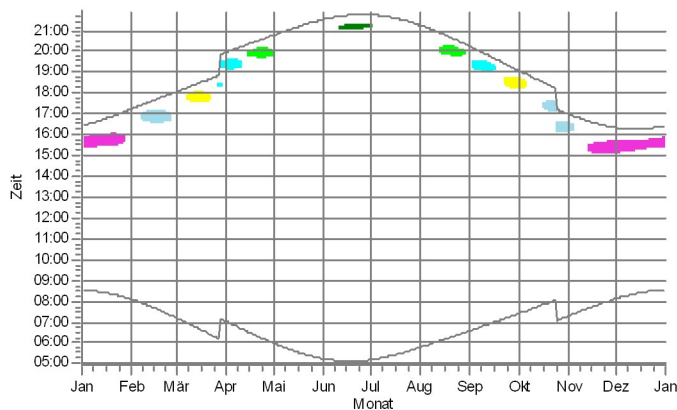
IPN36: Meerhof, Drosselgasse 18



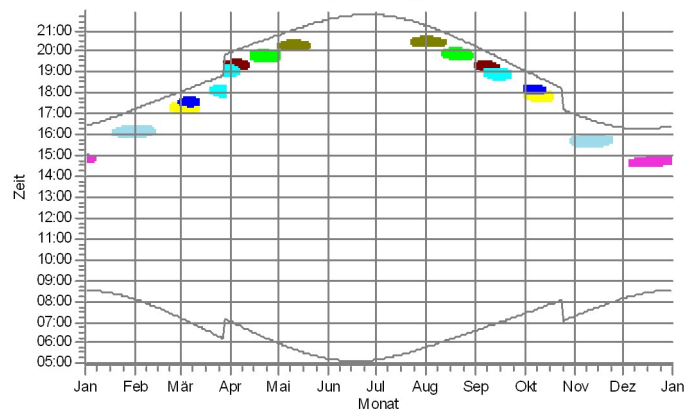
IPN37: Meerhof, Zur Egge 19



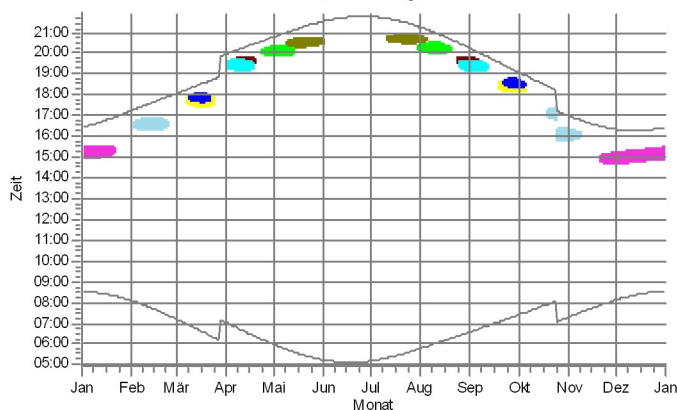
IPN38: Meerhof, Dalheimer Straße 20



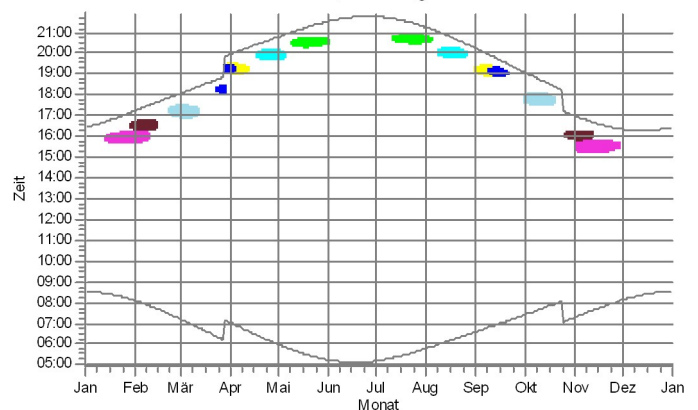
IPN42: Meerhof, Drosselgasse 24



IPN43: Meerhof, Drosselgasse 14



IPN44: Meerhof, Drosselgasse 2



WEA

HSK 9990371 D3: ENERCON E-115 3000 115.7 IOI NH: 135.4 m (Ges:193.3 m) (16)
HSK 8694 TLF: ENERCON E-126 EP4 TES 4200 127.0 IOI NH: 135.0 m (Ges:198.5 m) (53)
HSK MED1: E-126 EP3
HSK MED7: E-138 EP3

HSK MED8a: E-126 EP3
HSK MED9: E-138 EP3
HSK MED8b: E-126 EP3
HSK HR12: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (352)

HSK HR05: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (355)
HSK HR04: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (356)
HSK HR03: ENERCON E-160 EP5 E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (357)

Projekt:
Marsberg-Meerhof

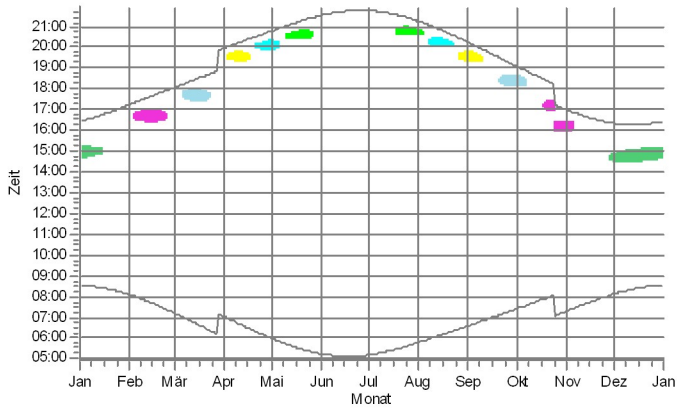
Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ullner / ullner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

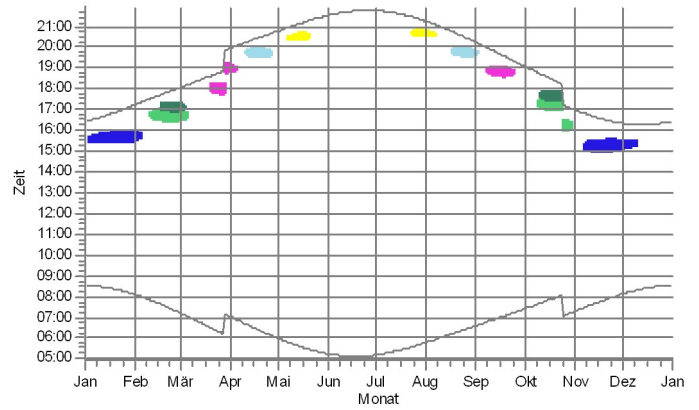
SHADOW - Grafischer Kalender

Berechnung: 2024PAV01486 Gesamtbelastung

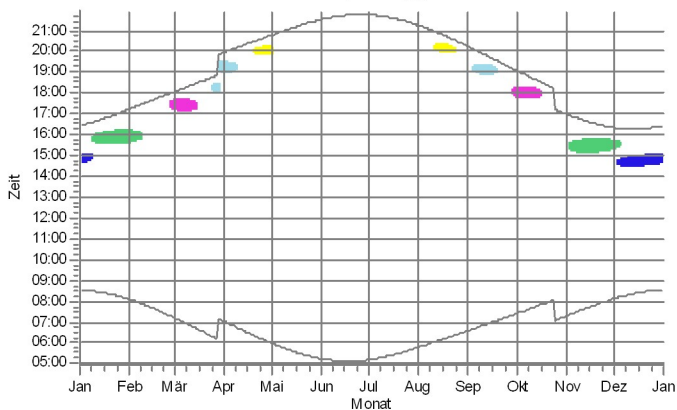
IPN45: Meerhof, Zur Egge 3



IPN46: Oesdorf, Zum Kesselberg 20



IPN47: Meerhof, Zur Egge 25



WEA

HSK 8694 TLF: ENERCON E-126 EP4 TES 4200 127.0 IOI NH: 135.0 m (Ges:198.5 m) (53)
HSK MED8a: E-126 EP3
HSK MED8b: E-126 EP3

HSK HR12: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (352)
HSK HR06: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (353)
HSK HR05: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (355)

HSK HR03: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (357)
HSK HR13: ENERCON E-160 EPS E3 R1 5560 160.0 IOI NH: 166.6 m (Ges:246.6 m) (360)

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN01 - Bad Wünnenberg, Auf der Körtge 6
Sonneneinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor												
N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar				Februar				März				April				Mai				Juni			
1	08:31	14:26 (PD 40634-18 (03) (V))	08:05		08:41 (HSK HR01)	07:13		07:38 (HSK ME02)	07:03	07:31 (HSK ME06)	05:59		06:58 (HSK ME05)	05:14		06:06 (HSK ME17)								
16:26	37	15:03 (PD 40634-18 (03) (V))	17:13	65	10:42 (PD 41610-23 Fu2)	18:04	32	08:10 (HSK ME03)	19:57	29	08:14 (HSK ME20)	20:47	74	08:12 (PD 41610-23 Fu1)	21:32	27	06:33 (HSK ME17)							
2	08:31	14:26 (PD 40634-18 (03) (V))	08:04		08:39 (HSK HR01)	07:10		07:36 (HSK ME02)	07:01	07:28 (HSK ME06)	05:57		06:59 (HSK ME05)	05:14		06:05 (HSK ME17)								
16:27	38	15:04 (PD 40634-18 (03) (V))	17:15	69	10:42 (PD 41610-23 Fu2)	18:06	35	08:11 (HSK ME03)	19:59	33	08:13 (HSK ME20)	20:49	73	08:12 (PD 41610-23 Fu1)	21:33	29	06:34 (HSK ME17)							
3	08:31	14:27 (PD 40634-18 (03) (V))	08:02		08:38 (HSK HR01)	07:08		07:34 (HSK ME02)	06:58		07:26 (HSK ME06)	05:55		07:00 (HSK ME05)	05:13		06:05 (HSK ME17)							
16:28	37	15:04 (PD 40634-18 (03) (V))	17:17	73	10:43 (PD 41610-23 Fu2)	18:08	37	08:12 (HSK ME03)	20:00	35	08:12 (HSK ME20)	20:50	71	08:11 (PD 41610-23 Fu1)	21:34	29	06:34 (HSK ME17)							
4	08:31	14:27 (PD 40634-18 (03) (V))	08:00		08:37 (HSK HR01)	07:06		07:34 (HSK ME02)	06:56		07:24 (HSK ME06)	05:53		07:01 (HSK ME05)	05:12		06:05 (HSK ME17)							
16:29	37	15:04 (PD 40634-18 (03) (V))	17:19	75	10:43 (PD 41610-23 Fu2)	18:09	37	08:11 (HSK ME03)	20:02		08:09 (HSK ME20)	20:52	68	08:11 (PD 41610-23 Fu1)	21:35	30	06:35 (HSK ME17)							
5	08:31	14:28 (PD 40634-18 (03) (V))	07:59		08:36 (HSK HR01)	07:04		07:34 (HSK ME02)	06:54		07:23 (HSK ME06)	05:51		07:03 (HSK ME05)	05:11		06:04 (HSK ME17)							
16:31	37	15:04 (PD 40634-18 (03) (V))	17:21	76	10:43 (PD 41610-23 Fu2)	18:11	37	08:11 (HSK ME03)	20:04	31	08:07 (HSK ME20)	20:54	65	08:11 (PD 41610-23 Fu1)	21:36	31	06:35 (HSK ME17)							
6	08:30	14:27 (PD 40634-18 (03) (V))	07:57		08:36 (HSK HR01)	07:02		07:33 (HSK ME02)	06:52		07:23 (HSK ME06)	05:50		07:05 (HSK ME05)	05:11		06:05 (HSK ME17)							
16:32	38	15:05 (PD 40634-18 (03) (V))	17:22	77	10:43 (PD 41610-23 Fu2)	18:13	38	08:11 (HSK ME03)	20:06	20	08:09 (HSK ME20)	20:55	59	08:10 (PD 41610-23 Fu1)	21:37	31	06:36 (HSK ME17)							
7	08:30	14:27 (PD 40634-18 (03) (V))	07:55		08:37 (HSK HR01)	06:59		07:33 (HSK ME02)	06:49		07:22 (HSK ME06)	05:48		07:22 (PD 41610-23 Fu1)	21:40		06:04 (HSK ME17)							
16:33	46	15:06 (PD 40634-18 (03) (V))	17:24	78	10:44 (PD 41610-23 Fu2)	18:15	36	08:09 (HSK ME03)	20:07	21	07:43 (HSK ME06)	20:57	48	08:10 (PD 41610-23 Fu1)	21:38	32	06:36 (HSK ME17)							
8	08:29	14:27 (PD 41610-23 Fu2)	07:54		08:36 (HSK HR01)	06:57		07:33 (HSK ME02)	06:47		07:22 (HSK ME06)	05:46		07:22 (PD 41610-23 Fu1)	21:40		06:04 (HSK ME17)							
16:34	52	15:06 (PD 40634-18 (03) (V))	17:26	78	10:44 (PD 41610-23 Fu2)	18:16		08:09 (HSK ME03)	20:09	21	07:43 (HSK ME06)	20:59	47	08:09 (PD 41610-23 Fu1)	21:39	33	06:37 (HSK ME17)							
9	08:29	14:27 (PD 41610-23 Fu2)	07:52		08:37 (HSK HR01)	06:55		07:34 (HSK ME02)	06:45		07:21 (HSK ME06)	05:44		07:22 (PD 41610-23 Fu1)	21:40		06:04 (HSK ME17)							
16:36	56	15:07 (PD 40634-18 (03) (V))	17:28	77	10:44 (PD 41610-23 Fu2)	18:18	46	17:43 (PD 40640-23 (WEA 01))	20:11	21	08:07 (PD 41610-23 Fu1)	21:00	45	08:07 (PD 41610-23 Fu1)	21:41	33	06:37 (HSK ME17)							
10	08:28	14:27 (PD 41610-23 Fu2)	07:50		08:37 (HSK HR01)	06:53		07:35 (HSK ME02)	06:43		07:22 (HSK ME06)	05:43		07:24 (PD 41610-23 Fu1)	21:42		06:04 (HSK ME17)							
16:37	59	15:07 (PD 40634-18 (03) (V))	17:30	75	10:43 (PD 41610-23 Fu2)	18:20	50	17:46 (PD 40639-23 (WEA 01))	20:12	19	07:41 (HSK ME06)	21:02	43	08:07 (PD 41610-23 Fu1)	21:41	34	06:38 (HSK ME17)							
11	08:28	14:27 (PD 40634-18 (03) (V))	07:48		08:38 (HSK HR01)	06:51		07:36 (HSK ME02)	06:40		07:22 (HSK ME06)	05:41		06:09 (HSK ME17)	21:42		06:04 (HSK ME17)							
16:38	62	15:07 (PD 40634-18 (03) (V))	17:32	74	10:43 (PD 41610-23 Fu2)	18:22	47	17:47 (PD 40639-23 (WEA 01))	20:14	34	07:59 (PD 41610-23 Fu1)	21:03	52	08:06 (PD 41610-23 Fu1)	21:41	34	06:38 (HSK ME17)							
12	08:27	14:27 (PD 41610-23 Fu2)	07:47		08:39 (HSK HR01)	06:48		07:31 (HSK ME02)	06:38		07:23 (HSK ME06)	05:39		06:08 (HSK ME17)	21:42		06:04 (HSK ME17)							
16:40	64	15:07 (PD 40634-18 (03) (V))	17:33	70	10:43 (PD 41610-23 Fu2)	18:23	35	17:49 (PD 40639-23 (WEA 01))	20:16	39	08:03 (PD 41610-23 Fu1)	21:05	53	08:05 (PD 41610-23 Fu1)	21:43	35	06:39 (HSK ME17)							
13	08:27	14:27 (PD 41610-23 Fu2)	07:45		08:41 (HSK HR01)	06:46		17:23 (PD 40639-23 (WEA 01))	20:16		07:24 (HSK ME06)	05:38		06:06 (HSK ME17)	21:43		06:04 (HSK ME17)							
16:41	67	15:08 (PD 40634-18 (03) (V))	17:35	65	10:42 (PD 41610-23 Fu2)	18:25	27	17:50 (PD 40639-23 (WEA 01))	20:17	41	08:05 (PD 41610-23 Fu1)	21:06	55	08:04 (PD 41610-23 Fu1)	21:43	35	06:39 (HSK ME17)							
14	08:26	14:27 (PD 41610-23 Fu2)	07:43		09:44 (PD 41610-23 Fu2)	06:44		17:21 (PD 40639-23 (WEA 01))	20:16		07:26 (HSK ME06)	05:36		06:06 (HSK ME17)	21:43		06:04 (HSK ME17)							
16:43	68	15:08 (PD 40634-18 (03) (V))	17:37	58	10:42 (PD 41610-23 Fu2)	18:27	33	18:01 (PD 40640-23 (WEA 02))	20:19	41	08:07 (PD 41610-23 Fu1)	21:08	54	08:03 (PD 41610-23 Fu1)	21:43	35	06:39 (HSK ME17)							
15	08:25	14:27 (PD 41610-23 Fu2)	07:41		09:45 (PD 41610-23 Fu2)	06:42		17:20 (PD 40640-23 (WEA 02))	20:19		07:10 (HSK ME05)	05:35		06:05 (HSK ME17)	21:43		06:04 (HSK ME17)							
16:44	71	15:09 (PD 40634-18 (03) (V))	17:39	56	10:41 (PD 41610-23 Fu2)	18:28	39	18:03 (PD 40640-23 (WEA 02))	20:21	44	08:08 (PD 41610-23 Fu1)	21:09	54	08:03 (PD 41610-23 Fu1)	21:44	35	06:39 (HSK ME17)							
16	08:24	14:27 (PD 40634-18 (03) (V))	07:39	59	10:45 (PD 41610-23 Fu2)	18:30	44	18:05 (PD 40640-23 (WEA 02))	20:22	54	08:09 (PD 41610-23 Fu1)	21:11	53	08:01 (PD 41610-23 Fu1)	21:44	36	06:40 (HSK ME17)							
16:46	73	15:09 (PD 40634-18 (03) (V))	17:41	55	10:40 (PD 41610-23 Fu2)	18:30	44	18:05 (PD 40640-23 (WEA 02))	20:22	54	08:09 (PD 41610-23 Fu1)	21:11	53	08:01 (PD 41610-23 Fu1)	21:44	36	06:40 (HSK ME17)							
17	08:23	14:27 (PD 41610-23 Fu2)	07:37		09:46 (PD 41610-23 Fu2)	06:37		17:19 (PD 40640-23 (WEA 01))	20:27		07:04 (HSK ME05)	05:32		06:04 (HSK ME17)	21:45		06:04 (HSK ME17)							
16:47	75	15:09 (PD 40634-18 (03) (V))	17:43	53	10:39 (PD 41610-23 Fu2)	18:32	48	18:07 (PD 40640-23 (WEA 02))	20:24	60	08:10 (PD 41610-23 Fu1)	21:12	51	08:00 (PD 41610-23 Fu1)	21:45	36	06:40 (HSK ME17)							
18	08:22	14:27 (PD 41610-23 Fu2)	07:35		09:47 (PD 41610-23 Fu2)	06:35		17:18 (PD 40640-23 (WEA 01))	20:25		07:02 (HSK ME05)	05:31		06:04 (HSK ME17)	21:45		06:04 (HSK ME17)							
16:49	75	15:09 (PD 40634-18 (03) (V))	17:44	51	10:38 (PD 41610-23 Fu2)	18:34	50	18:08 (PD 40640-23 (WEA 02))	20:26	66	08:11 (PD 41610-23 Fu1)	21:14	50	07:59 (PD 41610-23 Fu1)	21:45	36	06:40 (HSK ME17)							
19	08:22	14:27 (PD 41610-23 Fu2)	07:33		09:47 (PD 41610-23 Fu2)	06:32		07:08 (HSK 9974491.31 Kaesp)	06:23		07:01 (HSK ME05)	05:29		06:03 (HSK ME17)	21:45		06:05 (HSK ME17)							
16:51	77	15:08 (PD 40634-18 (03) (V))	17:46	50	10:37 (PD 41610-23 Fu2)	18:35	53	18:10 (PD 40640-23 (WEA 02))	20:27	70	08:12 (PD 41610-23 Fu1)	21:15	47	07:57 (PD 41610-23 Fu1)	21:46	35	06:40 (HSK ME17)							
20	08:20	14:27 (PD 40634-18 (03) (V))	07:31		09:48 (PD 41610-23 Fu2)	06:30		07:04 (HSK 9974491.31 Kaesp)	06:20		06:03 (HSK ME17)	05:28		06:03 (HSK ME17)	21:46		06:03 (HSK ME17)							
16:52	77	15:08 (PD 40634-18 (03) (V))	17:48	48	10:36 (PD 41610-23 Fu2)	18:37	63	18:11 (PD 40640-23 (WEA 02))	20:29	72	08:12 (PD 41610-23 Fu1)	21:17	44	07:55 (PD 41610-23 Fu1)	21:46	36	06:41 (HSK ME17)							
21	08:19	14:27 (PD 41610-23 Fu2)	07:29		09:50 (PD 41610-23 Fu2)	06:28		07:01 (HSK ME02)	06:19		06:59 (HSK ME05)	05:26		06:03 (HSK ME17)	21:46		06:06 (HSK ME17)							
16:54	77	15:08 (PD 40634-18 (03) (V))	17:50	45	10:35 (PD 41610-23 Fu2)	18:39	66	18:10 (PD 40640-23 (WEA 02))	20:31	74	08:13 (PD 41610-23 Fu1)	21:18	40	07:53 (PD 41610-23 Fu1)	21:46	36	06:42 (HSK ME17)							
22	08:18	14:27 (PD 41610-23 Fu2)	07:27		09:51 (PD 41610-23 Fu2)	06:26		06:58 (HSK ME02)	06:16		06:59 (HSK ME05)	05:25		06:04 (HSK ME17)	21:46		06:04 (HSK ME17)							
16:56	79	15:08 (PD 40634-18 (03) (V))	17:52	42	10:33 (PD 41610-23 Fu2)	18:40	70	18:10 (PD 40640-23 (WEA 02))	20:32	74	08:13 (PD 41610-23 Fu1)	21:20	33	07:50 (PD 41610-23 Fu1)	21:46	36	06:42 (HSK ME17)							
23	08:17	14:27 (PD 40634-18 (03) (V))	07:25		09:53 (PD 41610-23 Fu2)	06:23		06:57 (HSK ME02)	06:15		06:58 (HSK ME05)	05:24		06:04 (HSK ME17)	21:46		06:06 (HSK ME17)							
16:57	77	15:06 (PD 40634-18 (03) (V))	17:53	38	10:31 (PD 41610-23 Fu2)	18:42	69	18:09 (PD 40640-23 (WEA 02))	20:34	75	08:13 (PD 41610-23 Fu1)	21:21	22	06:26 (HSK ME17)	21:47	35	06:41 (HSK ME17)							
24	08:16	14:27 (PD 41610-23 Fu2)	07:23		09:55 (PD 41610-23 Fu2)	06:21		06:55 (HSK ME02)	06:13		06:57 (HSK ME05)	05:23		06:05 (HSK ME17)	21:47		06:06 (HSK ME17)							
16:59	77	15:06 (PD 40634-18 (03) (V))	17:55	34	10:29 (PD 41610-23 Fu2)	18:44	69	18:08 (PD 40640-23 (WEA 02))	20:36	76	08:13 (PD 41610-23 Fu1)	21:22	22	06:26 (HSK ME17)	21:47	35	06:41 (HSK ME17)							
25	08:15	14:27 (PD 41610-23 Fu2)	07:21		09:54 (HSK ME03)	06:19		06:54 (HSK ME02)	06:11		06:57 (HSK ME05)	05:21		06:04 (HSK ME17)	21:47		06:07 (HSK ME17)							
17:01	77	15:06 (PD 40634-18 (03) (V))	17:57	39	10:25 (PD 41610-23 Fu2)	18:45	67	18:07 (PD 40640-23 (WEA 02))	20:37	76	08:13 (PD 41610-23 Fu1)	21:24	22	06:26 (HSK ME17)	21:47	35	06:42 (HSK ME17)							
26	08:13	14:27 (PD 41610-23 Fu2)	07:19		09:51 (HSK ME03)	06:16		06:53 (HSK (

Marsberg-Meerhof

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	[Juli]		[August]		[September]		[Oktober]		[November]		[Dezember]	
1	05:12	06:08 (HSK ME17)	05:47	06:19 (HSK ME11)	05:36	07:21 (HSK ME06)	07:24	08:31 (HSK ME03)	07:17	08:07 (HSK HR01)	08:07	09:36 (PD 41610-23 Fu2)
2	05:12	06:09 (HSK ME17)	05:49	53 08:16 (PD 41610-23 Fu1)	20:18	07:58 (PD 41610-23 Fu1)	19:05	34 18:28 (PD 40639-23 (WEA 01))	17:00	75 10:13 (PD 41610-23 Fu2)	08:07	62 14:49 (PD 40634-18 (V3))
3	05:13	06:09 (HSK ME17)	05:49	06:21 (HSK ME11)	06:38	07:21 (HSK ME06)	07:26	08:17 (HSK ME02)	07:09	10:06 (HSK HR01)	08:09	09:38 (PD 41610-23 Fu2)
4	05:14	06:09 (HSK ME17)	05:52	50 08:17 (PD 41610-23 Fu1)	20:11	07:40 (HSK ME06)	19:03	44 18:27 (PD 40639-23 (WEA 01))	16:58	77 10:13 (PD 41610-23 Fu2)	16:20	59 14:50 (PD 40634-18 (V3))
5	05:15	06:10 (HSK ME17)	05:54	07:24 (PD 41610-23 Fu1)	06:41	07:19 (HSK ME06)	07:28	08:28 (PD 40639-23 (WEA 01))	16:58	77 10:13 (PD 41610-23 Fu2)	16:20	59 14:50 (PD 40634-18 (V3))
6	05:15	06:11 (HSK ME17)	05:55	48 08:19 (PD 41610-23 Fu1)	20:05	07:40 (HSK ME06)	19:03	44 18:25 (PD 40639-23 (WEA 01))	16:56	78 10:14 (PD 41610-23 Fu2)	16:19	55 14:50 (PD 40634-18 (V3))
7	05:16	06:11 (HSK ME17)	05:57	07:33 (PD 41610-23 Fu1)	06:43	07:19 (HSK ME06)	07:29	08:11 (HSK ME02)	07:23	10:13 (PD 41610-23 Fu2)	16:18	54 14:50 (PD 40634-18 (V3))
8	05:17	06:12 (HSK ME17)	06:00	06:19 (PD 41610-23 Fu1)	20:00	07:39 (HSK ME06)	18:54	36 18:22 (PD 40639-23 (WEA 01))	16:57	78 10:13 (PD 41610-23 Fu2)	16:19	52 14:49 (PD 40634-18 (V3))
9	05:18	06:12 (HSK ME17)	06:01	07:13 (HSK ME05)	06:46	07:39 (HSK ME06)	18:54	36 18:22 (PD 40639-23 (WEA 01))	16:57	78 10:13 (PD 41610-23 Fu2)	16:19	52 14:49 (PD 40634-18 (V3))
10	05:19	06:13 (HSK ME17)	06:01	07:13 (HSK ME05)	06:46	07:39 (HSK ME06)	18:54	36 18:22 (PD 40639-23 (WEA 01))	16:57	78 10:13 (PD 41610-23 Fu2)	16:19	52 14:49 (PD 40634-18 (V3))
11	05:20	06:13 (HSK ME17)	06:03	07:07 (HSK ME05)	06:52	07:23 (HSK ME06)	07:41	08:09 (HSK ME02)	07:35	78 10:13 (PD 41610-23 Fu2)	16:17	52 14:49 (PD 40634-18 (V3))
12	05:21	06:14 (HSK ME17)	06:04	07:07 (HSK ME05)	06:54	07:23 (HSK ME06)	07:41	08:09 (HSK ME02)	07:35	78 10:13 (PD 41610-23 Fu2)	16:17	52 14:49 (PD 40634-18 (V3))
13	05:21	06:14 (HSK ME17)	06:04	07:07 (HSK ME05)	06:54	07:23 (HSK ME06)	07:41	08:09 (HSK ME02)	07:35	78 10:13 (PD 41610-23 Fu2)	16:17	52 14:49 (PD 40634-18 (V3))
14	05:23	06:15 (HSK ME17)	06:08	07:05 (HSK ME05)	06:57	07:42 (HSK ME02)	07:46	08:22 (HSK ME02)	07:40	65 14:52 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
15	05:23	06:15 (HSK ME17)	06:08	07:05 (HSK ME05)	06:57	07:42 (HSK ME02)	07:46	08:22 (HSK ME02)	07:40	65 14:52 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
16	05:26	06:18 (HSK ME17)	06:11	07:21 (PD 41610-23 Fu1)	19:42	07:42 (HSK ME02)	07:46	08:22 (HSK ME02)	07:42	72 14:35 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
17	05:27	06:18 (HSK ME17)	06:12	07:04 (HSK ME05)	07:02	07:41 (HSK ME02)	07:50	08:28 (HSK ME02)	07:45	72 14:35 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
18	05:28	06:19 (HSK ME17)	06:16	07:21 (PD 41610-23 Fu1)	19:40	07:41 (HSK ME02)	07:50	08:28 (HSK ME02)	07:45	72 14:35 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
19	05:29	06:19 (HSK ME17)	06:16	07:03 (HSK ME05)	07:05	07:42 (HSK ME02)	07:58	08:28 (HSK ME02)	07:50	72 14:35 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
20	05:31	06:19 (HSK ME17)	06:17	07:04 (HSK ME05)	07:07	07:42 (HSK ME02)	07:58	08:28 (HSK ME02)	07:50	72 14:35 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
21	05:32	06:19 (HSK ME17)	06:19	07:03 (HSK ME05)	07:08	07:43 (HSK ME02)	07:58	08:28 (HSK ME02)	07:50	72 14:35 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
22	05:33	06:20 (HSK ME17)	06:20	07:04 (HSK ME05)	07:10	07:43 (HSK ME02)	07:58	08:28 (HSK ME02)	07:50	72 14:35 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
23	05:33	06:13 (HSK ME17)	06:20	07:04 (HSK ME05)	07:10	07:46 (HSK ME02)	07:58	08:28 (HSK ME02)	07:50	72 14:35 (PD 40634-18 (V3))	16:16	51 14:49 (PD 40634-18 (V3))
24	05:36	06:16 (HSK ME17)	06:23	07:05 (HSK ME05)	07:13	07:49 (HSK 997491-21 Kasueb)	08:03	10:17 (PD 41610-23 Fu2)	07:57	09:26 (PD 41610-23 Fu2)	08:30	14:23 (PD 40634-18 (V3))
25	05:37	06:16 (HSK ME17)	06:23	07:05 (HSK ME05)	07:13	07:49 (HSK 997491-21 Kasueb)	08:03	10:17 (PD 41610-23 Fu2)	07:57	09:26 (PD 41610-23 Fu2)	08:30	14:23 (PD 40634-18 (V3))
26	05:39	06:19 (HSK ME17)	06:27	08:13 (PD 41610-23 Fu1)	19:17	08:01 (PD 40639-23 (WEA 01))	17:03	10:14 (PD 41610-23 Fu2)	08:00	09:28 (PD 41610-23 Fu2)	08:30	14:23 (PD 40634-18 (V3))
27	05:40	06:15 (HSK ME17)	06:28	07:08 (HSK ME05)	07:18	08:01 (PD 40639-23 (WEA 01))	17:08	10:14 (PD 41610-23 Fu2)	08:02	09:30 (PD 41610-23 Fu2)	08:31	14:23 (PD 40634-18 (V3))
28	05:43	06:16 (HSK ME17)	06:31	07:27 (HSK ME06)	07:12	08:01 (PD 40639-23 (WEA 01))	17:02	10:11 (PD 41610-23 Fu2)	08:05	09:32 (PD 41610-23 Fu2)	08:31	14:24 (PD 40634-18 (V3))
29	05:43	06:16 (HSK ME17)	06:31	07:27 (HSK ME06)	07:12	08:01 (PD 40639-23 (WEA 01))	17:02	10:11 (PD 41610-23 Fu2)	08:05	09:32 (PD 41610-23 Fu2)	08:31	14:24 (PD 40634-18 (V3))
30	05:44	06:17 (HSK ME17)	06:35	07:23 (HSK ME06)	07:18	08:07 (HSK HR01)	08:07	10:13 (PD 41610-23 Fu2)	16:22	67 14:49 (PD 40634-18 (V3))	16:23	15:01 (PD 40634-18 (V3))
31	05:46	06:17 (HSK ME17)	06:35	07:23 (HSK ME06)	07:18	08:07 (HSK HR01)	08:07	10:13 (PD 41610-23 Fu2)	16:22	67 14:49 (PD 40634-18 (V3))	16:23	15:01 (PD 40634-18 (V3))
Sonnenscheinstunden	500	55 08:15 (PD 41610-23 Fu1)	453	39 08:03 (PD 41610-23 Fu1)	381	73 12:02 (PD 41610-23 Fu1)	335	71 11:02 (PD 41610-23 Fu1)	268	74 14:44 (PD 40634-18 (V3))	246	15:02 (PD 40634-18 (V3))
astr.mog.mögl.Beschattung	1082	0.32	1942	0.32	1229	0.29	1382	0.29	2162	0.23	1228	0.23
Reduktion Windrichtung	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Reduktion Windrichtung	0.70	0.70	0.71	0.70	0.70	0.70	0.62	0.61	0.61	0.64	0.64	0.64
Gesamte Reduktion	0.26	0.27	0.27	0.21	0.21	0.21	0.17	0.17	0.13	0.10	0.10	0.10
Met.wetter.Beschattung												

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattenende	Schattenanfang (WEA mit erstem Schatten)	Schattenende (WEA mit letztem Schatten)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN02 - Bad Wünnenberg, Auf der Körtge 4
Sonneneinstrahlungswahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar		Februar		März		April		Mai		Juni		
1	08:31	09:54 (PD 41610-23 Fu2)	08:05	08:40 (HSK HR01)	07:13	07:39 (HSK ME02)	07:03	07:31 (HSK ME06)	05:59	07:46 (PD 41610-23 Fu1)	05:14	06:16 (HSK ME17)	
16:26	43	14:46 (PD 40634-18 (03) (V))	17:13	10:35 (PD 41610-23 Fu2)	18:04	08:16 (HSK ME03)	19:57	28	08:12 (PD 41610-23 Fu1)	20:47	26	06:54 (HSK ME17)	
2	08:31	09:52 (PD 41610-23 Fu2)	08:04	08:38 (HSK HR01)	07:10	07:39 (HSK ME02)	07:01	07:31 (HSK ME06)	05:57	07:47 (PD 41610-23 Fu1)	05:14	06:16 (HSK ME17)	
16:27	48	14:47 (PD 40634-18 (03) (V))	17:15	10:35 (PD 41610-23 Fu2)	18:06	08:16 (HSK ME03)	19:59	38	08:17 (PD 41610-23 Fu1)	20:49	23	06:53 (HSK ME17)	
3	08:31	09:51 (PD 41610-23 Fu2)	08:02	08:39 (HSK HR01)	07:08	07:38 (HSK ME02)	06:58	07:30 (HSK ME06)	05:55	07:50 (PD 41610-23 Fu1)	05:13	06:16 (HSK ME17)	
16:28	51	14:47 (PD 40634-18 (03) (V))	17:17	10:36 (PD 41610-23 Fu2)	18:08	43	17:29 (PD 40639-23 (WEA 01))	20:00	46	08:20 (PD 41610-23 Fu1)	20:50	06:53 (HSK ME17)	
4	08:31	09:50 (PD 41610-23 Fu2)	08:00	08:39 (HSK HR01)	07:06	07:38 (HSK ME02)	06:56	07:29 (HSK ME06)	05:53	08:07 (PD 41610-23 Fu1)	21:34	06:54 (HSK ME17)	
16:29	53	14:47 (PD 40634-18 (03) (V))	17:19	10:35 (PD 41610-23 Fu2)	18:09	51	17:33 (PD 40639-23 (WEA 01))	20:00	50	08:21 (PD 41610-23 Fu1)	20:52	06:54 (HSK ME17)	
5	08:31	09:49 (PD 41610-23 Fu2)	07:59	08:38 (HSK HR01)	07:04	07:38 (HSK ME02)	06:54	07:29 (HSK ME06)	05:51	06:19 (HSK ME17)	05:11	06:16 (HSK ME17)	
16:31	56	14:48 (PD 40634-18 (03) (V))	17:21	10:35 (PD 41610-23 Fu2)	18:11	55	17:36 (PD 40639-23 (WEA 01))	20:04	53	08:23 (PD 41610-23 Fu1)	20:54	06:54 (HSK ME17)	
6	08:30	09:48 (PD 41610-23 Fu2)	07:57	08:38 (HSK HR01)	07:02	07:39 (HSK ME02)	06:52	07:30 (HSK ME06)	05:50	08:07 (PD 41610-23 Fu1)	21:34	06:54 (HSK ME17)	
16:32	57	14:47 (PD 40634-18 (03) (V))	17:22	10:35 (PD 41610-23 Fu2)	18:13	57	17:38 (PD 40639-23 (WEA 01))	20:06	54	08:24 (PD 41610-23 Fu1)	20:55	06:54 (HSK ME17)	
7	08:30	09:48 (PD 41610-23 Fu2)	07:55	08:39 (HSK HR01)	06:59	07:39 (HSK ME02)	06:49	07:30 (HSK ME06)	05:48	06:16 (HSK ME17)	05:10	06:17 (HSK ME17)	
16:33	59	14:48 (PD 40634-18 (03) (V))	17:24	10:35 (PD 41610-23 Fu2)	18:15	56	17:38 (PD 40639-23 (WEA 01))	20:07	55	08:25 (PD 41610-23 Fu1)	20:57	06:54 (HSK ME17)	
8	08:29	09:47 (PD 41610-23 Fu2)	07:54	08:39 (HSK HR01)	06:57	07:41 (HSK ME02)	06:47	07:31 (HSK ME06)	05:46	06:19 (HSK ME17)	05:11	06:17 (HSK ME17)	
16:34	61	14:48 (PD 40634-18 (03) (V))	17:26	10:35 (PD 41610-23 Fu2)	18:16	50	17:39 (PD 40639-23 (WEA 01))	20:09	55	08:26 (PD 41610-23 Fu1)	20:59	06:54 (HSK ME17)	
9	08:29	09:47 (PD 41610-23 Fu2)	07:52	08:40 (HSK HR01)	06:55	17:10 (PD 40639-23 (WEA 01))	06:45	07:22 (HSK ME05)	05:44	06:13 (HSK ME17)	05:09	06:17 (HSK ME17)	
16:36	63	14:49 (PD 40634-18 (03) (V))	17:28	10:34 (PD 41610-23 Fu2)	18:18	30	17:40 (PD 40639-23 (WEA 01))	20:11	61	08:26 (PD 41610-23 Fu1)	21:00	06:54 (HSK ME17)	
10	08:28	09:46 (PD 41610-23 Fu2)	07:50	08:41 (HSK HR01)	06:53	17:09 (PD 40639-23 (WEA 01))	06:43	07:18 (HSK ME05)	05:43	06:14 (HSK ME17)	05:08	06:17 (HSK ME17)	
16:37	63	14:48 (PD 40634-18 (03) (V))	17:30	10:34 (PD 41610-23 Fu2)	18:20	32	17:41 (PD 40639-23 (WEA 01))	20:12	65	08:27 (PD 41610-23 Fu1)	21:02	06:54 (HSK ME17)	
11	08:28	09:45 (PD 41610-23 Fu2)	07:48	08:42 (HSK HR01)	06:51	17:08 (PD 40639-23 (WEA 01))	06:40	07:16 (HSK ME05)	05:41	06:13 (HSK ME17)	05:08	06:18 (HSK ME17)	
16:38	65	14:48 (PD 40634-18 (03) (V))	17:32	10:33 (PD 41610-23 Fu2)	18:22	39	17:56 (PD 40640-23 (WEA 02))	20:14	63	08:27 (PD 41610-23 Fu1)	21:03	06:55 (HSK ME17)	
12	08:27	09:44 (PD 41610-23 Fu2)	07:47	09:44 (PD 41610-23 Fu2)	06:48	17:07 (PD 40639-23 (WEA 01))	06:38	07:14 (HSK ME05)	05:39	06:14 (HSK ME17)	05:08	06:18 (HSK ME17)	
16:40	66	14:48 (PD 40634-18 (03) (V))	17:33	10:32 (PD 41610-23 Fu2)	18:23	44	17:58 (PD 40640-23 (WEA 02))	20:16	67	08:27 (PD 41610-23 Fu1)	21:05	06:55 (HSK ME17)	
13	08:27	09:45 (PD 41610-23 Fu2)	07:45	09:44 (PD 41610-23 Fu2)	06:46	17:07 (PD 40639-23 (WEA 01))	06:36	07:13 (HSK ME05)	05:38	06:12 (HSK ME17)	05:08	06:58 (HSK ME17)	
16:41	66	14:49 (PD 40634-18 (03) (V))	17:35	10:31 (PD 41610-23 Fu2)	18:25	49	18:00 (PD 40640-23 (WEA 02))	20:17	71	08:28 (PD 41610-23 Fu1)	21:06	06:54 (HSK ME17)	
14	08:26	09:44 (PD 41610-23 Fu2)	07:43	09:45 (PD 41610-23 Fu2)	06:44	07:16 (HSK 9974491.31 Kaesp)	06:34	07:12 (HSK ME05)	05:36	06:12 (HSK ME17)	05:08	06:37 (HSK ME17)	
16:43	67	14:48 (PD 40634-18 (03) (V))	17:37	10:30 (PD 41610-23 Fu2)	18:27	57	18:01 (PD 40640-23 (WEA 02))	20:19	72	08:28 (PD 41610-23 Fu1)	21:08	06:55 (HSK ME17)	
15	08:25	09:44 (PD 41610-23 Fu2)	07:41	09:46 (PD 41610-23 Fu2)	06:42	07:13 (HSK 9974491.31 Kaesp)	06:32	07:10 (HSK ME05)	05:35	06:13 (HSK ME17)	05:07	06:37 (HSK ME17)	
16:44	66	14:48 (PD 40634-18 (03) (V))	17:39	10:29 (PD 41610-23 Fu2)	18:28	65	18:03 (PD 40640-23 (WEA 02))	20:21	75	08:27 (PD 41610-23 Fu1)	21:09	06:55 (HSK ME17)	
16	08:24	09:43 (PD 41610-23 Fu2)	07:39	09:47 (PD 41610-23 Fu2)	06:39	07:11 (HSK 9974491.31 Kaesp)	06:29	07:10 (HSK ME05)	05:33	06:14 (HSK ME17)	05:07	06:58 (HSK ME17)	
16:46	67	14:48 (PD 40634-18 (03) (V))	17:41	10:28 (PD 41610-23 Fu2)	18:30	69	18:05 (PD 40640-23 (WEA 02))	20:22	75	08:27 (PD 41610-23 Fu1)	21:11	06:55 (HSK ME17)	
17	08:23	09:43 (PD 41610-23 Fu2)	07:37	09:49 (PD 41610-23 Fu2)	06:37	07:10 (HSK ME02)	06:27	07:09 (HSK ME05)	05:32	06:13 (HSK ME17)	05:07	06:57 (HSK ME17)	
16:47	66	14:47 (PD 40634-18 (03) (V))	17:43	10:26 (PD 41610-23 Fu2)	18:32	72	18:05 (PD 40640-23 (WEA 02))	20:24	75	08:26 (PD 41610-23 Fu1)	21:12	06:55 (HSK ME17)	
18	08:22	09:43 (PD 41610-23 Fu2)	07:35	09:50 (PD 41610-23 Fu2)	06:35	07:06 (HSK ME02)	06:25	07:09 (HSK ME05)	05:29	06:14 (HSK ME17)	05:08	06:58 (HSK ME17)	
16:49	64	14:46 (PD 40634-18 (03) (V))	17:44	10:24 (PD 41610-23 Fu2)	18:34	74	18:04 (PD 40640-23 (WEA 02))	20:26	75	08:26 (PD 41610-23 Fu1)	21:14	06:55 (HSK ME17)	
19	08:22	09:42 (PD 41610-23 Fu2)	07:33	09:52 (PD 41610-23 Fu2)	06:32	07:05 (HSK ME02)	06:23	07:09 (HSK ME05)	05:29	06:13 (HSK ME17)	05:07	06:37 (HSK ME17)	
16:51	65	14:45 (PD 40634-18 (03) (V))	17:46	10:22 (PD 41610-23 Fu2)	18:35	72	18:04 (PD 40640-23 (WEA 02))	20:27	75	08:26 (PD 41610-23 Fu1)	21:15	06:56 (HSK ME17)	
20	08:21	09:41 (PD 41610-23 Fu2)	07:31	09:55 (PD 41610-23 Fu2)	06:30	07:03 (HSK ME02)	06:21	07:09 (HSK ME05)	05:28	06:14 (HSK ME17)	05:08	06:57 (HSK ME17)	
16:52	62	14:43 (PD 40634-18 (03) (V))	17:48	10:19 (PD 41610-23 Fu2)	18:37	71	18:03 (PD 40640-23 (WEA 02))	20:29	73	08:25 (PD 41610-23 Fu1)	21:17	06:56 (HSK ME17)	
21	08:19	09:41 (PD 41610-23 Fu2)	07:29	09:58 (PD 41610-23 Fu2)	06:28	07:01 (HSK ME02)	06:19	07:09 (HSK ME05)	05:26	06:15 (HSK ME17)	05:08	06:58 (HSK ME17)	
16:54	58	14:41 (PD 40634-18 (03) (V))	17:50	10:15 (PD 41610-23 Fu2)	18:39	67	18:02 (PD 40640-23 (WEA 02))	20:31	72	08:24 (PD 41610-23 Fu1)	21:18	06:57 (HSK ME17)	
22	08:18	09:40 (PD 41610-23 Fu2)	07:27	07:59 (HSK ME03)	06:26	07:01 (HSK ME02)	06:17	07:09 (HSK ME05)	05:25	06:14 (HSK ME17)	05:08	06:58 (HSK ME17)	
16:56	49	10:30 (PD 41610-23 Fu2)	17:52	11	10:10 (HSK ME03)	18:40	61	18:01 (PD 40640-23 (WEA 02))	20:32	71	08:24 (PD 41610-23 Fu1)	21:20	06:57 (HSK ME17)
23	08:17	09:40 (PD 41610-23 Fu2)	07:25	07:57 (HSK ME03)	06:23	07:01 (HSK ME02)	06:15	07:09 (HSK ME05)	05:24	06:15 (HSK ME17)	05:08	06:38 (HSK ME17)	
16:57	50	10:30 (PD 41610-23 Fu2)	17:53	15	08:12 (HSK ME03)	18:42	53	17:59 (PD 40640-23 (WEA 02))	20:34	69	08:23 (PD 41610-23 Fu1)	21:21	06:58 (HSK ME17)
24	08:16	09:41 (PD 41610-23 Fu2)	07:23	07:55 (HSK ME03)	06:21	06:59 (HSK ME02)	06:13	07:10 (HSK ME05)	05:23	06:16 (HSK ME17)	05:08	06:38 (HSK ME17)	
16:59	50	10:31 (PD 41610-23 Fu2)	17:55	19	08:14 (HSK ME03)	18:44	38	17:57 (PD 40640-23 (WEA 02))	20:36	65	08:22 (PD 41610-23 Fu1)	21:22	06:57 (HSK ME17)
25	08:15	09:41 (PD 41610-23 Fu2)	07:21	07:53 (HSK ME03)	06:19	06:59 (HSK ME02)	06:11	07:11 (HSK ME05)	05:21	06:16 (HSK ME17)	05:09	06:39 (HSK ME17)	
17:01	51	10:32 (PD 41610-23 Fu2)	17:57	21	08:14 (HSK ME03)	18:45	30	17:53 (PD 40640-23 (WEA 02))	20:37	62	08:21 (PD 41610-23 Fu1)	21:24	06:57 (HSK ME17)
26	08:13	09:40 (PD 41610-23 Fu2)	07:19	07:43 (HSK ME02)	06:16	07:00 (HSK ME02)	06:09	07:12 (HSK ME05)	05:20	06:16 (HSK ME17)	05:09	06:39 (HSK ME17)	
17:03	52	10:32 (PD 41610-23 Fu2)	17:59	32	08:15 (HSK ME03)	18:47	23	07:23 (HSK ME02)	06:07	58	08:20 (PD 41610-23 Fu1)	21:25	06:58 (HSK ME17)
27	08:12	09:40 (PD 41610-23 Fu2)	07:17	07:41 (HSK ME02)	06:14	07:00 (HSK ME02)	06:07	07:13 (HSK ME05)	05:19	06:16 (HSK ME17)	05:09	06:40 (HSK ME17)	
17:04	53	10:33 (PD 41610-23 Fu2)	18:01	34	08:15 (HSK ME03)	18:49	23	07:23 (HSK ME02)	06:07	52	08:18 (PD 41610-23 Fu1)	21:26	06:58 (HSK ME17)
28	08:11	09:40 (PD 41610-23 Fu2)	07:15	07:40 (HSK ME02)	06:12	07:00 (HSK ME02)	06:05	07:15 (HSK ME05)	05:18	06:16 (HSK ME17)	05:10	06:40 (HSK ME17)	
17:06	53	10:33 (PD 41610-23 Fu2)	18:02	35	08:15 (HSK ME03)	18:50	21	07:21 (HSK ME02)	06:04	45	08:17 (PD 41610-23 Fu1)	21:27	06:58 (HSK ME17)
29	08:09	09:40 (PD 41610-23 Fu2)			07:10	07:36 (HSK ME06)	06:03	07:44 (PD 41610-23 Fu1)	05:17	06:16 (HSK ME17)	05:10	06:41 (HSK ME17)	
17:08	54	10:34 (PD 41610-23 Fu2)			19:52	30	08:20 (HSK ME06)	20:44	32	08:16 (PD 41610-23 Fu1)	21:29	06:59 (HSK ME17)	
30	08:08	08:43 (HSK HR01)			07:07	07:34 (HSK ME06)	06:01	07:45 (PD 41610-23 Fu1)	05:16	06:15 (HSK ME17)	05:11	06:58 (HSK ME17)	
17:10	57	10:34 (PD 41610-23 Fu2)			19:54	31	08:18 (HSK ME06)	20:46	29	08:14 (PD 41610-23 Fu1)	21:30	06:58 (HSK ME17)	
31	08:07	08:41 (HSK HR01)			07:05	07:32 (HSK ME06)			05:15	06:15 (HSK ME17)	05:11	06:58 (HSK ME17)	
17:11	63	10:35 (PD 41610-23 Fu2)			19:55	29	08:15 (HSK ME02)		21:31	38	06:53 (HSK ME17)		
Sonneneinstrahlung													
261													
1798													
astr. max. mögl. Beschattung													
0,19													
Red. Sonneneinstrahlung													
0,96													
Reduktion Betriebsdauer													
0,61													
Reduktion Windrichtung													
0,11													
Gesamte Reduktion													
0,19													
Met. wahrsch. Beschattung													
197													
238													
1466													
0,28													
0,96													
0,70													
0,29													
439													
1781													
0,36													
0,96													
0,70													
0,29													
483													
888													
0,43													
0,96													
0,70													
0,29													
258													
888													
0,43													
0,96													
0,70													
0,29													
283													
1244													

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN02 - Bad Wünnenberg, Auf der Körtge 4
Sonneneinstrahlungswahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Juli		August		September		Oktober		November		Dezember	
1	05:12	06:22 (HSK ME17)	05:47	06:23 (HSK ME11)	06:36	07:15 (HSK ME05)	07:24	17:46 (PD 40639-23 (WEA 01))	07:17	08:10 (HSK HR01)	08:07	09:27 (PD 41610-23 Fu2)
2	05:12	06:23 (HSK ME17)	05:49	06:23 (HSK ME11)	06:38	08:26 (PD 41610-23 Fu1)	19:05	17:46 (PD 40639-23 (WEA 01))	07:19	08:09 (HSK HR01)	08:09	14:30 (PD 40634-18 (03) (V))
3	05:13	06:22 (HSK ME17)	05:50	06:24 (HSK ME11)	06:39	07:20 (HSK ME05)	07:28	17:47 (PD 40639-23 (WEA 01))	07:21	08:09 (HSK HR01)	08:10	14:33 (PD 40634-18 (03) (V))
4	05:14	06:22 (HSK ME17)	05:52	06:24 (HSK ME11)	06:41	08:24 (PD 41610-23 Fu1)	19:01	18:34 (PD 40640-23 (WEA 02))	07:23	08:07 (HSK HR01)	08:12	14:33 (PD 40634-18 (03) (V))
5	05:15	06:23 (HSK ME17)	05:55	06:26 (HSK ME11)	06:44	07:26 (HSK ME06)	07:31	17:46 (PD 40639-23 (WEA 01))	07:23	08:07 (HSK HR01)	08:14	14:33 (PD 40634-18 (03) (V))
6	05:16	06:23 (HSK ME17)	05:57	06:26 (HSK ME11)	06:46	08:24 (PD 41610-23 Fu1)	18:54	18:16 (PD 40639-23 (WEA 01))	07:24	08:08 (HSK HR01)	08:15	14:33 (PD 40634-18 (03) (V))
7	05:16	06:23 (HSK ME17)	05:57	06:26 (HSK ME11)	06:46	07:24 (HSK ME06)	07:34	18:13 (PD 40639-23 (WEA 01))	07:24	08:08 (HSK HR01)	08:15	14:33 (PD 40634-18 (03) (V))
8	05:17	06:23 (HSK ME17)	05:58	06:29 (HSK ME11)	06:47	08:20 (PD 41610-23 Fu1)	18:54	18:13 (PD 40639-23 (WEA 01))	07:25	08:08 (HSK HR01)	08:17	14:33 (PD 40634-18 (03) (V))
9	05:18	06:23 (HSK ME17)	06:00	06:30 (HSK ME11)	06:49	07:24 (HSK ME06)	07:36	18:12 (PD 40639-23 (WEA 01))	07:26	08:09 (HSK HR01)	08:18	14:33 (PD 40634-18 (03) (V))
10	05:19	06:23 (HSK ME17)	06:01	06:31 (PD 41610-23 Fu1)	06:51	08:13 (PD 41610-23 Fu1)	18:47	18:10 (PD 40639-23 (WEA 01))	07:27	08:10 (HSK HR01)	08:19	14:33 (PD 40634-18 (03) (V))
11	05:20	06:23 (HSK ME17)	06:03	06:32 (PD 41610-23 Fu1)	06:52	08:11 (PD 41610-23 Fu1)	18:45	18:07 (PD 40639-23 (WEA 01))	07:28	08:12 (HSK HR01)	08:20	14:33 (PD 40634-18 (03) (V))
12	05:21	06:24 (HSK ME17)	06:04	06:33 (PD 41610-23 Fu1)	06:53	08:05 (PD 41610-23 Fu1)	18:43	18:07 (PD 40639-23 (WEA 01))	07:29	08:13 (HSK HR01)	08:21	14:33 (PD 40634-18 (03) (V))
13	05:22	06:24 (HSK ME17)	06:06	06:34 (PD 41610-23 Fu1)	06:55	07:25 (HSK ME06)	07:44	18:07 (PD 40639-23 (WEA 01))	07:30	08:14 (HSK HR01)	08:22	14:33 (PD 40634-18 (03) (V))
14	05:23	06:24 (HSK ME17)	06:08	06:35 (PD 41610-23 Fu1)	06:57	08:09 (HSK ME06)	07:46	18:07 (PD 40639-23 (WEA 01))	07:31	08:15 (HSK HR01)	08:23	14:33 (PD 40634-18 (03) (V))
15	05:24	06:24 (HSK ME17)	06:09	06:36 (PD 41610-23 Fu1)	06:59	07:30 (HSK ME06)	07:48	18:07 (PD 40639-23 (WEA 01))	07:32	08:16 (HSK HR01)	08:24	14:33 (PD 40634-18 (03) (V))
16	05:26	06:24 (HSK ME17)	06:11	06:37 (PD 41610-23 Fu1)	07:00	08:11 (HSK ME06)	07:49	18:07 (PD 40639-23 (WEA 01))	07:33	08:17 (HSK HR01)	08:25	14:33 (PD 40634-18 (03) (V))
17	05:27	06:24 (HSK ME17)	06:12	06:38 (PD 41610-23 Fu1)	07:02	08:12 (HSK ME06)	07:51	18:07 (PD 40639-23 (WEA 01))	07:34	08:18 (HSK HR01)	08:26	14:33 (PD 40634-18 (03) (V))
18	05:28	06:26 (HSK ME17)	06:14	06:39 (PD 41610-23 Fu1)	07:03	08:13 (HSK ME06)	07:53	18:07 (PD 40639-23 (WEA 01))	07:35	08:19 (HSK HR01)	08:27	14:33 (PD 40634-18 (03) (V))
19	05:29	06:26 (HSK ME17)	06:16	06:40 (PD 41610-23 Fu1)	07:05	08:14 (HSK ME06)	07:55	18:07 (PD 40639-23 (WEA 01))	07:36	08:20 (HSK HR01)	08:28	14:33 (PD 40634-18 (03) (V))
20	05:31	06:26 (HSK ME17)	06:17	06:41 (PD 41610-23 Fu1)	07:07	08:15 (HSK ME06)	07:56	18:07 (PD 40639-23 (WEA 01))	07:37	08:21 (HSK HR01)	08:29	14:33 (PD 40634-18 (03) (V))
21	05:32	06:26 (HSK ME17)	06:19	06:42 (PD 41610-23 Fu1)	07:08	08:16 (PD 40640-23 (WEA 02))	07:58	18:07 (PD 40639-23 (WEA 01))	07:38	08:22 (HSK HR01)	08:30	14:33 (PD 40634-18 (03) (V))
22	05:33	06:25 (HSK ME17)	06:20	06:43 (HSK ME05)	07:10	08:17 (PD 40640-23 (WEA 02))	08:00	18:07 (PD 40639-23 (WEA 01))	07:39	08:23 (HSK HR01)	08:31	14:33 (PD 40634-18 (03) (V))
23	05:35	06:25 (HSK ME17)	06:22	06:44 (PD 41610-23 Fu1)	07:11	08:18 (PD 40640-23 (WEA 02))	08:01	18:07 (PD 40639-23 (WEA 01))	07:40	08:24 (HSK HR01)	08:32	14:33 (PD 40634-18 (03) (V))
24	05:36	06:24 (HSK ME17)	06:23	06:45 (PD 41610-23 Fu1)	07:13	08:19 (PD 40640-23 (WEA 02))	08:03	18:07 (PD 40639-23 (WEA 01))	07:41	08:25 (HSK HR01)	08:33	14:33 (PD 40634-18 (03) (V))
25	05:37	06:24 (HSK ME17)	06:25	06:46 (PD 41610-23 Fu1)	07:15	08:20 (PD 40640-23 (WEA 02))	08:05	18:07 (PD 40639-23 (WEA 01))	07:42	08:26 (HSK HR01)	08:34	14:33 (PD 40634-18 (03) (V))
26	05:39	06:24 (HSK ME17)	06:27	06:47 (HSK ME05)	07:16	08:21 (PD 40640-23 (WEA 02))	08:07	18:07 (PD 40639-23 (WEA 01))	07:43	08:27 (HSK HR01)	08:35	14:33 (PD 40634-18 (03) (V))
27	05:40	06:23 (HSK ME17)	06:28	06:48 (PD 41610-23 Fu1)	07:18	08:22 (PD 40640-23 (WEA 02))	08:09	18:07 (PD 40639-23 (WEA 01))	07:44	08:28 (HSK HR01)	08:36	14:33 (PD 40634-18 (03) (V))
28	05:42	06:23 (HSK ME17)	06:30	06:49 (PD 41610-23 Fu1)	07:19	08:23 (PD 40640-23 (WEA 02))	08:10	18:07 (PD 40639-23 (WEA 01))	07:45	08:29 (HSK HR01)	08:37	14:33 (PD 40634-18 (03) (V))
29	05:43	06:23 (HSK ME17)	06:31	06:50 (PD 41610-23 Fu1)	07:21	08:24 (PD 40640-23 (WEA 02))	08:12	18:07 (PD 40639-23 (WEA 01))	07:46	08:30 (HSK HR01)	08:38	14:33 (PD 40634-18 (03) (V))
30	05:44	06:23 (HSK ME17)	06:33	06:51 (PD 41610-23 Fu1)	07:23	08:25 (PD 40640-23 (WEA 02))	08:14	18:07 (PD 40639-23 (WEA 01))	07:47	08:31 (HSK HR01)	08:39	14:33 (PD 40634-18 (03) (V))
31	05:46	06:23 (HSK ME17)	06:35	06:52 (PD 41610-23 Fu1)	07:25	08:26 (PD 40640-23 (WEA 02))	08:16	18:07 (PD 40639-23 (WEA 01))	07:48	08:32 (HSK HR01)	08:40	14:33 (PD 40634-18 (03) (V))
Sonnenscheinstunden												
astr. max. mögl. Beschattung												
Red. Sonnenscheinwahrsch.												
Reduktion Betriebsdauer												
Reduktion Windrichtung												
Gesamte Reduktion												
Met. wahrsch. Beschattung												
	500		453		381		1503		1177		1866	
	1102		1451		1503		1503		1177		1866	
	0,39		0,40		0,32		0,29		0,29		0,23	
	0,96		0,96		0,96		0,96		0,96		0,96	
	0,70		0,70		0,70		0,64		0,64		0,63	
	0,26		0,27		0,21		0,18		0,13		0,10	
	290		394		322		210		242		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 (WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	--	---

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN12 - Essentho, In den Stricken 30
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar	Februar	März		April	Mai	Jun
1	08:31 16:26	08:05 17:13	07:12 18:04		07:03 19:57	05:59 20:47	05:15 21:32
2	08:31 16:27	08:03 17:15	07:10 18:06		07:01 19:59	05:57 20:49	05:14 21:33
3	08:31 16:28	08:02 17:17	07:08 18:08		06:58 20:00	05:55 20:50	05:13 21:34
4	08:31 16:30	08:00 17:19	07:06 18:09		06:56 20:02	05:53 20:52	05:12 21:35
5	08:30 16:31	07:59 17:21	07:04 18:11	5	07:40 (TW 600) 07:45 (TW 600)	06:54 20:04	05:52 20:54
6	08:30 16:32	07:57 17:22	07:02 18:13	12	07:36 (TW 600) 07:48 (TW 600)	06:52 20:05	05:50 20:55
7	08:30 16:33	07:55 17:24	06:59 18:15	16	07:34 (TW 600) 07:50 (TW 600)	06:49 20:07	05:48 20:57
8	08:29 16:34	07:54 17:26	06:57 18:16	18	07:33 (TW 600) 07:51 (TW 600)	06:47 20:09	05:46 20:58
9	08:29 16:36	07:52 17:28	06:55 18:18	20	07:32 (TW 600) 07:52 (TW 600)	06:45 20:10	05:45 21:00
10	08:28 16:37	07:50 17:30	06:53 18:20	21	07:30 (TW 600) 07:51 (TW 600)	06:43 20:12	05:43 21:02
11	08:28 16:39	07:48 17:32	06:50 18:22	22	07:30 (TW 600) 07:52 (TW 600)	06:40 20:14	05:41 21:03
12	08:27 16:40	07:46 17:33	06:48 18:23	22	07:30 (TW 600) 07:52 (TW 600)	06:38 20:15	05:40 21:05
13	08:26 16:41	07:45 17:35	06:46 18:25	21	07:30 (TW 600) 07:51 (TW 600)	06:36 20:17	05:38 21:06
14	08:26 16:43	07:43 17:37	06:44 18:27	20	07:30 (TW 600) 07:50 (TW 600)	06:34 20:19	05:36 21:08
15	08:25 16:44	07:41 17:39	06:41 18:28	18	07:31 (TW 600) 07:49 (TW 600)	06:32 20:20	05:35 21:09
16	08:24 16:46	07:39 17:41	06:39 18:30	16	07:32 (TW 600) 07:48 (TW 600)	06:29 20:22	05:33 21:11
17	08:23 16:48	07:37 17:43	06:37 18:32	13	07:32 (TW 600) 07:45 (TW 600)	06:27 20:24	05:32 21:12
18	08:22 16:49	07:35 17:44	06:35 18:34	7	07:35 (TW 600) 07:42 (TW 600)	06:25 20:25	05:30 21:14
19	08:21 16:51	07:33 17:46	06:32 18:35		06:23 20:27	05:29 21:15	05:07 21:15
20	08:20 16:52	07:31 17:48	06:30 18:37		06:21 20:29	05:28 21:17	05:08 21:16
21	08:19 16:54	07:29 17:50	06:28 18:39		06:19 20:30	05:26 21:18	05:08 21:16
22	08:18 16:56	07:27 17:52	06:26 18:40		06:17 20:32	05:25 21:19	05:08 21:16
23	08:17 16:57	07:25 17:53	06:23 18:42		06:15 20:34	05:24 21:21	05:08 21:16
24	08:16 16:59	07:23 17:55	06:21 18:44		06:13 20:35	05:23 21:22	05:08 21:16
25	08:15 17:01	07:21 17:57	06:19 18:45		06:11 20:37	05:22 21:23	05:09 21:17
26	08:13 17:03	07:19 17:59	06:16 18:47		06:09 20:39	05:20 21:25	05:09 21:17
27	08:12 17:04	07:17 18:01	06:14 18:49		06:07 20:40	05:19 21:26	05:10 21:16
28	08:11 17:06	07:15 18:02	06:12 18:50		06:05 20:42	05:18 21:27	05:10 21:16
29	08:09 17:08		07:10 19:52		06:03 20:44	05:17 21:28	05:11 21:16
30	08:08 17:10		07:07 19:54		06:01 20:45	05:16 21:30	05:11 21:16
31	08:06 17:12		07:05 19:55			05:15 21:31	05:11 21:16
Sonnenscheinstunden	261	279	367		415	483	496
astr.max.mögl.Beschattung			231			372	1036
Red.Sonnenscheinwahrsch.			0,28			0,43	0,34
Reduktion Betriebsdauer			0,96			0,96	0,96
Reduktion Windrichtung			0,67			0,70	0,70
Gesamte Reduktion			0,18			0,29	0,23
Met.wahrsch.Beschattung			42			108	237

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN12 - Essentho, In den Stricken 30
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Juli			August			September			Oktober			November			Dezember
1	05:12		06:11 (KB2)	05:48		06:36				07:24		08:09 (TW 600)	07:17		08:07	
	21:46	35	06:46 (KB2)	21:15		20:14				19:05	21	08:30 (TW 600)	17:00		16:20	
2	05:12		06:12 (KB2)	05:49		06:38				07:26		08:09 (TW 600)	07:19		08:09	
	21:45	34	06:46 (KB2)	21:13		20:11				19:03	21	08:30 (TW 600)	16:58		16:20	
3	05:13		06:11 (KB2)	05:51		06:39				07:28		08:09 (TW 600)	07:21		08:10	
	21:45	35	06:46 (KB2)	21:11		20:09				19:01	21	08:30 (TW 600)	16:56		16:19	
4	05:14		06:12 (KB2)	05:52		06:41				07:29		08:09 (TW 600)	07:22		08:11	
	21:45	34	06:46 (KB2)	21:10		20:07				18:58	20	08:29 (TW 600)	16:55		16:19	
5	05:15		06:12 (KB2)	05:54		06:43				07:31		08:09 (TW 600)	07:24		08:13	
	21:44	35	06:47 (KB2)	21:08		20:05				18:56	19	08:28 (TW 600)	16:53		16:18	
6	05:15		06:13 (KB2)	05:55		06:44				07:33		08:10 (TW 600)	07:26		08:14	
	21:44	34	06:47 (KB2)	21:06		20:02				18:54	17	08:27 (TW 600)	16:51		16:18	
7	05:16		06:12 (KB2)	05:57		06:46				07:34		08:11 (TW 600)	07:28		08:15	
	21:43	34	06:46 (KB2)	21:04		20:00				18:52	14	08:25 (TW 600)	16:49		16:17	
8	05:17		06:12 (KB2)	05:58		06:47				07:36		08:13 (TW 600)	07:29		08:16	
	21:43	34	06:46 (KB2)	21:03		19:58				18:49	10	08:23 (TW 600)	16:48		16:17	
9	05:18		06:13 (KB2)	06:00		06:49				07:38			07:31		08:18	
	21:42	34	06:47 (KB2)	21:01		19:56				18:47			16:46		16:17	
10	05:19		06:13 (KB2)	06:01		06:51				07:39			07:33		08:19	
	21:41	34	06:47 (KB2)	20:59		19:53				18:45			16:45		16:16	
11	05:20		06:14 (KB2)	06:03		06:52				07:41			07:35		08:20	
	21:40	33	06:47 (KB2)	20:57		19:51				18:43			16:43		16:16	
12	05:21		06:14 (KB2)	06:04		06:54				07:43			07:36		08:21	
	21:40	33	06:47 (KB2)	20:55		19:49				18:40			16:42		16:16	
13	05:22		06:14 (KB2)	06:06		06:55				07:44			07:38		08:22	
	21:39	33	06:47 (KB2)	20:53		19:46				18:38			16:40		16:16	
14	05:23		06:15 (KB2)	06:08		06:57				07:46			07:40		08:23	
	21:38	31	06:46 (KB2)	20:51		19:44				18:36			16:39		16:16	
15	05:25		06:15 (KB2)	06:09		06:59				07:48			07:42		08:24	
	21:37	31	06:46 (KB2)	20:49		19:42				18:34			16:37		16:16	
16	05:26		06:15 (KB2)	06:11		07:00				07:49			07:43		08:24	
	21:36	31	06:46 (KB2)	20:47		19:40				18:32			16:36		16:16	
17	05:27		06:17 (KB2)	06:12		07:02				07:51			07:45		08:25	
	21:35	29	06:46 (KB2)	20:45		19:37				18:30			16:34		16:17	
18	05:28		06:17 (KB2)	06:14		07:03				07:53			07:47		08:26	
	21:34	29	06:46 (KB2)	20:43		19:35				18:28			16:33		16:17	
19	05:29		06:18 (KB2)	06:16		07:05				07:54			07:48		08:27	
	21:33	27	06:45 (KB2)	20:41		19:33				18:25			16:32		16:17	
20	05:31		06:18 (KB2)	06:17		07:07				07:56			07:50		08:27	
	21:32	27	06:45 (KB2)	20:39		19:30				18:23			16:31		16:17	
21	05:32		06:19 (KB2)	06:19		07:08				07:58			07:52		08:28	
	21:30	25	06:44 (KB2)	20:37		19:28				18:21			16:30		16:18	
22	05:33		06:20 (KB2)	06:20		07:10				08:00			07:53		08:29	
	21:29	24	06:44 (KB2)	20:35		19:26				18:19			16:28		16:18	
23	05:35		06:21 (KB2)	06:22		07:11				08:01			07:55		08:29	
	21:28	21	06:42 (KB2)	20:33		19:23				18:17			16:27		16:19	
24	05:36		06:22 (KB2)	06:24		07:13				08:03			07:57		08:29	
	21:26	19	06:41 (KB2)	20:31		19:21				18:15			16:26		16:19	
25	05:37		06:23 (KB2)	06:25		07:15			08:21 (TW 600)	07:05			07:58		08:30	
	21:25	16	06:39 (KB2)	20:29		19:19		1	08:22 (TW 600)	07:13			16:25		16:20	
26	05:39		06:26 (KB2)	06:27		07:16			08:16 (TW 600)	07:07			08:00		08:30	
	21:24	12	06:38 (KB2)	20:27		19:17		11	08:27 (TW 600)	07:11			16:24		16:21	
27	05:40			06:28		07:18			08:14 (TW 600)	07:08			08:01		08:30	
	21:22			20:25		19:14		15	08:29 (TW 600)	07:09			16:23		16:22	
28	05:42			06:30		07:19			08:12 (TW 600)	07:10			08:03		08:31	
	21:21			20:22		19:12		17	08:29 (TW 600)	07:07			16:23		16:22	
29	05:43			06:32		07:21			08:11 (TW 600)	07:12			08:04		08:31	
	21:19			20:20		19:10		19	08:30 (TW 600)	07:05			16:22		16:23	
30	05:45			06:33		07:23			08:10 (TW 600)	07:14			08:06		08:31	
	21:18			20:18		19:07		21	08:31 (TW 600)	07:04			16:21		16:24	
31	05:46			06:35						07:15					08:31	
	21:16			20:16						17:02					16:25	
Sonnenscheinstunden	500			452		381				332			268		246	
astr.max.mögl.Beschattung		764				84				143						
Red.Sonnenscheinwahrsch.		0,39				0,32				0,29						
Reduktion Betriebsdauer		0,96				0,96				0,96						
Reduktion Windrichtung		0,70				0,67				0,67						
Gesamte Reduktion		0,26				0,20				0,18						
Met.wahrsch.Beschattung		201				17				26						

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

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnér / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN23 - Oesdorf, Zum Kesselberg 15

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar	Februar	März	April	Mai	Juni
1	08:31 16:26	08:05 17:13	07:12 18:04	16:12 (HSK HR13) 19:57	18:12 (HSK HR12) 20:47	05:14 21:32
2	08:31 16:27	08:03 17:15	07:10 18:06	16:12 (HSK HR13) 19:59	18:12 (HSK HR12) 20:49	05:13 21:33
3	08:31 16:28	08:02 17:17	07:08 18:07	16:13 (HSK HR13) 20:00	18:12 (HSK HR12) 20:50	05:13 21:34
4	08:30 16:29	08:00 17:19	07:06 18:09	16:15 (HSK HR13) 20:02	18:14 (HSK HR12) 20:52	05:12 21:35
5	08:30 16:30	07:58 17:20	07:04 18:11	16:16 (HSK HR13) 20:04	18:16 (HSK HR12) 20:53	05:11 21:36
6	08:30 16:32	07:57 17:22	07:01 18:13	16:17 (HSK HR13) 20:05	18:18 (HSK HR12) 20:55	05:11 21:37
7	08:30 16:33	07:55 17:24	06:59 18:14	16:21 (HSK HR13) 20:07	18:23 (HSK HR12) 20:57	05:10 21:38
8	08:29 16:34	07:53 17:26	16:31 (HSK HR14) 18:16	06:57 20:09	05:46 20:58	05:10 21:39
9	08:29 16:36	07:52 17:28	16:28 (HSK HR14) 18:18	06:55 20:10	05:44 21:00	05:09 21:40
10	08:28 16:37	07:50 17:29	16:26 (HSK HR14) 18:20	06:53 20:12	05:43 21:01	05:09 21:40
11	08:28 16:38	07:48 17:31	16:25 (HSK HR14) 18:21	06:50 20:14	05:41 21:03	05:08 21:41
12	08:27 16:40	07:46 17:33	16:24 (HSK HR14) 18:23	17:35 (HSK HR06) 20:15	05:39 21:05	05:08 21:42
13	08:26 16:41	07:44 17:35	16:23 (HSK HR14) 18:25	17:31 (HSK HR06) 20:17	05:38 21:06	05:08 21:42
14	08:26 16:43	07:43 17:37	16:23 (HSK HR14) 18:26	17:30 (HSK HR06) 20:19	05:36 21:08	05:08 21:43
15	08:25 16:44	07:41 17:39	16:23 (HSK HR13) 18:28	17:29 (HSK HR06) 20:20	05:35 21:09	05:07 21:44
16	08:24 16:46	07:39 17:40	16:20 (HSK HR13) 18:30	17:28 (HSK HR06) 20:22	05:33 21:11	05:07 21:44
17	08:23 16:47	07:37 17:42	16:18 (HSK HR13) 18:32	17:27 (HSK HR06) 20:24	05:32 21:12	05:07 21:45
18	08:22 16:49	07:35 17:44	16:16 (HSK HR13) 18:33	17:24 (HSK HR12) 20:25	05:30 21:14	05:07 21:45
19	08:21 16:51	07:33 17:46	16:15 (HSK HR13) 18:35	17:21 (HSK HR12) 20:27	05:29 21:15	05:07 21:45
20	08:20 16:52	07:31 17:48	16:14 (HSK HR13) 18:37	17:18 (HSK HR12) 20:29	05:27 21:16	05:07 21:46
21	08:19 16:54	07:29 17:50	16:13 (HSK HR13) 18:38	17:17 (HSK HR12) 20:30	05:26 21:18	05:07 21:46
22	08:18 16:56	07:27 17:51	16:13 (HSK HR13) 18:40	17:16 (HSK HR12) 20:32	05:25 21:19	05:08 21:46
23	08:17 16:57	07:25 17:53	16:11 (HSK HR13) 18:42	17:14 (HSK HR12) 20:34	05:24 21:21	05:08 21:46
24	08:16 16:59	07:23 17:55	16:11 (HSK HR13) 18:43	17:13 (HSK HR12) 20:35	05:22 21:22	05:08 21:46
25	08:14 17:01	07:21 17:57	16:11 (HSK HR13) 18:45	17:12 (HSK HR12) 20:37	05:21 21:23	05:08 21:46
26	08:13 17:02	07:19 17:59	16:11 (HSK HR13) 18:47	17:12 (HSK HR12) 20:39	05:20 21:25	05:09 21:46
27	08:12 17:04	07:16 18:00	16:12 (HSK HR13) 18:48	17:11 (HSK HR12) 20:40	05:19 21:26	05:09 21:46
28	08:11 17:06	07:14 18:02	16:12 (HSK HR13) 18:50	17:11 (HSK HR12) 20:42	05:18 21:27	05:10 21:46
29	08:09 17:08		07:09 19:52	18:11 (HSK HR12) 20:44	05:17 21:28	05:10 21:46
30	08:08 17:09		07:07 19:54	18:10 (HSK HR12) 20:45	05:16 21:30	05:11 21:46
31	08:06 17:11		07:05 19:55	18:11 (HSK HR12) 18:42 (HSK HR12)	05:15 21:31	
Sonnenscheinstunden	261	278	367	415	483	496
astr.max.mögl.Beschattung		523	679	145		
Red.Sonnenscheinwahrsch.		0,32	0,28	0,36		
Reduktion Betriebsdauer		0,96	0,96	0,96		
Reduktion Windrichtung		0,70	0,70	0,70		
Gesamte Reduktion		0,22	0,19	0,25		
Met.wahrsch.Beschattung		113	130	36		

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

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnert / ulnert@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN23 - Oesdorf, Zum Kesselberg 15

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Jul	August	September		Oktober		November		Dezember
1	05:11 21:46	05:47 21:15	06:36 20:13		07:24 19:05	18:12 (HSK HR06) 18:23 (HSK HR06)	07:17 17:00	15:55 (HSK HR14) 16:10 (HSK HR14)	08:07 16:20
2	05:12 21:45	05:49 21:13	06:38 20:11		07:26 19:03		07:19 16:58	15:57 (HSK HR14) 16:08 (HSK HR14)	08:09 16:19
3	05:13 21:45	05:50 21:11	06:39 20:09		07:27 19:00		07:21 16:56	16:02 (HSK HR14) 16:04 (HSK HR14)	08:10 16:19
4	05:14 21:45	05:52 21:10	06:41 20:07		07:29 18:58		07:22 16:54		08:11 16:18
5	05:14 21:44	05:53 21:08	06:42 20:04	5	18:19 (HSK HR12) 18:24 (HSK HR12)		07:24 16:53		08:13 16:18
6	05:15 21:44	05:55 21:06	06:44 20:02	15	18:14 (HSK HR12) 18:29 (HSK HR12)	17:00 (HSK HR13) 17:04 (HSK HR13)	07:26 16:51		08:14 16:17
7	05:16 21:43	05:56 21:04	06:46 20:00	19	18:11 (HSK HR12) 18:30 (HSK HR12)	16:55 (HSK HR13) 17:09 (HSK HR13)	07:28 16:49		08:15 16:17
8	05:17 21:42	05:58 21:03	06:47 19:58	23	18:09 (HSK HR12) 18:32 (HSK HR12)	16:52 (HSK HR13) 17:11 (HSK HR13)	07:29 16:48		08:16 16:17
9	05:18 21:42	06:00 21:01	06:49 19:55	25	18:07 (HSK HR12) 18:32 (HSK HR12)	16:50 (HSK HR13) 17:13 (HSK HR13)	07:31 16:46		08:17 16:16
10	05:19 21:41	06:01 20:59	06:50 19:53	27	18:06 (HSK HR12) 18:33 (HSK HR12)	16:48 (HSK HR13) 17:13 (HSK HR13)	07:33 16:44		08:19 16:16
11	05:20 21:40	06:03 20:57	06:52 19:51	29	18:04 (HSK HR12) 18:33 (HSK HR12)	16:47 (HSK HR13) 17:14 (HSK HR13)	07:35 16:43		08:20 16:16
12	05:21 21:39	06:04 20:55	06:54 19:49	31	18:03 (HSK HR12) 18:34 (HSK HR12)	16:46 (HSK HR13) 17:15 (HSK HR13)	07:36 16:41		08:21 16:16
13	05:22 21:39	06:06 20:53	06:55 19:46	31	18:02 (HSK HR12) 18:33 (HSK HR12)	16:44 (HSK HR13) 17:15 (HSK HR13)	07:38 16:40		08:22 16:16
14	05:23 21:38	06:07 20:51	06:57 19:44	32	18:02 (HSK HR12) 18:34 (HSK HR12)	16:44 (HSK HR13) 17:15 (HSK HR13)	07:40 16:38		08:23 16:16
15	05:24 21:37	06:09 20:49	06:58 19:42	33	18:00 (HSK HR12) 18:33 (HSK HR12)	16:44 (HSK HR13) 17:15 (HSK HR13)	07:42 16:37		08:24 16:16
16	05:25 21:36	06:11 20:47	07:00 19:39	33	18:00 (HSK HR12) 18:33 (HSK HR12)	16:43 (HSK HR13) 17:15 (HSK HR13)	07:43 16:36		08:24 16:16
17	05:27 21:35	06:12 20:45	07:02 19:37	32	18:01 (HSK HR12) 18:33 (HSK HR12)	16:43 (HSK HR13) 17:15 (HSK HR13)	07:45 16:34		08:25 16:16
18	05:28 21:34	06:14 20:43	07:03 19:35	32	18:00 (HSK HR12) 18:32 (HSK HR12)	16:43 (HSK HR13) 17:14 (HSK HR13)	07:47 16:33		08:26 16:17
19	05:29 21:33	06:15 20:41	07:05 19:32	31	18:00 (HSK HR12) 18:31 (HSK HR12)	16:43 (HSK HR13) 17:14 (HSK HR13)	07:48 16:32		08:27 16:17
20	05:30 21:31	06:17 20:39	07:06 19:30	30	18:00 (HSK HR12) 18:30 (HSK HR12)	16:43 (HSK HR13) 17:13 (HSK HR13)	07:50 16:30		08:27 16:17
21	05:32 21:30	06:18 20:37	07:08 19:28	29	18:01 (HSK HR12) 18:30 (HSK HR06)	16:44 (HSK HR13) 17:13 (HSK HR13)	07:52 16:29		08:28 16:18
22	05:33 21:29	06:20 20:35	07:10 19:26	29	18:01 (HSK HR12) 18:30 (HSK HR06)	16:45 (HSK HR13) 17:14 (HSK HR14)	07:53 16:28		08:28 16:18
23	05:34 21:28	06:22 20:33	07:11 19:23	29	18:02 (HSK HR12) 18:31 (HSK HR06)	16:46 (HSK HR13) 17:15 (HSK HR14)	07:55 16:27		08:29 16:19
24	05:36 21:26	06:23 20:31	07:13 19:21	27	18:04 (HSK HR12) 18:31 (HSK HR06)	16:46 (HSK HR13) 17:14 (HSK HR14)	07:57 16:26		08:29 16:19
25	05:37 21:25	06:25 20:29	07:14 19:19	25	18:06 (HSK HR12) 18:31 (HSK HR06)	15:48 (HSK HR13) 16:14 (HSK HR14)	07:58 16:25		08:30 16:20
26	05:39 21:24	06:26 20:27	07:16 19:16	21	18:09 (HSK HR06) 18:30 (HSK HR06)	15:50 (HSK HR13) 16:15 (HSK HR14)	08:00 16:24		08:30 16:20
27	05:40 21:22	06:28 20:24	07:18 19:14	20	18:09 (HSK HR06) 18:29 (HSK HR06)	15:52 (HSK HR14) 16:14 (HSK HR14)	08:01 16:23		08:30 16:21
28	05:41 21:21	06:30 20:22	07:19 19:12	20	18:09 (HSK HR06) 18:29 (HSK HR06)	15:53 (HSK HR14) 16:14 (HSK HR14)	08:03 16:22		08:31 16:22
29	05:43 21:19	06:31 20:20	07:21 19:09	18	18:10 (HSK HR06) 18:28 (HSK HR06)	15:53 (HSK HR14) 16:14 (HSK HR14)	08:04 16:22		08:31 16:23
30	05:44 21:18	06:33 20:18	07:23 19:07	15	18:10 (HSK HR06) 18:25 (HSK HR06)	15:54 (HSK HR14) 16:13 (HSK HR14)	08:06 16:21		08:31 16:24
31	05:46 21:16	06:34 20:16			07:15 17:02	15:55 (HSK HR14) 16:12 (HSK HR14)			08:31 16:25
Sonnenscheinstunden	500	453	381		332		268		246
astr. max. mögl. Beschattung			661		667		28		
Red. Sonnenscheinwahrsch.			0,32		0,29		0,23		
Reduktion Betriebsdauer			0,96		0,96		0,96		
Reduktion Windrichtung			0,70		0,70		0,70		
Gesamte Reduktion			0,22		0,19		0,15		
Met. wahrsch. Beschattung			142		129		4		

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnér / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN26 - Meerhof, Sintfeldstraße 28

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar			Februar			März			April			Mai			Juni		
1	08:31		15:06 (HSK HR06)	08:05		15:59 (HSK HR05)	07:12			07:03		05:59			05:14		20:57 (HSK ME08a)	
	16:26	24	15:30 (HSK HR06)	17:13	28	16:27 (HSK HR05)	18:04			19:57		20:47			21:32	3	21:00 (HSK ME08a)	
2	08:31		15:06 (HSK HR06)	08:03		15:58 (HSK HR05)	07:10			07:00		05:57			05:13		20:57 (HSK ME08a)	
	16:27	25	15:31 (HSK HR06)	17:15	30	16:28 (HSK HR05)	18:06			19:59		20:49			21:33	4	21:01 (HSK ME08a)	
3	08:31		15:06 (HSK HR06)	08:02		15:57 (HSK HR05)	07:08			06:58		05:55			05:13		20:56 (HSK ME08a)	
	16:28	24	15:30 (HSK HR06)	17:17	31	16:28 (HSK HR05)	18:07			20:00		20:50			21:34	6	21:02 (HSK ME08a)	
4	08:31		15:07 (HSK HR06)	08:00		15:58 (HSK HR05)	07:06			07:06		05:53	19:33 (HSK ME01)		05:12		20:57 (HSK ME08a)	
	16:29	24	15:31 (HSK HR06)	17:19	32	16:30 (HSK HR05)	18:09			20:02	3	20:52	19:36 (HSK ME01)		21:35	6	21:03 (HSK ME08a)	
5	08:30		15:08 (HSK HR06)	07:59		15:57 (HSK HR05)	07:04			06:54		05:51	19:31 (HSK ME01)	20:21 (HSK ME08b)	05:11		20:56 (HSK ME08a)	
	16:30	24	15:32 (HSK HR06)	17:20	33	16:30 (HSK HR05)	18:11			20:04	7	20:53	19:38 (HSK ME01)	20:25 (HSK ME08b)	21:36	8	21:04 (HSK ME08a)	
6	08:30		15:08 (HSK HR06)	07:57		15:57 (HSK HR05)	07:01			06:51		05:50	19:29 (HSK ME01)	20:50 (HSK ME08b)	05:11		20:55 (HSK ME08a)	
	16:32	24	15:32 (HSK HR06)	17:22	33	16:30 (HSK HR05)	18:13			20:05	11	20:55	19:40 (HSK ME01)	20:55 (HSK ME08b)	21:37	9	21:04 (HSK ME08a)	
7	08:30		15:09 (HSK HR06)	07:55		15:57 (HSK HR05)	06:59		17:29 (HSK HR03)	06:49		05:48	19:28 (HSK ME01)	20:54 (HSK ME08b)	05:10		20:56 (HSK ME08a)	
	16:33	23	15:32 (HSK HR06)	17:24	42	16:51 (HSK HR04)	18:14	17	17:49 (HSK HR02)	20:07	14	20:57	19:42 (HSK ME01)	20:57 (HSK ME08b)	21:38	9	21:05 (HSK ME08a)	
8	08:29		15:09 (HSK HR06)	07:53		15:56 (HSK HR05)	06:57		17:26 (HSK HR03)	06:47		05:46	19:27 (HSK ME01)	20:54 (HSK ME08b)	05:10		20:56 (HSK ME08a)	
	16:34	23	15:32 (HSK HR06)	17:26	48	16:54 (HSK HR04)	18:16	25	17:51 (HSK HR02)	20:09	15	20:58	19:42 (HSK ME01)	20:58 (HSK ME08b)	21:39	11	21:07 (HSK ME08a)	
9	08:29		15:09 (HSK HR06)	07:52		15:57 (HSK HR05)	06:55		17:25 (HSK HR03)	06:45		05:44	19:26 (HSK ME01)	20:53 (HSK ME08b)	05:09		20:56 (HSK ME08a)	
	16:36	23	15:32 (HSK HR06)	17:28	51	16:56 (HSK HR04)	18:18	28	17:53 (HSK HR02)	20:10	18	21:00	19:44 (HSK ME01)	21:00 (HSK ME08b)	21:40	12	21:07 (HSK ME08a)	
10	08:28		15:11 (HSK HR06)	07:50		15:57 (HSK HR05)	06:53		17:22 (HSK HR03)	06:42		05:43	19:26 (HSK ME01)	20:53 (HSK ME08b)	05:09		20:56 (HSK ME08a)	
	16:37	22	15:33 (HSK HR06)	17:30	53	16:57 (HSK HR04)	18:20	32	17:54 (HSK HR02)	20:12	19	21:01	19:45 (HSK ME01)	21:01 (HSK ME08b)	21:40	12	21:08 (HSK ME08a)	
11	08:28		15:11 (HSK HR06)	07:48		15:58 (HSK HR05)	06:50		17:21 (HSK HR03)	06:40		05:41	19:26 (HSK ME01)	20:54 (HSK ME08b)	05:08		20:56 (HSK ME08a)	
	16:38	22	15:33 (HSK HR06)	17:31	54	16:58 (HSK HR04)	18:21	35	17:56 (HSK HR02)	20:14	19	21:03	19:45 (HSK ME01)	21:03 (HSK ME08b)	21:41	13	21:09 (HSK ME08a)	
12	08:27		15:12 (HSK HR06)	07:46		15:58 (HSK HR05)	06:48		17:20 (HSK HR03)	06:38		05:39	19:27 (HSK ME01)	20:53 (HSK ME08b)	05:08		20:55 (HSK ME08a)	
	16:40	20	15:32 (HSK HR06)	17:33	54	16:58 (HSK HR04)	18:23	36	17:56 (HSK HR02)	20:15	23	21:05	19:50 (HSK HR04 TLF)	20:59 (HSK ME08b)	21:42	14	21:09 (HSK ME08a)	
13	08:26		15:13 (HSK HR06)	07:45		15:58 (HSK HR05)	06:46		17:18 (HSK HR03)	06:36		05:38	19:26 (HSK ME01)	20:58 (HSK ME08b)	05:08		20:56 (HSK ME08a)	
	16:41	19	15:32 (HSK HR06)	17:35	55	16:59 (HSK HR04)	18:25	37	17:55 (HSK HR02)	20:17	24	21:06	19:50 (HSK HR04 TLF)	21:06 (HSK ME08b)	21:42	13	21:09 (HSK ME08a)	
14	08:26		15:14 (HSK HR06)	07:43		15:59 (HSK HR05)	06:44		17:18 (HSK HR03)	06:34		05:37	19:27 (HSK ME01)	20:57 (HSK ME08b)	05:07		20:56 (HSK ME08a)	
	16:43	18	15:32 (HSK HR06)	17:37	53	16:59 (HSK HR04)	18:27	37	17:55 (HSK HR02)	20:19	25	21:08	19:52 (HSK HR04 TLF)	21:08 (HSK ME08b)	21:43	14	21:10 (HSK ME08a)	
15	08:25		15:15 (HSK HR06)	07:41		16:00 (HSK HR05)	06:41		17:18 (HSK HR03)	06:31		05:35	19:29 (HSK ME01)	20:55 (HSK ME08b)	05:07		20:56 (HSK ME08a)	
	16:44	16	15:31 (HSK HR06)	17:39	51	16:59 (HSK HR04)	18:28	37	17:55 (HSK HR02)	20:20	25	21:09	19:54 (HSK HR04 TLF)	21:09 (HSK ME08b)	21:44	15	21:11 (HSK ME08a)	
16	08:24		15:16 (HSK HR06)	07:39		16:01 (HSK HR05)	06:39		17:18 (HSK HR03)	06:29		05:33	19:32 (HSK HR04 TLF)	20:53 (HSK ME08b)	05:07		20:56 (HSK ME08a)	
	16:46	15	15:31 (HSK HR06)	17:40	49	16:59 (HSK HR04)	18:30	37	17:55 (HSK HR02)	20:22	23	21:11	19:55 (HSK HR04 TLF)	21:11 (HSK ME08b)	21:44	15	21:11 (HSK ME08a)	
17	08:23		15:18 (HSK HR06)	07:37		16:02 (HSK HR05)	06:37		17:17 (HSK HR03)	06:27		05:32	19:31 (HSK HR04 TLF)	20:52 (HSK ME08b)	05:07		20:57 (HSK ME08a)	
	16:47	12	15:30 (HSK HR06)	17:42	47	16:59 (HSK HR04)	18:32	36	17:53 (HSK HR02)	20:24	24	21:12	19:55 (HSK HR04 TLF)	21:12 (HSK ME08b)	21:45	15	21:12 (HSK ME08a)	
18	08:22		15:20 (HSK HR06)	07:35		16:04 (HSK HR05)	06:35		17:17 (HSK HR03)	06:25		05:30	19:31 (HSK HR04 TLF)	20:53 (HSK ME08b)	05:07		20:57 (HSK ME08a)	
	16:49	9	15:29 (HSK HR06)	17:44	42	16:58 (HSK HR04)	18:33	35	17:52 (HSK HR02)	20:26	25	21:14	19:56 (HSK HR04 TLF)	21:14 (HSK ME08b)	21:45	15	21:13 (HSK ME08a)	
19	08:21			07:33		16:06 (HSK HR05)	06:32		17:17 (HSK HR03)	06:23		05:29	19:30 (HSK HR04 TLF)	20:52 (HSK ME08b)	05:07		20:57 (HSK ME08a)	
	16:51			17:46	36	16:57 (HSK HR04)	18:35	33	17:50 (HSK HR02)	20:27		21:15	19:56 (HSK HR04 TLF)	21:15 (HSK ME08b)	21:45		21:12 (HSK ME08a)	
20	08:20			07:31		16:10 (HSK HR05)	06:30		17:17 (HSK HR03)	06:21		05:27	19:30 (HSK HR04 TLF)	20:57 (HSK ME08b)	05:07		20:57 (HSK ME08a)	
	16:52			17:48	27	16:56 (HSK HR04)	18:37	30	17:47 (HSK HR03)	20:29	26	21:17	19:56 (HSK HR04 TLF)	21:17 (HSK ME08b)	21:46	15	21:12 (HSK ME08a)	
21	08:19			07:29		16:40 (HSK HR04)	06:28		17:17 (HSK HR03)	06:19		05:26	19:30 (HSK HR04 TLF)	20:56 (HSK ME08b)	05:07		20:57 (HSK ME08a)	
	16:54			17:50	15	16:55 (HSK HR04)	18:38	29	17:46 (HSK HR03)	20:30	25	21:18	19:55 (HSK HR04 TLF)	21:18 (HSK ME08b)	21:46	15	21:12 (HSK ME08a)	
22	08:18			07:27		16:42 (HSK HR04)	06:25		17:18 (HSK HR03)	06:17		05:25	19:30 (HSK HR04 TLF)	20:55 (HSK ME08b)	05:08		20:58 (HSK ME08a)	
	16:56			17:51	11	16:53 (HSK HR04)	18:40	27	17:45 (HSK HR03)	20:32	25	21:19	19:55 (HSK HR04 TLF)	21:19 (HSK ME08b)	21:46	15	21:13 (HSK ME08a)	
23	08:17			07:25		06:23			17:20 (HSK HR03)	06:15		05:24	19:30 (HSK HR04 TLF)	20:54 (HSK ME08b)	05:08		20:58 (HSK ME08a)	
	16:57			17:53		18:42		24	17:44 (HSK HR03)	20:34	24	21:21	19:54 (HSK HR04 TLF)	21:21 (HSK ME08b)	21:46	15	21:13 (HSK ME08a)	
24	08:16			07:23		06:21			17:20 (HSK HR03)	06:13		05:22	19:30 (HSK HR04 TLF)	20:52 (HSK ME08b)	05:08		20:58 (HSK ME08a)	
	16:59			17:55		18:43		22	17:42 (HSK HR03)	20:35	24	21:22	19:54 (HSK HR04 TLF)	21:22 (HSK ME08b)	21:46	15	21:13 (HSK ME08a)	
25	08:15			07:21		06:19			17:22 (HSK HR03)	06:10		05:21	19:30 (HSK HR04 TLF)	20:51 (HSK ME08b)	05:08		20:59 (HSK ME08a)	
	17:01			17:57		18:45		18	17:40 (HSK HR03)	20:37	23	21:23	19:53 (HSK HR04 TLF)	21:23 (HSK ME08b)	21:46	15	21:14 (HSK ME08a)	
26	08:13			07:19		06:16			17:25 (HSK HR03)	06:08		05:20	19:31 (HSK HR04 TLF)	20:50 (HSK ME08b)	05:09		20:58 (HSK ME08a)	
	17:02	10	16:17 (HSK HR05)	17:59		18:47		12	17:37 (HSK HR03)	20:39	21	21:25	19:52 (HSK HR04 TLF)	21:25 (HSK ME08b)	21:46	15	21:13 (HSK ME08a)	
27	08:12			07:17		06:14				06:06		05:19	19:32 (HSK HR04 TLF)	20:51 (HSK ME08b)	05:09		20:58 (HSK ME08a)	
	17:04	15	16:20 (HSK HR05)	18:00		18:49			20:40	18	20:58	19:50 (HSK HR04 TLF)	21:26	11	20:32 (HSK ME08b)	21:46	15	21:13 (HSK ME08a)
28	08:11			07:14		06:12				06:05		05:18	19:33 (HSK HR04 TLF)	20:51 (HSK ME08b)	05:10		20:59 (HSK ME08a)	
	17:06			18:02						06:03	16	21:27	19:49 (HSK HR04 TLF)	21:27 (HSK ME08b)	21:46	14	21:13 (HSK ME08a)	
29	08:09			07:11		07:09				06:03		05:17	19:35 (HSK HR04 TLF)	20:57 (HSK ME08b)	05:10		21:00 (HSK ME08a)	
	17:08	22	16:23 (HSK HR05)			19:52			20:44	11	19:46 (HSK HR04 TLF)	21:28			21:46	14	21:14 (HSK ME08a)	
30	08:08			07:10		07:07				06:01		05:16	19:40 (HSK HR04 TLF)	20:56 (HSK ME08b)	05:11		21:00 (HSK ME08a)	
	17:09	25	16:25 (HSK HR05)			19:54			20:45	2	19:42 (HSK HR04 TLF)	21:30			21:46	13	21:13 (HSK ME08a)	
31	08:06			07:05		07:05						05:15			20:58 (HSK ME08a)			
	17:11	27	16:26 (HSK HR05)			19:55						21:31	1	20:59 (HSK ME08a)				
Sonnenscheinstunden		261		278		367			415			483			496			
astr.max.mögl.Beschattung		485		875		587			516			411			370			
Red. Sonnenscheinwahrsch.		0,19		0,32		0,28			0,36			0,43			0,34			
Reduktion Betriebsdauer		0,96		0,96		0,96			0,96			0,96			0,96			
Reduktion Windrichtung		0,66		0,69		0,70			0,68			0,66			0,63			
Gesamte Reduktion		0,12		0,21		0,19			0,24			0,27			0,21			
Met.wahrsch.Beschattung		58		187		112			123			112			76			

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung Schattenrezeptor: IPN26 - Meerhof, Sintfeldstraße 28
Annahmen für Schattenwurfberechnung Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11	21:00 (HSK ME08a)	05:47	20:25 (HSK ME08b)	06:36	19:25 (HSK ME01)	07:24	17:59 (HSK HR03)	07:17	15:27 (HSK HR05)	08:07
2	21:46	13 21:13 (HSK ME08a)	21:15	20:45 (HSK ME08b)	20:13	19:44 (HSK ME01)	19:05	36 18:35 (HSK HR02)	17:00	53 16:27 (HSK HR04)	16:20
3	05:12	21:00 (HSK ME08a)	05:49	20:24 (HSK ME08b)	06:38	19:24 (HSK ME01)	07:26	17:59 (HSK HR03)	07:19	15:26 (HSK HR05)	08:09
4	21:45	12 21:12 (HSK ME08a)	21:13	20:43 (HSK ME08b)	20:11	19:43 (HSK ME01)	19:03	36 18:35 (HSK HR02)	16:58	50 16:24 (HSK HR04)	16:19
5	05:13	21:01 (HSK ME08a)	05:50	20:25 (HSK ME08b)	06:39	19:24 (HSK ME01)	07:27	17:59 (HSK HR03)	07:21	15:26 (HSK HR05)	08:10
6	21:45	11 21:12 (HSK ME08a)	21:11	20:42 (HSK ME08b)	20:09	19:42 (HSK ME01)	19:00	34 18:33 (HSK HR02)	16:56	47 16:23 (HSK HR04)	16:19
7	05:14	21:01 (HSK ME08a)	05:52	20:26 (HSK ME08b)	06:41	19:24 (HSK ME01)	07:29	18:01 (HSK HR03)	07:22	15:26 (HSK HR05)	08:11
8	21:45	11 21:12 (HSK ME08a)	21:10	20:40 (HSK ME08b)	20:07	19:39 (HSK ME01)	18:58	30 18:31 (HSK HR02)	16:54	43 16:21 (HSK HR04)	16:18
9	05:14	21:02 (HSK ME08a)	05:53	20:26 (HSK ME08b)	06:42	19:24 (HSK ME01)	07:31	18:02 (HSK HR03)	07:24	15:27 (HSK HR05)	08:13
10	21:44	10 21:12 (HSK ME08a)	21:08	20:38 (HSK ME08b)	20:05	19:38 (HSK ME01)	18:56	27 18:29 (HSK HR02)	16:53	33 16:00 (HSK HR05)	16:18
11	05:15	21:01 (HSK ME08a)	05:55	20:27 (HSK ME08b)	06:44	19:25 (HSK ME01)	07:32	18:04 (HSK HR03)	07:26	15:27 (HSK HR05)	08:14
12	21:44	10 21:11 (HSK ME08a)	21:06	20:37 (HSK ME08b)	20:02	19:36 (HSK ME01)	18:54	22 18:26 (HSK HR02)	16:51	33 16:00 (HSK HR05)	16:17
13	05:16	21:02 (HSK ME08a)	05:56	20:28 (HSK ME08b)	06:46	19:26 (HSK ME01)	07:34	18:08 (HSK HR03)	07:28	15:28 (HSK HR05)	08:15
14	21:43	8 21:10 (HSK ME08a)	21:04	20:35 (HSK ME08b)	20:00	7 19:33 (HSK ME01)	18:51	7 18:15 (HSK HR03)	16:49	31 15:59 (HSK HR05)	16:17
15	05:17	21:03 (HSK ME08a)	05:58	20:31 (HSK ME08b)	06:47	19:28 (HSK ME01)	07:36	17:29	07:29	15:28 (HSK HR05)	08:16
16	21:43	7 21:10 (HSK ME08a)	21:03	20:34 (HSK ME08b)	19:58	3 19:31 (HSK ME01)	18:49	16:48	31 15:59 (HSK HR05)	16:17	24 15:19 (HSK HR06)
17	05:18	21:03 (HSK ME08a)	06:00		06:49		07:37	16:48	31 15:59 (HSK HR05)	16:17	24 15:19 (HSK HR06)
18	21:42	6 21:09 (HSK ME08a)	21:01		19:55		18:47	16:46	30 15:59 (HSK HR05)	16:16	24 15:19 (HSK HR06)
19	05:19	21:04 (HSK ME08a)	06:01		06:50		07:39	16:44	28 15:58 (HSK HR05)	16:16	25 15:20 (HSK HR06)
20	21:41	5 21:09 (HSK ME08a)	20:59		19:53		18:45	16:44	28 15:58 (HSK HR05)	16:16	25 15:20 (HSK HR06)
21	05:20	21:05 (HSK ME08a)	06:03		06:52		07:41	16:43	26 15:57 (HSK HR05)	16:16	24 15:20 (HSK HR06)
22	21:40	3 21:08 (HSK ME08a)	20:57		19:51		18:42	16:43	26 15:57 (HSK HR05)	16:16	24 15:20 (HSK HR06)
23	05:21	21:06 (HSK ME08a)	06:04		06:54		07:42	16:42	25 15:57 (HSK HR05)	16:16	25 15:21 (HSK HR06)
24	21:40	2 21:08 (HSK ME08a)	20:55		19:49		18:40	16:41	25 15:57 (HSK HR05)	16:16	25 15:21 (HSK HR06)
25	05:22		06:06	19:46 (HSK 8694 TLF)	06:55		07:44	16:41	25 15:57 (HSK HR05)	16:16	25 15:21 (HSK HR06)
26	21:39		20:53	19:52 (HSK 8694 TLF)	19:46		18:38	16:40	22 15:55 (HSK HR05)	16:16	25 15:21 (HSK HR06)
27	05:23		06:07	19:43 (HSK 8694 TLF)	06:57		07:46	16:40	22 15:55 (HSK HR05)	16:16	25 15:21 (HSK HR06)
28	21:38		20:51	19:55 (HSK 8694 TLF)	19:44		18:36	16:38	18 15:53 (HSK HR05)	16:16	24 15:21 (HSK HR06)
29	05:24	20:33 (HSK ME08b)	06:09	19:40 (HSK 8694 TLF)	06:58		07:47	16:42	15 15:52 (HSK HR05)	16:16	24 15:22 (HSK HR06)
30	21:37	4 20:37 (HSK ME08b)	20:49	19:57 (HSK 8694 TLF)	19:42		18:34	16:37	15 15:52 (HSK HR05)	16:16	24 15:22 (HSK HR06)
31	05:25	20:31 (HSK ME08b)	06:11	19:39 (HSK 8694 TLF)	07:00		07:49	16:43	15 15:52 (HSK HR05)	16:16	24 15:22 (HSK HR06)
32	21:36	8 20:39 (HSK ME08b)	20:47	19:58 (HSK 8694 TLF)	19:39		18:32	16:36	9 15:49 (HSK HR05)	16:16	25 15:23 (HSK HR06)
33	05:26	20:29 (HSK ME08b)	06:12	19:37 (HSK 8694 TLF)	07:02	18:15 (HSK HR03)	07:51	16:36	9 15:49 (HSK HR05)	16:16	25 15:23 (HSK HR06)
34	21:35	12 20:41 (HSK ME08b)	20:45	19:59 (HSK 8694 TLF)	19:37	9 18:24 (HSK HR03)	18:29	16:34	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
35	05:28	20:28 (HSK ME08b)	06:14	19:37 (HSK 8694 TLF)	07:03	18:10 (HSK HR03)	07:53	16:33	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
36	21:34	14 20:42 (HSK ME08b)	20:43	20:00 (HSK 8694 TLF)	19:35	17 18:27 (HSK HR03)	18:27	16:33	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
37	05:29	20:28 (HSK ME08b)	06:15	19:35 (HSK 8694 TLF)	07:05	18:08 (HSK HR03)	07:54	16:33	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
38	21:33	16 20:44 (HSK ME08b)	20:41	24 19:59 (HSK 8694 TLF)	19:32	21 18:29 (HSK HR03)	18:25	6 17:21 (HSK HR04)	16:32	16:17	25 15:24 (HSK HR06)
39	05:30	20:27 (HSK ME08b)	06:17	19:35 (HSK 8694 TLF)	07:06	18:05 (HSK HR03)	07:56	16:32	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
40	21:31	17 20:44 (HSK ME08b)	20:39	25 20:00 (HSK 8694 TLF)	19:30	24 18:29 (HSK HR03)	18:23	13 17:24 (HSK HR04)	16:30	16:17	25 15:24 (HSK HR06)
41	05:32	20:26 (HSK ME08b)	06:19	19:34 (HSK 8694 TLF)	07:08	18:04 (HSK HR03)	07:58	16:30	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
42	21:30	19 20:45 (HSK ME08b)	20:37	26 20:00 (HSK 8694 TLF)	19:28	27 18:31 (HSK HR03)	18:21	16 17:26 (HSK HR04)	16:29	16:18	25 15:25 (HSK HR06)
43	05:33	20:25 (HSK ME08b)	06:20	19:34 (HSK 8694 TLF)	07:10	18:02 (HSK HR03)	07:59	16:30	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
44	21:29	20 20:45 (HSK ME08b)	20:35	26 20:00 (HSK 8694 TLF)	19:26	29 18:31 (HSK HR03)	18:19	30 17:27 (HSK HR04)	16:28	16:18	25 15:26 (HSK HR06)
45	05:34	20:26 (HSK ME08b)	06:22	19:33 (HSK 8694 TLF)	07:11	18:01 (HSK HR03)	08:01	16:36	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
46	21:28	20 20:46 (HSK ME08b)	20:33	26 19:59 (HSK 8694 TLF)	19:23	30 18:31 (HSK HR03)	18:17	38 17:28 (HSK HR04)	16:27	16:19	25 15:26 (HSK HR06)
47	05:36	20:25 (HSK ME08b)	06:23	19:34 (HSK 8694 TLF)	07:13	18:01 (HSK HR03)	08:03	16:33	15 15:52 (HSK HR05)	16:16	24 15:23 (HSK HR06)
48	21:26	22 20:47 (HSK ME08b)	20:31	25 19:59 (HSK 8694 TLF)	19:21	32 18:33 (HSK HR02)	18:15	43 17:28 (HSK HR04)	16:26	9 15:06 (HSK HR06)	16:19
49	05:37	20:24 (HSK ME08b)	06:25	19:33 (HSK 8694 TLF)	07:14	18:00 (HSK HR03)	07:05	15:31 (HSK HR05)	07:58	14:56 (HSK HR06)	16:20
50	21:25	23 20:47 (HSK ME08b)	20:29	25 19:58 (HSK 8694 TLF)	19:19	34 18:34 (HSK HR02)	17:13	48 16:28 (HSK HR04)	16:25	12 15:08 (HSK HR06)	16:20
51	05:39	20:24 (HSK ME08b)	06:26	19:34 (HSK 8694 TLF)	07:16	17:59 (HSK HR03)	07:06	15:30 (HSK HR05)	08:00	14:55 (HSK HR06)	16:20
52	21:24	23 20:47 (HSK ME08b)	20:27	24 19:58 (HSK 8694 TLF)	19:16	36 18:35 (HSK HR02)	17:11	50 16:28 (HSK HR04)	16:24	15 15:10 (HSK HR06)	16:20
53	05:40	20:24 (HSK ME08b)	06:28	19:34 (HSK 8694 TLF)	07:18	17:59 (HSK HR03)	07:08	15:29 (HSK HR05)	08:01	14:55 (HSK HR06)	16:20
54	21:22	24 20:48 (HSK ME08b)	20:24	23 19:57 (HSK 8694 TLF)	19:14	37 18:36 (HSK HR02)	17:09	53 16:29 (HSK HR04)	16:23	16 15:11 (HSK HR06)	16:21
55	05:41	20:24 (HSK ME08b)	06:30	19:31 (HSK ME01)	07:19	37 17:58 (HSK HR03)	07:10	15:28 (HSK HR05)	08:03	14:54 (HSK HR06)	16:21
56	21:21	23 20:47 (HSK ME08b)	20:22	24 19:55 (HSK 8694 TLF)	19:12	38 18:36 (HSK HR02)	17:07	54 16:28 (HSK HR04)	16:22	18 15:12 (HSK HR06)	16:22
57	05:43	20:24 (HSK ME08b)	06:31	19:28 (HSK ME01)	07:21	37 17:59 (HSK HR03)	07:12	15:28 (HSK HR05)	08:04	14:54 (HSK HR06)	16:22
58	21:19	24 20:48 (HSK ME08b)	20:20	25 19:53 (HSK 8694 TLF)	19:09	37 18:36 (HSK HR02)	17:05	53 16:28 (HSK HR04)	16:22	19 15:13 (HSK HR06)	16:23
59	05:44	20:24 (HSK ME08b)	06:33	19:27 (HSK ME01)	07:23	37 17:58 (HSK HR03)	07:13	15:27 (HSK HR05)	08:06	14:53 (HSK HR06)	16:23
60	21:18	23 20:47 (HSK ME08b)	20:18	24 19:51 (HSK 8694 TLF)	19:07	37 18:35 (HSK HR02)	17:03	55 16:28 (HSK HR04)	16:21	20 15:13 (HSK HR06)	16:24
61	05:46	20:24 (HSK ME08b)	06:34	19:26 (HSK ME01)			07:15	15:27 (HSK HR05)		14:53 (HSK HR06)	16:24
62	21:16	22 20:46 (HSK ME08b)	20:16	22 19:48 (HSK 8694 TLF)			17:02	53 16:27 (HSK HR04)		16:25	24 15:29 (HSK HR06)
Sonnenscheinstunden		500	453		381		332		268		246
astr. max. mögl. Beschattung		412	520		514		704		603		748
Red. Sonnenscheinwahrsch.		0,39	0,40		0,32		0,29		0,23		0,17
Reduktion Betriebsdauer		0,96	0,96		0,96		0,96		0,96		0,96
Reduktion Windrichtung		0,65	0,68		0,70		0,70		0,68		0,66
Gesamte Reduktion		0,24	0,26		0,21		0,19		0,15		0,11
Met. wahrsch. Beschattung		101	136		110		135		89		80

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN27 - Meerhof, Im Kesperbusch 1
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

	Januar			Februar			März			April			Mai			Juni		
1	08:31	14:24 (HSK HR03)	08:05	15:59 (HSK HR02)	07:12	16:01 (HSK HR02)	07:03	18:19 (HSK ME08b)	05:59	19:42 (HSK ME18)	05:14	19:39 (HSK ME08a)						
2	16:26	40 15:04 (HSK HR03)	17:13	16:25 (HSK HR02)	18:04	16:01 (HSK ME01)	19:57	19:04 (HSK ME08b)	20:47	20:09 (HSK ME18)	21:32	20:54 (HSK ME10)						
3	08:31	14:25 (HSK HR03)	08:03	15:59 (HSK HR02)	07:10	16:01 (HSK ME01)	07:00	18:19 (HSK ME08b)	05:57	19:42 (HSK ME18)	05:13	19:39 (HSK ME08a)						
4	16:27	39 15:04 (HSK HR03)	17:15	16:24 (HSK HR02)	18:06	17:18 (HSK ME01)	19:59	19:04 (HSK ME08b)	20:49	20:08 (HSK ME18)	21:33	20:55 (HSK ME10)						
5	08:31	14:25 (HSK HR03)	08:02	15:59 (HSK HR02)	07:08	16:02 (HSK ME01)	06:58	18:17 (HSK ME08b)	05:55	19:42 (HSK ME18)	05:13	19:39 (HSK ME08a)						
6	16:28	39 15:04 (HSK HR03)	17:17	16:24 (HSK HR02)	18:07	17:42 (HSK ME02)	20:00	19:24 (HSK ME07)	20:50	20:08 (HSK ME18)	21:34	20:54 (HSK ME10)						
7	08:31	14:25 (HSK HR03)	08:00	16:00 (HSK HR02)	07:06	16:04 (HSK ME01)	06:56	18:17 (HSK ME08b)	05:53	19:42 (HSK ME18)	05:12	19:40 (HSK ME08a)						
8	16:29	40 15:05 (HSK HR03)	17:19	16:25 (HSK HR02)	18:09	17:47 (HSK ME02)	20:02	19:35 (HSK ME06)	20:52	20:08 (HSK ME18)	21:35	20:56 (HSK ME10)						
9	08:30	14:26 (HSK HR03)	07:59	16:00 (HSK HR02)	07:04	16:06 (HSK ME01)	06:54	18:17 (HSK ME08b)	05:51	19:42 (HSK ME18)	05:11	19:40 (HSK ME08a)						
10	16:30	40 15:06 (HSK HR03)	17:20	16:24 (HSK HR02)	18:11	17:46 (HSK ME02)	20:04	19:38 (HSK ME06)	20:54	20:09 (HSK ME18)	21:36	20:56 (HSK ME10)						
11	08:30	14:26 (HSK HR03)	07:57	16:01 (HSK HR02)	07:01	16:08 (HSK ME01)	06:51	18:17 (HSK ME08b)	05:50	19:42 (HSK ME18)	05:11	19:40 (HSK ME08a)						
12	16:32	40 15:06 (HSK HR03)	17:22	16:23 (HSK HR02)	18:13	17:47 (HSK ME02)	20:05	19:40 (HSK ME06)	20:55	20:11 (HSK ME18)	21:37	20:56 (HSK ME10)						
13	08:30	14:27 (HSK HR03)	07:55	16:02 (HSK HR02)	06:59	16:11 (HSK ME01)	06:49	18:17 (HSK ME08b)	05:48	19:42 (HSK ME18)	05:10	19:41 (HSK ME08a)						
14	16:33	40 15:07 (HSK HR03)	17:24	16:27 (HSK HR02)	18:14	17:49 (HSK ME02)	20:07	19:41 (HSK ME06)	20:57	20:13 (HSK ME18)	21:38	20:57 (HSK ME10)						
15	08:29	14:27 (HSK HR03)	07:54	16:04 (HSK HR02)	06:57	16:57 (HSK ME01)	06:47	18:16 (HSK ME08b)	05:46	19:44 (HSK ME18)	05:10	19:42 (HSK ME08a)						
16	16:34	40 15:07 (HSK HR03)	17:26	16:31 (HSK ME01)	18:16	17:49 (HSK ME02)	20:09	19:41 (HSK ME06)	20:58	20:14 (HSK ME18)	21:39	20:58 (HSK ME10)						
17	08:29	14:27 (HSK HR03)	07:52	16:05 (HSK HR02)	06:55	17:00 (HSK ME01)	06:45	18:17 (HSK ME08b)	05:44	19:43 (HSK ME18)	05:09	19:41 (HSK ME08a)						
18	16:36	40 15:07 (HSK HR03)	17:28	16:33 (HSK ME01)	18:18	17:49 (HSK ME02)	20:10	19:42 (HSK ME06)	21:00	20:15 (HSK ME18)	21:40	20:59 (HSK ME10)						
19	08:28	14:28 (HSK HR03)	07:50	16:06 (HSK ME01)	06:53	17:29 (HSK ME02)	06:42	18:17 (HSK ME08b)	05:43	19:43 (HSK ME18)	05:09	19:42 (HSK ME08a)						
20	16:37	40 15:08 (HSK HR03)	17:30	16:35 (HSK ME01)	18:20	17:48 (HSK ME02)	20:12	19:42 (HSK ME06)	21:02	20:17 (HSK ME18)	21:40	20:59 (HSK ME10)						
21	08:28	14:29 (HSK HR03)	07:48	16:04 (HSK HR02)	06:50	17:30 (HSK ME02)	06:40	18:17 (HSK ME08b)	05:41	19:41 (HSK ME18)	05:08	19:43 (HSK ME08a)						
22	16:38	39 15:08 (HSK HR03)	17:31	17:03 (HSK HR01)	18:21	17:47 (HSK ME02)	20:14	19:42 (HSK ME06)	21:03	20:17 (HSK ME18)	21:41	21:00 (HSK ME10)						
23	08:27	14:29 (HSK HR03)	07:46	16:03 (HSK ME01)	06:48	17:31 (HSK ME02)	06:38	18:18 (HSK ME08b)	05:39	19:41 (HSK ME18)	05:08	19:42 (HSK ME08a)						
24	16:40	39 15:08 (HSK HR03)	17:33	17:05 (HSK HR01)	18:23	17:46 (HSK ME02)	20:15	19:42 (HSK ME06)	21:05	20:18 (HSK ME18)	21:42	21:00 (HSK ME10)						
25	08:26	14:29 (HSK HR03)	07:45	16:02 (HSK HR02)	06:46	17:32 (HSK ME02)	06:36	18:18 (HSK ME08b)	05:38	19:40 (HSK ME18)	05:08	19:43 (HSK ME08a)						
26	16:41	39 15:08 (HSK HR03)	17:35	17:07 (HSK HR01)	18:25	17:45 (HSK ME02)	20:17	19:40 (HSK ME06)	21:06	20:18 (HSK ME18)	21:43	21:00 (HSK ME10)						
27	08:26	14:30 (HSK HR03)	07:43	16:01 (HSK HR02)	06:44	17:34 (HSK ME02)	06:34	18:19 (HSK ME08b)	05:36	19:40 (HSK ME18)	05:07	19:43 (HSK ME08a)						
28	16:43	38 15:08 (HSK HR03)	17:37	17:08 (HSK HR01)	18:27	17:46 (HSK ME02)	20:19	19:39 (HSK ME06)	21:08	20:19 (HSK ME18)	21:43	21:00 (HSK ME10)						
29	08:25	14:30 (HSK HR03)	07:41	16:00 (HSK HR02)	06:41	17:41 (HSK ME02)	06:31	18:20 (HSK ME08b)	05:35	19:41 (HSK ME18)	05:07	19:44 (HSK ME08a)						
30	16:44	38 15:08 (HSK HR03)	17:39	17:08 (HSK HR01)	18:28	17:47 (HSK ME02)	20:20	19:38 (HSK ME06)	21:09	20:19 (HSK ME18)	21:44	21:01 (HSK ME10)						
31	08:24	14:31 (HSK HR03)	07:39	15:59 (HSK ME01)	06:39	17:48 (HSK ME02)	20:21	19:39 (HSK ME06)	21:10	20:20 (HSK ME18)	21:44	21:01 (HSK ME10)						
32	16:46	37 15:08 (HSK HR03)	17:41	17:08 (HSK HR01)	18:30	17:49 (HSK ME02)	20:22	19:40 (HSK ME06)	21:11	20:20 (HSK ME18)	21:44	21:01 (HSK ME10)						
33	08:23	14:32 (HSK HR03)	07:37	15:59 (HSK ME01)	06:37	17:49 (HSK ME02)	20:23	19:40 (HSK ME06)	21:12	20:21 (HSK ME18)	21:45	21:02 (HSK ME10)						
34	16:47	36 15:08 (HSK HR03)	17:42	17:08 (HSK HR01)	18:32	17:50 (HSK ME02)	20:24	19:41 (HSK ME06)	21:12	20:22 (HSK ME18)	21:45	21:02 (HSK ME10)						
35	08:22	14:33 (HSK HR03)	07:35	15:59 (HSK ME01)	06:35	17:50 (HSK ME02)	20:25	19:41 (HSK ME06)	21:13	20:23 (HSK ME18)	21:46	21:03 (HSK ME10)						
36	16:49	35 15:08 (HSK HR03)	17:44	17:08 (HSK HR01)	18:33	17:51 (HSK ME02)	20:26	19:42 (HSK ME06)	21:14	20:24 (HSK ME18)	21:47	21:04 (HSK ME10)						
37	08:21	14:34 (HSK HR03)	07:33	15:58 (HSK ME01)	06:32	17:52 (HSK ME02)	20:27	19:43 (HSK ME06)	21:15	20:25 (HSK ME18)	21:48	21:05 (HSK ME10)						
38	16:51	34 15:08 (HSK HR03)	17:46	17:07 (HSK HR01)	18:35	17:53 (HSK ME02)	20:28	19:44 (HSK ME06)	21:16	20:26 (HSK ME18)	21:50	21:06 (HSK ME10)						
39	08:20	14:35 (HSK HR03)	07:31	15:58 (HSK ME01)	06:30	17:54 (HSK ME02)	20:29	19:45 (HSK ME06)	21:17	20:27 (HSK ME18)	21:51	21:07 (HSK ME10)						
40	16:52	38 16:11 (HSK HR02)	17:48	17:13 (HSK ME01)	18:37	17:55 (HSK ME02)	20:30	19:46 (HSK ME06)	21:19	20:28 (HSK ME18)	21:52	21:08 (HSK ME10)						
41	08:19	14:36 (HSK HR03)	07:29	15:58 (HSK ME01)	06:28	17:56 (HSK ME02)	20:31	19:47 (HSK ME06)	21:20	20:29 (HSK ME18)	21:53	21:09 (HSK ME10)						
42	16:54	42 16:14 (HSK HR02)	17:50	17:15 (HSK ME01)	18:38	17:57 (HSK ME02)	20:32	19:48 (HSK ME06)	21:21	20:30 (HSK ME18)	21:54	21:10 (HSK ME10)						
43	08:18	14:37 (HSK HR03)	07:27	15:58 (HSK ME01)	06:25	17:58 (HSK ME02)	20:33	19:49 (HSK ME06)	21:22	20:31 (HSK ME18)	21:55	21:11 (HSK ME10)						
44	16:56	45 16:14 (HSK HR02)	17:51	17:17 (HSK ME01)	18:40	17:59 (HSK ME02)	20:34	19:50 (HSK ME06)	21:23	20:32 (HSK ME18)	21:56	21:12 (HSK ME10)						
45	08:17	14:38 (HSK HR03)	07:25	15:58 (HSK ME01)	06:23	17:59 (HSK ME02)	20:35	19:51 (HSK ME06)	21:24	20:33 (HSK ME18)	21:57	21:13 (HSK ME10)						
46	16:57	46 16:18 (HSK HR02)	17:53	17:18 (HSK ME01)	18:42	18:01 (HSK ME08b)	20:36	19:52 (HSK ME06)	21:25	20:34 (HSK ME18)	21:58	21:14 (HSK ME10)						
47	08:16	14:39 (HSK HR03)	07:23	15:58 (HSK ME01)	06:21	17:59 (HSK ME02)	20:37	19:53 (HSK ME06)	21:26	20:35 (HSK ME18)	21:59	21:15 (HSK ME10)						
48	16:59	47 16:19 (HSK HR02)	17:55	17:18 (HSK ME01)	18:44	18:02 (HSK ME08b)	20:38	19:54 (HSK ME06)	21:27	20:36 (HSK ME18)	22:00	21:16 (HSK ME10)						
49	08:15	14:40 (HSK HR03)	07:21	15:58 (HSK ME01)	06:19	17:59 (HSK ME02)	20:39	19:55 (HSK ME06)	21:28	20:37 (HSK ME18)	22:01	21:17 (HSK ME10)						
50	17:01	46 16:20 (HSK HR02)	17:57	17:19 (HSK ME01)	18:45	18:03 (HSK ME08b)	20:40	19:56 (HSK ME06)	21:29	20:38 (HSK ME18)	22:02	21:18 (HSK ME10)						
51	08:13	14:42 (HSK HR03)	07:19	15:58 (HSK ME01)	06:16	17:59 (HSK ME02)	20:41	19:57 (HSK ME06)	21:30	20:39 (HSK ME18)	22:03	21:19 (HSK ME10)						
52	17:02	44 16:21 (HSK HR02)	17:59	17:19 (HSK ME01)	18:47	18:04 (HSK ME08b)	20:42	19:58 (HSK ME06)	21:31	20:40 (HSK ME18)	22:04	21:20 (HSK ME10)						
53	08:12	14:45 (HSK HR03)	07:17	15:59 (HSK ME01)	06:14	17:59 (HSK ME02)	20:43	19:59 (HSK ME06)	21:32	20:41 (HSK ME18)	22:05	21:21 (HSK ME10)						
54	17:04	42 16:23 (HSK HR02)	18:00	17:19 (HSK ME01)	18:49	18:05 (HSK ME08b)	20:44	19:59 (HSK ME06)	21:33	20:42 (HSK ME18)	22:06	21:22 (HSK ME10)						
55	08:11	14:47 (HSK HR03)	07:14	16:00 (HSK ME01)	06:12	17:59 (HSK ME02)	20:45	19:59 (HSK ME06)	21:34	20:43 (HSK ME18)	22:07	21:23 (HSK ME10)						
56	17:06	39 16:23 (HSK HR02)	18:02	17:20 (HSK ME01)	18:50	18:06 (HSK ME08b)	20:46	19:59 (HSK ME06)	21:35	20:44 (HSK ME18)	22:08	21:24 (HSK ME10)						
57	08:09	14:54 (HSK HR03)			07:09	18:22 (HSK ME08b)	20:47	19:59 (HSK ME06)	21:36	20:45 (HSK ME18)	22:09	21:25 (HSK ME10)						
58	17:08	26 16:24 (HSK HR02)			07:07	18:23 (HSK ME08b)	20:48	19:59 (HSK ME06)	21:37	20:46 (HSK ME18)	22:10	21:26 (HSK ME10)						
59	08:08	15:58 (HSK HR02)			07:05	18:24 (HSK ME08b)	20:49	19:59 (HSK ME06)	21:38	20:47 (HSK ME18)	22:11	21:27 (HSK ME10)						
60	17:09	26 16:24 (HSK HR02)			07:03	18:25 (HSK ME08b)	20:50	19:59 (HSK ME06)	21:39	20:48 (HSK ME18)	22:12	21:28 (HSK ME10)						
61	08:06	15:58 (HSK HR02)			07:01	18:26 (HSK ME08b)	20:51	19:59 (HSK ME06)	21:40	20:49 (HSK ME18)	22:13	21:29 (HSK ME10)						
62	17:11	26 16:24 (HSK HR02)			07:00	18:27 (HSK ME08b)	20:52	19:59 (HSK ME06)	21:41	20:50 (HSK ME18)	22:14	21:30 (HSK ME10)						
Sonneneinstrahlung	261		278		367		415		483		497							
astr. max. mögl. Beschattung	1200		1306		895													

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung Schattenrezeptor: IPN27 - Meerhof, Im Kesperbusch 1
Annahmen für Schattenwurfberechnung Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

		Juli		August		September		Oktober		November		Dezember	
1	05:11 21:46 69	19:47 (HSK ME08a) 21:04 (HSK ME08a) 21:15	05:47 21:15 21:15	19:52 (HSK ME08a) 20:28 (HSK ME08a) 20:14	06:36 20:14 20:14	18:16 (HSK ME08b) 19:41 (HSK ME06) 19:05	07:24 19:05 19:05	18:10 (HSK ME02) 18:24 (HSK ME02) 17:00	07:17 17:00 16:04 (HSK ME06 TLF)	15:35 (HSK ME02 TLF) 16:04 (HSK ME02 TLF) 16:20	08:07 16:20 14:50 (HSK HR03)		
2	05:12 21:45 68	19:46 (HSK ME08a) 21:03 (HSK ME09) 21:13	05:49 21:13 21:13	19:52 (HSK ME08a) 20:27 (HSK ME08a) 20:11	06:38 20:11 20:11	18:15 (HSK ME08b) 19:40 (HSK ME06) 19:03	07:26 19:03 07:27	18:09 (HSK ME02) 18:25 (HSK ME02) 16:58	07:19 16:58 16:01 (HSK ME06 TLF)	15:33 (HSK ME02 TLF) 15:32 (HSK ME02 TLF) 16:19	08:09 16:19 14:50 (HSK HR03)		
3	05:13 21:45 69	19:47 (HSK ME08a) 21:04 (HSK ME09) 21:11	05:50 21:11 21:11	19:54 (HSK ME08a) 20:27 (HSK ME08a) 20:09	06:39 20:09 20:09	18:15 (HSK ME08b) 19:40 (HSK ME06) 19:00	07:27 19:00 07:29	18:07 (HSK ME02) 18:25 (HSK ME02) 16:56	07:21 16:56 15:59 (HSK ME06 TLF)	15:32 (HSK ME02 TLF) 15:31 (HSK ME02 TLF) 16:19	08:10 16:19 14:51 (HSK HR03)		
4	05:14 21:45 69	19:47 (HSK ME08a) 21:04 (HSK ME09) 21:10	05:52 21:10 21:10	19:54 (HSK ME08a) 20:25 (HSK ME08a) 20:07	06:41 20:07 20:07	18:14 (HSK ME08b) 19:39 (HSK ME06) 18:58	07:29 18:58 07:31	18:07 (HSK ME02) 18:26 (HSK ME02) 16:54	07:22 16:54 15:56 (HSK ME06 TLF)	15:31 (HSK ME02 TLF) 15:30 (HSK ME02 TLF) 16:18	08:11 16:18 14:51 (HSK HR03)		
5	05:14 21:44 69	19:47 (HSK ME08a) 21:04 (HSK ME09) 21:08	05:53 21:08 21:08	19:53 (HSK ME08a) 20:23 (HSK ME08a) 20:05	06:42 20:05 20:05	18:13 (HSK ME08b) 19:38 (HSK ME06) 18:56	07:31 18:56 18:56	17:35 (HSK ME01) 18:26 (HSK ME02) 16:53	07:24 16:53 15:53 (HSK ME02 TLF)	15:30 (HSK ME02 TLF) 15:30 (HSK ME02 TLF) 16:18	08:13 16:18 14:52 (HSK HR03)		
6	05:15 21:44 70	19:46 (HSK ME08a) 21:03 (HSK ME09) 21:06	05:55 21:06 21:06	19:53 (HSK ME08a) 20:22 (HSK ME08a) 20:02	06:44 20:02 20:02	18:13 (HSK ME08b) 19:36 (HSK ME06) 18:54	07:32 18:54 18:54	16:50 (HSK ME06 TLF) 18:20 (HSK ME02) 16:51	07:26 16:46 16:51	15:30 (HSK ME02 TLF) 15:54 (HSK ME02 TLF) 16:17	08:14 16:17 14:52 (HSK HR03)		
7	05:16 21:43 68	19:47 (HSK ME08a) 21:03 (HSK ME09) 21:04	05:56 21:04 21:04	19:52 (HSK ME08a) 20:20 (HSK ME08a) 20:00	06:46 20:00 20:00	18:12 (HSK ME08b) 19:33 (HSK ME06) 18:51	07:34 18:51 18:51	16:45 (HSK ME06 TLF) 18:24 (HSK ME02) 16:49	07:28 16:49 15:54 (HSK ME02 TLF)	15:30 (HSK ME02 TLF) 15:54 (HSK ME02 TLF) 16:17	08:15 16:17 14:52 (HSK HR03)		
8	05:17 21:43 68	19:47 (HSK ME08a) 21:02 (HSK ME09) 21:03	05:58 21:03 21:03	19:52 (HSK ME08a) 20:18 (HSK ME08a) 19:58	06:47 19:58 19:58	18:12 (HSK ME08b) 19:31 (HSK ME06) 18:49	07:36 18:49 18:49	16:42 (HSK ME06 TLF) 18:22 (HSK ME02) 16:48	07:29 16:48 15:55 (HSK ME02 TLF)	15:30 (HSK ME02 TLF) 15:55 (HSK ME02 TLF) 16:17	08:16 16:17 14:53 (HSK HR03)		
9	05:18 21:42 68	19:47 (HSK ME08a) 21:02 (HSK ME09) 21:01	06:00 21:01 21:01	19:51 (HSK ME08a) 20:17 (HSK ME08a) 19:56	06:49 19:56 19:56	18:11 (HSK ME08b) 19:18 (HSK ME07) 18:47	07:37 18:47 18:47	16:40 (HSK ME06 TLF) 18:20 (HSK ME02) 16:46	07:31 16:46 16:51	15:30 (HSK ME02 TLF) 15:55 (HSK ME02 TLF) 16:16	08:18 16:16 14:53 (HSK HR03)		
10	05:19 21:41 68	19:47 (HSK ME08a) 21:02 (HSK ME10) 20:59	06:01 20:59 20:59	19:51 (HSK ME08a) 20:18 (HSK ME10) 19:53	06:50 19:53 19:53	18:12 (HSK ME08b) 18:57 (HSK ME08b) 18:45	07:39 18:45 18:45	16:37 (HSK ME06 TLF) 18:17 (HSK ME02) 16:44	07:33 16:44 16:56 (HSK ME02 TLF)	15:30 (HSK ME02 TLF) 15:56 (HSK ME02 TLF) 16:16	08:19 16:16 14:54 (HSK HR03)		
11	05:20 21:41 69	19:47 (HSK ME08a) 21:02 (HSK ME10) 20:57	06:03 20:57 20:57	19:50 (HSK ME08a) 20:17 (HSK ME10) 19:51	06:52 19:51 19:51	18:11 (HSK ME08b) 18:56 (HSK ME08b) 18:42	07:41 18:42 18:42	16:36 (HSK ME06 TLF) 18:15 (HSK ME02) 16:43	07:35 16:43 16:56 (HSK ME02 TLF)	15:30 (HSK ME02 TLF) 15:56 (HSK ME02 TLF) 16:16	08:20 16:16 14:54 (HSK HR03)		
12	05:21 21:40 68	19:47 (HSK ME08a) 21:02 (HSK ME10) 20:55	06:04 20:55 20:55	19:51 (HSK ME08a) 20:17 (HSK ME10) 19:49	06:54 19:49 19:49	18:12 (HSK ME08b) 18:56 (HSK ME08b) 18:40	07:42 18:40 18:40	16:35 (HSK ME06 TLF) 17:53 (HSK ME01) 16:41	07:36 16:41 15:56 (HSK ME02 TLF)	15:30 (HSK ME02 TLF) 15:56 (HSK ME02 TLF) 16:16	08:21 16:16 14:54 (HSK HR03)		
13	05:22 21:39 68	19:47 (HSK ME08a) 21:02 (HSK ME10) 20:53	06:06 20:53 20:53	19:50 (HSK ME08a) 20:16 (HSK ME10) 19:46	06:55 19:46 19:46	18:12 (HSK ME08b) 18:54 (HSK ME08b) 18:38	07:44 18:38 18:38	16:34 (HSK ME06 TLF) 17:53 (HSK ME01) 16:40	07:38 16:40 15:56 (HSK ME02 TLF)	14:25 (HSK ME02 TLF) 15:54 (HSK ME02 TLF) 16:16	08:22 16:16 14:55 (HSK HR03)		
14	05:23 21:38 68	19:47 (HSK ME08a) 21:02 (HSK ME10) 20:51	06:07 20:51 20:51	19:51 (HSK ME08a) 20:16 (HSK ME10) 19:44	06:57 19:44 19:44	18:12 (HSK ME08b) 18:53 (HSK ME08b) 18:36	07:46 18:36 18:36	16:32 (HSK ME06 TLF) 17:52 (HSK ME01) 16:38	07:40 16:38 15:55 (HSK ME02 TLF)	14:19 (HSK ME02 TLF) 15:55 (HSK ME02 TLF) 16:16	08:23 16:16 14:55 (HSK HR03)		
15	05:24 21:37 68	19:47 (HSK ME08a) 21:02 (HSK ME10) 20:49	06:09 20:49 20:49	19:51 (HSK ME08a) 20:15 (HSK ME10) 19:42	06:58 19:42 19:42	18:12 (HSK ME08b) 18:52 (HSK ME08b) 18:34	07:48 18:34 18:34	16:31 (HSK ME06 TLF) 17:51 (HSK ME01) 16:37	07:42 16:37 15:54 (HSK ME02 TLF)	14:17 (HSK ME02 TLF) 15:54 (HSK ME02 TLF) 16:16	08:24 16:16 14:55 (HSK HR03)		
16	05:25 21:36 68	19:47 (HSK ME08a) 21:02 (HSK ME10) 20:47	06:11 20:47 20:47	19:52 (HSK ME08a) 20:15 (HSK ME10) 19:39	07:00 19:39 19:39	18:12 (HSK ME08b) 18:51 (HSK ME08b) 18:32	07:49 18:32 18:32	16:30 (HSK ME06 TLF) 17:51 (HSK ME01) 16:36	07:43 16:36 15:54 (HSK ME02 TLF)	14:15 (HSK ME02 TLF) 15:54 (HSK ME02 TLF) 16:16	08:25 16:16 14:56 (HSK HR03)		
17	05:27 21:35 67	19:47 (HSK ME08a) 21:02 (HSK ME10) 20:45	06:12 20:45 20:45	19:52 (HSK ME08a) 20:13 (HSK ME10) 19:37	07:02 19:37 19:37	18:15 (HSK ME08b) 18:49 (HSK ME08b) 18:30	07:51 18:30 18:30	16:30 (HSK ME06 TLF) 17:51 (HSK ME01) 16:34	07:45 16:34 15:54 (HSK ME02 TLF)	14:14 (HSK ME02 TLF) 15:54 (HSK ME02 TLF) 16:16	08:25 16:16 14:57 (HSK HR03)		
18	05:28 21:34 66	19:47 (HSK ME08a) 21:01 (HSK ME10) 20:43	06:14 20:43 20:43	19:53 (HSK ME08a) 20:13 (HSK ME10) 19:35	07:03 19:35 19:35	18:15 (HSK ME08b) 18:47 (HSK ME08b) 18:27	07:53 18:27 18:27	16:29 (HSK ME06 TLF) 17:49 (HSK ME01) 16:33	07:47 16:33 15:53 (HSK ME02 TLF)	14:13 (HSK ME02 TLF) 15:53 (HSK ME02 TLF) 16:17	08:26 16:17 14:56 (HSK HR03)		
19	05:29 21:33 66	19:48 (HSK ME08a) 21:02 (HSK ME10) 20:41	06:15 20:41 20:41	19:54 (HSK ME08a) 20:10 (HSK ME10) 19:33	07:05 19:33 19:33	18:17 (HSK ME08b) 18:45 (HSK ME08b) 18:25	07:54 18:25 18:25	16:29 (HSK ME06 TLF) 17:48 (HSK ME01) 16:32	07:48 16:32 15:53 (HSK ME02 TLF)	14:13 (HSK ME02 TLF) 15:53 (HSK ME02 TLF) 16:17	08:27 16:17 14:57 (HSK HR03)		
20	05:30 21:32 65	19:47 (HSK ME08a) 21:01 (HSK ME10) 20:39	06:17 20:39 20:39	19:51 (HSK ME08a) 20:09 (HSK ME10) 19:30	07:06 19:30 19:30	18:19 (HSK ME08b) 18:41 (HSK ME08b) 18:23	07:56 18:23 18:23	16:28 (HSK ME06 TLF) 17:46 (HSK ME01) 16:30	07:50 16:30 15:51 (HSK ME02 TLF)	14:11 (HSK ME02 TLF) 15:51 (HSK ME02 TLF) 16:17	08:27 16:17 14:58 (HSK HR03)		
21	05:32 21:30 63	19:47 (HSK ME08a) 20:59 (HSK ME10) 20:37	06:19 20:37 20:37	19:13 (HSK ME07) 20:04 (HSK ME10) 19:28	07:08 19:28 19:28	18:23 (HSK ME08b) 18:38 (HSK ME08b) 18:21	07:58 18:21 18:21	16:28 (HSK ME06 TLF) 17:45 (HSK ME01) 16:29	07:52 16:29 16:29	14:11 (HSK ME02 TLF) 15:49 (HSK ME02 TLF) 16:18	08:28 16:18 14:58 (HSK HR03)		
22	05:33 21:29 62	19:47 (HSK ME08a) 20:58 (HSK ME10) 20:35	06:20 20:35 20:35	19:13 (HSK ME07) 20:04 (HSK ME10) 19:26	07:10 19:26 19:26	18:23 (HSK ME08b) 18:38 (HSK ME08b) 18:21	08:00 18:21 18:21	16:29 (HSK ME06 TLF) 17:42 (HSK ME01) 16:28	07:53 16:28 16:28	14:11 (HSK ME02 TLF) 15:47 (HSK ME02 TLF) 16:18	08:29 16:18 14:59 (HSK HR03)		
23	05:34 21:28 58	19:48 (HSK ME08a) 20:57 (HSK ME10) 20:33	06:22 20:33 20:33	19:13 (HSK ME07) 20:04 (HSK ME10) 19:26	07:11 19:26 19:26	18:23 (HSK ME08b) 18:38 (HSK ME08b) 18:21	08:01 18:21 18:21	16:29 (HSK ME06 TLF) 17:42 (HSK ME01) 16:28	07:55 16:28 16:28	14:11 (HSK ME02 TLF) 15:47 (HSK ME02 TLF) 16:18	08:29 16:18 14:59 (HSK HR03)		
24	05:36 21:26 56	19:48 (HSK ME08a) 20:56 (HSK ME10) 20:31	06:23 20:31 20:31	19:13 (HSK ME07) 20:04 (HSK ME10) 19:21	07:13 19:21 19:21	18:23 (HSK ME08b) 18:38 (HSK ME08b) 18:21	08:03 18:21 18:21	16:28 (HSK ME06 TLF) 17:37 (HSK ME01) 16:26	07:57 16:26 16:26	14:11 (HSK ME02 TLF) 15:46 (HSK ME02 TLF) 16:19	08:29 16:19 14:59 (HSK HR03)		
25	05:37 21:25 52	19:48 (HSK ME08a) 20:54 (HSK ME10) 20:29	06:25 20:29 20:29	19:13 (HSK ME07) 20:04 (HSK ME10) 19:19	07:14 19:19 19:19	18:23 (HSK ME08b) 18:38 (HSK ME08b) 18:21	08:04 18:21 18:21	16:29 (HSK ME06 TLF) 17:36 (HSK ME01) 16:25	07:58 16:25 16:25	14:10 (HSK ME02 TLF) 15:46 (HSK ME02 TLF) 16:20	08:30 16:20 15:00 (HSK HR03)		
26	05:39 21:24 48	19:49 (HSK ME08a) 20:54 (HSK ME10) 20:27	06:27 20:27 20:27	19:13 (HSK ME07) 20:04 (HSK ME10) 19:16	07:16 19:16 19:16	18:23 (HSK ME08b) 18:38 (HSK ME08b) 18:21	08:05 18:21 18:21	16:29 (HSK ME06 TLF) 17:36 (HSK ME01) 16:24	08:00 16:24 16:24	14:10 (HSK ME02 TLF) 15:47 (HSK ME02 TLF) 16:20	08:30 16:20 15:01 (HSK HR03)		
27	05:40 21:22 42	19:49 (HSK ME08a) 20:53 (HSK ME10) 20:24	06:28 20:24 20:24	19:13 (HSK ME07) 20:04 (HSK ME10) 19:14	07:18 19:14 19:14	18:23 (HSK ME08b) 18:38 (HSK ME08b) 18:21	08:06 18:21 18:21	16:30 (HSK ME06 TLF) 17:36 (HSK ME01) 16:23	08:01 16:23 16:23	14:10 (HSK ME02 TLF) 15:48 (HSK ME02 TLF) 16:21	08:30 16:21 15:01 (HSK HR03)		
28	05:41 21:21 41	19:49 (HSK ME08a) 20:53 (HSK ME10) 20:22	06:30 20:22 20:22	19:13 (HSK ME07) 20:04 (HSK ME10) 19:12	07:19 19:12 19:12	18:23 (HSK ME08b) 18:38 (HSK ME08b) 18:21	08:07 18:21 18:21	16:31 (HSK ME06 TLF) 17:36 (HSK ME01) 16:22	08:03 16:22 16:22	14:10 (HSK ME02 TLF) 15:48 (HSK ME02 TLF) 16:22	08:31 16:22 15:01 (HSK HR03)		
29	05:43 21:19 40	19:50 (HSK ME08a) 20:53 (HSK ME10) 20:20	06:31 20:20 20:20	19:13 (HSK ME07) 20:04 (HSK ME10) 19:09	07:21 19:09 19:09	18:19 (HSK ME08b) 18:19 (HSK ME08b) 18:12	07:12 18:12 18:12	15:32 (HSK ME06 TLF) 16:36 (HSK ME01) 16:22	08:04 16:22 16:22	14:10 (HSK ME02 TLF) 14:49 (HSK ME02 TLF) 16:23	08:31 16:23 15:02 (HSK HR03)		
30	05:44 21:18 40	19:50 (HSK ME08a) 20:53 (HSK ME10) 20:18	06:33 20:18 20:18	19:13 (HSK ME07) 20:04 (HSK ME10) 19:07	07:23 19:07 19:07	18:19 (HSK ME08b) 18:19 (HSK ME08b) 18:12	07:14 18:12 18:12	15:33 (HSK ME06 TLF) 16:36 (HSK ME01) 16:21	08:06 16:21 16:21	14:10 (HSK ME02 TLF) 14:49 (HSK ME02 TLF) 16:24	08:31 16:24 15:02 (HSK HR03)		
31	05:46 21:16 38	19:50 (HSK ME08a) 20:53 (HSK ME10) 20:16	06:35 20:16 20:16	19:13 (HSK ME07) 20:04 (HSK ME10) 19:07	07:25 19:07 19:07	18:19 (HSK ME08b) 18:19 (HSK ME08b) 18:12	07:15 18:12 18:12	15:34 (HSK ME06 TLF) 16:36 (HSK ME01) 16:21	08:07 16:21 16:21	14:10 (HSK ME02 TLF) 14:49 (HSK ME02 TLF) 16:25	08:31 16:25 15:03 (HSK HR03)		
Sonnenscheinstunden		500	453		381		332		268		246		
astr. max. mögl. Beschattung		1899	1159		1136		1622		1020		1216		
Red. Sonnenscheinwahrsh.		0,39	0,40		0,32		0,29		0,23		0,17		
Reduktion Betriebsdauhrs.		0,96	0,96		0,96		0,96		0,96		0,96		
Reduktion Windrichtung		0,26	0,26		0,26		0,26		0,66		0		

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung Schattenrezeptor: IPN28 - Meerhof, Sintfeldstraße 33
Annahmen für Schattenwurfberechnung Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar			Februar			März			April			Mai			Juni		
1	08:31	15:01 (HSK HR05)	08:05	15:09 (HSK HR05)	07:12	16:48 (HSK HR03)	07:03	19:24 (HSK ME01)	05:59	19:19 (HSK ME01)	05:14	20:13 (HSK ME08b)						
2	16:26	15:27 (HSK HR05)	17:13	16:30 (HSK HR04)	18:04	17:37 (HSK HR02)	19:57	19:31 (HSK ME01)	20:47	19:38 (HSK ME01)	21:32	20:41 (HSK ME08b)						
3	08:31	15:02 (HSK HR05)	08:03	15:09 (HSK HR05)	07:10	16:47 (HSK HR03)	07:00	19:21 (HSK ME01)	05:57	19:21 (HSK ME01)	05:13	20:14 (HSK ME08b)						
4	16:27	15:28 (HSK HR05)	17:15	16:30 (HSK HR04)	18:06	17:38 (HSK HR02)	19:59	19:33 (HSK ME01)	20:49	19:36 (HSK ME01)	21:33	20:41 (HSK ME08b)						
5	08:31	15:01 (HSK HR05)	08:02	15:10 (HSK HR05)	07:08	16:46 (HSK HR03)	06:58	19:19 (HSK ME01)	05:55	19:24 (HSK ME01)	05:13	20:14 (HSK ME08b)						
6	16:28	15:28 (HSK HR05)	17:17	16:31 (HSK HR04)	18:07	17:39 (HSK HR02)	20:00	19:34 (HSK ME01)	20:50	19:22 (HSK ME01)	21:34	20:41 (HSK ME08b)						
7	08:31	15:01 (HSK HR05)	08:00	15:13 (HSK HR05)	07:06	16:45 (HSK HR03)	06:56	19:17 (HSK ME01)	05:53	19:14 (HSK ME01)	05:12	20:15 (HSK ME08b)						
8	16:29	15:29 (HSK HR05)	17:19	16:32 (HSK HR04)	18:09	17:41 (HSK HR02)	20:02	19:36 (HSK ME01)	20:52	19:24 (HSK ME01)	21:35	20:41 (HSK ME08b)						
9	08:30	15:02 (HSK HR05)	07:59	15:14 (HSK HR05)	07:04	16:45 (HSK HR03)	06:54	19:17 (HSK ME01)	05:51	19:12 (HSK ME01)	05:11	20:15 (HSK ME08b)						
10	16:30	15:31 (HSK HR05)	17:20	16:31 (HSK HR04)	18:11	17:41 (HSK HR02)	20:04	19:38 (HSK ME01)	20:53	19:25 (HSK ME01)	21:36	20:41 (HSK ME08b)						
11	08:30	15:01 (HSK HR05)	07:57	15:16 (HSK HR05)	07:01	16:44 (HSK HR03)	06:51	19:16 (HSK ME01)	05:50	19:11 (HSK ME01)	05:11	20:15 (HSK ME08b)						
12	16:32	15:31 (HSK HR05)	17:22	16:31 (HSK HR04)	18:13	17:41 (HSK HR02)	20:05	19:38 (HSK ME01)	20:55	19:26 (HSK ME01)	21:37	20:41 (HSK ME08b)						
13	08:30	15:02 (HSK HR05)	07:55	15:19 (HSK HR05)	06:59	16:44 (HSK HR03)	06:49	19:16 (HSK ME01)	05:48	19:10 (HSK ME01)	05:10	20:16 (HSK ME08b)						
14	16:33	15:32 (HSK HR05)	17:24	16:31 (HSK HR04)	18:14	17:41 (HSK HR02)	20:07	19:38 (HSK ME01)	20:57	19:28 (HSK ME01)	21:38	20:41 (HSK ME08b)						
15	08:29	15:01 (HSK HR05)	07:53	16:06 (HSK HR04)	06:57	16:44 (HSK HR03)	06:47	19:15 (HSK ME01)	05:46	19:09 (HSK ME01)	05:10	20:17 (HSK ME08b)						
16	16:34	15:33 (HSK HR05)	17:26	16:30 (HSK HR04)	18:16	17:41 (HSK HR02)	20:09	19:37 (HSK ME01)	20:58	19:29 (HSK ME01)	21:39	20:41 (HSK ME08b)						
17	08:29	15:01 (HSK HR05)	07:52	16:07 (HSK HR04)	06:55	16:44 (HSK HR03)	06:45	19:15 (HSK ME01)	05:44	19:09 (HSK ME01)	05:09	20:17 (HSK ME08b)						
18	16:36	15:33 (HSK HR05)	17:28	16:31 (HSK HR04)	18:18	17:41 (HSK HR02)	20:10	19:37 (HSK ME01)	21:00	19:30 (HSK ME01)	21:40	20:41 (HSK ME08b)						
19	08:28	15:02 (HSK HR05)	07:50	16:08 (HSK HR04)	06:53	16:43 (HSK HR03)	06:42	19:15 (HSK ME01)	05:43	19:09 (HSK ME01)	05:09	20:18 (HSK ME08b)						
20	16:37	15:35 (HSK HR05)	17:30	16:30 (HSK HR04)	18:20	17:54 (HSK HR01)	20:12	19:39 (HSK ME01)	21:01	19:32 (HSK ME01)	21:42	20:41 (HSK ME08b)						
21	08:28	15:01 (HSK HR05)	07:48	16:09 (HSK HR04)	06:50	16:44 (HSK HR03)	06:40	19:15 (HSK ME01)	05:41	19:08 (HSK ME01)	05:08	20:19 (HSK ME08b)						
22	16:38	15:35 (HSK HR05)	17:31	16:29 (HSK HR04)	18:21	17:56 (HSK HR01)	20:14	19:42 (HSK ME01)	21:03	19:35 (HSK ME01)	21:41	20:41 (HSK ME08b)						
23	08:27	15:01 (HSK HR05)	07:46	16:11 (HSK HR04)	06:48	16:44 (HSK HR03)	06:38	19:16 (HSK ME01)	05:39	19:09 (HSK ME01)	05:08	20:18 (HSK ME08b)						
24	16:40	15:36 (HSK HR05)	17:33	16:27 (HSK HR04)	18:23	17:58 (HSK HR01)	20:15	19:44 (HSK ME01)	21:05	19:36 (HSK ME01)	21:42	20:41 (HSK ME08b)						
25	08:26	15:01 (HSK HR05)	07:45	16:13 (HSK HR04)	06:46	16:44 (HSK HR03)	06:36	19:16 (HSK ME01)	05:38	19:08 (HSK ME01)	05:08	20:19 (HSK ME08b)						
26	16:41	15:36 (HSK HR05)	17:35	16:25 (HSK HR04)	18:25	17:59 (HSK HR01)	20:17	19:44 (HSK ME01)	21:06	19:36 (HSK ME01)	21:43	20:41 (HSK ME08b)						
27	08:26	15:01 (HSK HR05)	07:43	16:17 (HSK HR04)	06:44	16:45 (HSK HR03)	06:34	19:18 (HSK ME01)	05:36	19:09 (HSK ME01)	05:08	20:20 (HSK ME08b)						
28	16:43	15:37 (HSK HR05)	17:37	16:21 (HSK HR04)	18:27	18:01 (HSK HR01)	20:19	19:45 (HSK ME01)	21:08	19:38 (HSK ME01)	21:43	20:41 (HSK ME08b)						
29	08:25	15:01 (HSK HR05)	07:41	16:21 (HSK HR04)	06:41	16:46 (HSK HR03)	06:31	19:17 (HSK ME01)	05:35	19:08 (HSK ME01)	05:07	20:20 (HSK ME08b)						
30	16:44	15:38 (HSK HR05)	17:39	18:28	18:01 (HSK HR01)	20:20	29	19:46 (HSK ME01)	21:09	19:30 (HSK ME01)	21:44	20:41 (HSK ME08b)						
31	08:24	15:01 (HSK HR05)	07:39	18:30	18:00 (HSK HR01)	20:22	30	19:16 (HSK ME01)	05:33	19:09 (HSK ME01)	05:07	20:21 (HSK ME08b)						
1	16:46	15:38 (HSK HR05)	17:41	18:30	18:00 (HSK HR01)	20:22	30	19:46 (HSK ME01)	21:11	19:39 (HSK ME01)	21:44	20:41 (HSK ME08b)						
2	08:23	15:01 (HSK HR05)	07:37	18:37	18:00 (HSK HR01)	20:22	30	19:15 (HSK ME01)	05:32	19:08 (HSK ME01)	05:07	20:21 (HSK ME08b)						
3	16:47	15:39 (HSK HR05)	17:42	18:32	18:01 (HSK HR01)	20:24	32	19:47 (HSK ME01)	21:12	19:30 (HSK ME01)	21:45	20:41 (HSK ME08b)						
4	08:22	15:01 (HSK HR05)	07:35	18:35	18:02 (HSK HR01)	20:25	32	19:15 (HSK ME01)	05:30	19:08 (HSK ME01)	05:07	20:21 (HSK ME08b)						
5	16:49	15:39 (HSK HR05)	17:44	18:33	18:03 (HSK HR01)	20:25	32	19:47 (HSK ME01)	21:14	19:30 (HSK ME01)	21:45	20:41 (HSK ME08b)						
6	08:21	15:02 (HSK HR05)	07:33	18:32	18:03 (HSK HR01)	20:23	32	19:14 (HSK ME01)	05:29	19:07 (HSK ME01)	05:07	20:22 (HSK ME08b)						
7	16:51	15:40 (HSK HR05)	17:46	18:35	18:04 (HSK HR01)	20:27	33	19:47 (HSK ME01)	21:15	19:30 (HSK ME01)	21:45	20:41 (HSK ME08b)						
8	08:20	15:02 (HSK HR05)	07:31	18:30	18:05 (HSK HR01)	20:21	33	19:14 (HSK ME01)	05:27	19:07 (HSK ME01)	05:07	20:22 (HSK ME08b)						
9	16:52	15:41 (HSK HR05)	17:48	18:37	18:06 (HSK HR01)	20:29	33	19:47 (HSK ME01)	21:17	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
10	08:19	15:03 (HSK HR05)	07:29	18:28	18:07 (HSK HR01)	20:26	33	19:14 (HSK ME01)	05:26	19:06 (HSK ME01)	05:07	20:22 (HSK ME08b)						
11	16:54	15:41 (HSK HR05)	17:50	18:38	18:08 (HSK HR01)	20:30	33	19:47 (HSK ME01)	21:18	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
12	08:18	15:02 (HSK HR05)	07:27	18:33	18:09 (HSK HR01)	20:25	32	19:14 (HSK ME01)	05:25	19:06 (HSK ME01)	05:08	20:23 (HSK ME08b)						
13	16:56	15:41 (HSK HR05)	17:51	18:40	18:10 (HSK HR01)	20:32	33	19:47 (HSK ME01)	21:19	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
14	08:17	15:03 (HSK HR05)	07:25	18:37	18:11 (HSK HR01)	20:23	33	19:14 (HSK ME01)	05:24	19:05 (HSK ME01)	05:08	20:23 (HSK ME08b)						
15	16:57	15:41 (HSK HR05)	17:53	18:42	18:12 (HSK HR01)	20:34	32	19:46 (HSK ME01)	21:21	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
16	08:16	15:03 (HSK HR05)	07:23	18:33	18:13 (HSK HR01)	20:26	32	19:14 (HSK ME01)	05:22	19:04 (HSK ME01)	05:08	20:22 (HSK ME08b)						
17	16:59	15:43 (HSK HR04)	17:55	18:44	18:14 (HSK HR01)	20:35	32	19:46 (HSK ME01)	21:22	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
18	08:15	15:03 (HSK HR05)	07:21	18:34	18:15 (HSK HR01)	20:27	33	19:14 (HSK ME01)	05:21	19:04 (HSK ME01)	05:08	20:23 (HSK ME08b)						
19	17:01	16:21 (HSK HR04)	17:57	18:45	18:15 (HSK HR01)	20:37	31	19:45 (HSK ME01)	21:23	19:30 (HSK ME01)	21:47	20:41 (HSK ME08b)						
20	08:13	15:04 (HSK HR05)	07:19	18:32	18:16 (HSK HR01)	20:28	33	19:14 (HSK ME01)	05:20	19:03 (HSK ME01)	05:09	20:23 (HSK ME08b)						
21	17:02	16:24 (HSK HR04)	17:59	18:47	18:17 (HSK HR01)	20:39	30	19:44 (HSK ME01)	21:25	19:30 (HSK ME01)	21:47	20:41 (HSK ME08b)						
22	08:12	15:05 (HSK HR05)	07:17	18:31	18:18 (HSK HR01)	20:29	33	19:15 (HSK ME01)	05:19	19:04 (HSK ME01)	05:09	20:23 (HSK ME08b)						
23	17:04	16:26 (HSK HR04)	18:00	18:49	18:19 (HSK HR01)	20:40	28	19:43 (HSK ME01)	21:26	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
24	08:11	15:05 (HSK HR05)	07:14	18:30	18:20 (HSK HR01)	20:28	33	19:15 (HSK ME01)	05:18	19:04 (HSK ME01)	05:10	20:24 (HSK ME08b)						
25	17:06	16:27 (HSK HR04)	18:02	18:50	18:20 (HSK HR01)	20:42	27	19:42 (HSK ME01)	21:27	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
26	08:09	15:06 (HSK HR05)	07:11	18:29	18:21 (HSK HR01)	20:27	33	19:16 (HSK ME01)	05:17	19:04 (HSK ME01)	05:10	20:24 (HSK ME08b)						
27	17:08	16:28 (HSK HR04)	18:03	18:52	18:22 (HSK HR01)	20:44	25	19:41 (HSK ME01)	21:28	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
28	08:08	15:07 (HSK HR05)	07:07	18:27	18:23 (HSK HR01)	20:27	33	19:18 (HSK ME01)	05:16	19:04 (HSK ME01)	05:11	20:24 (HSK ME08b)						
29	17:09	16:29 (HSK HR04)	18:04	18:54	18:24 (HSK HR01)	20:45	22	19:40 (HSK ME01)	21:30	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
30	08:06	15:07 (HSK HR05)	07:05	18:25	18:25 (HSK HR01)	20:27	33	19:16 (HSK ME01)	05:15	19:04 (HSK ME01)	05:11	20:24 (HSK ME08b)						
31	17:11	16:29 (HSK HR04)	18:05	18:55	18:25 (HSK HR01)	20:46	22	19:41 (HSK ME01)	21:31	19:30 (HSK ME01)	21:46	20:41 (HSK ME08b)						
Sonnenscheinstunden	261		278		367		415		483		496							
astr. max. mögl. Beschattung	1207		603		969		778		776		644							
Red. Sonnenscheinwahrsh.	0,19		0,32		0,28		0,36		0,43		0,34							
Reduktion Betriebsdauer	0,96		0,96		0,96		0,96		0,96		0,96							
Reduktion Windrichtung	0,66		0,69		0,70		0,69		0,66		0,66							
Gesamte Reduktion	0,12		0,21		0,19		0,24		0,27									

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnert / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN28 - Meerhof, Sintfeldstraße 33
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

		Juli		August		September		Oktober		November		Dezember	
1	05:11	20:23 (HSK ME08b)	05:47	20:19 (HSK ME07)	06:36	19:14 (HSK ME01)	07:24	17:23 (HSK HR03)	07:17	15:38 (HSK HR04)	08:07	14:43 (HSK HR05)	
2	21:46	20:45 (HSK ME08b)	21:15	20:45 (HSK ME08b)	20:13	19:41 (HSK B694 TLF)	19:05	18:38 (HSK HR01)	17:00	16:00 (HSK HR04)	16:20	15:17 (HSK HR05)	
3	05:12	20:22 (HSK ME08b)	05:49	20:19 (HSK ME07)	06:38	19:13 (HSK ME01)	07:26	17:23 (HSK HR03)	07:19	15:36 (HSK HR04)	08:09	14:44 (HSK HR05)	
4	21:45	20:44 (HSK ME08b)	21:13	20:43 (HSK ME08b)	20:11	19:37 (HSK B694 TLF)	19:03	18:36 (HSK HR01)	16:58	15:59 (HSK HR04)	16:19	15:17 (HSK HR05)	
5	05:13	20:22 (HSK ME08b)	05:50	20:19 (HSK ME07)	06:39	19:13 (HSK ME01)	07:27	17:21 (HSK HR03)	07:21	15:35 (HSK HR04)	08:10	14:45 (HSK HR05)	
6	21:45	20:45 (HSK ME08b)	21:11	20:42 (HSK ME08b)	20:09	19:35 (HSK ME01)	19:00	18:33 (HSK HR01)	16:56	16:00 (HSK HR04)	16:19	15:17 (HSK HR05)	
7	05:14	20:23 (HSK ME08b)	05:52	20:19 (HSK ME07)	06:41	19:13 (HSK ME01)	07:29	17:21 (HSK HR03)	07:22	14:48 (HSK HR05)	08:11	14:45 (HSK HR05)	
8	21:45	20:46 (HSK ME08b)	21:10	20:40 (HSK ME07)	20:07	19:35 (HSK ME01)	18:58	18:18 (HSK HR02)	16:54	16:01 (HSK HR04)	16:18	15:17 (HSK HR05)	
9	05:14	20:23 (HSK ME08b)	05:53	20:19 (HSK ME07)	06:42	19:12 (HSK ME01)	07:31	17:21 (HSK HR03)	07:24	14:46 (HSK HR05)	08:13	14:47 (HSK HR05)	
10	21:44	20:47 (HSK ME08b)	21:08	20:38 (HSK ME07)	20:05	19:34 (HSK ME01)	18:56	18:18 (HSK HR02)	16:53	16:01 (HSK HR04)	16:18	15:17 (HSK HR05)	
11	05:15	20:22 (HSK ME08b)	05:55	20:20 (HSK ME07)	06:44	19:12 (HSK ME01)	07:32	17:20 (HSK HR03)	07:26	14:44 (HSK HR05)	08:14	14:47 (HSK HR05)	
12	21:44	20:46 (HSK ME08b)	21:06	20:37 (HSK ME07)	20:02	19:34 (HSK ME01)	18:54	18:17 (HSK HR02)	16:51	16:01 (HSK HR04)	16:17	15:17 (HSK HR05)	
13	05:16	20:22 (HSK ME08b)	05:56	20:20 (HSK ME07)	06:46	19:12 (HSK ME01)	07:34	17:20 (HSK HR03)	07:28	14:42 (HSK HR04)	08:15	14:48 (HSK HR05)	
14	21:43	20:47 (HSK ME08b)	21:04	20:35 (HSK ME07)	20:00	19:33 (HSK ME01)	18:51	18:17 (HSK HR02)	16:49	16:01 (HSK HR04)	16:17	15:17 (HSK HR05)	
15	05:17	20:22 (HSK ME08b)	05:58	20:22 (HSK ME07)	06:47	19:12 (HSK ME01)	07:36	17:20 (HSK HR03)	07:29	14:41 (HSK HR05)	08:16	14:49 (HSK HR05)	
16	21:43	20:48 (HSK ME08b)	21:03	20:34 (HSK ME07)	19:58	19:31 (HSK ME01)	18:49	18:17 (HSK HR02)	16:48	16:01 (HSK HR04)	16:17	15:17 (HSK HR05)	
17	05:18	20:22 (HSK ME08b)	06:00	20:23 (HSK ME07)	06:49	19:13 (HSK ME01)	07:37	17:20 (HSK HR03)	07:31	14:40 (HSK HR05)	08:18	14:50 (HSK HR05)	
18	21:42	20:48 (HSK ME08b)	21:01	20:32 (HSK ME07)	19:55	19:29 (HSK ME01)	18:47	18:16 (HSK HR02)	16:46	16:01 (HSK HR04)	16:16	15:17 (HSK HR05)	
19	05:19	20:22 (HSK ME08b)	06:01	19:32 (HSK B694 TLF)	06:50	19:14 (HSK ME01)	07:39	17:20 (HSK HR03)	07:33	14:39 (HSK HR04)	08:19	14:51 (HSK HR05)	
20	21:41	20:49 (HSK ME08b)	20:59	20:31 (HSK ME07)	19:53	19:27 (HSK ME01)	18:45	18:14 (HSK HR02)	16:44	16:01 (HSK HR04)	16:16	15:17 (HSK HR05)	
21	05:20	20:22 (HSK ME08b)	06:03	19:29 (HSK B694 TLF)	06:52	19:16 (HSK ME01)	07:41	17:20 (HSK HR03)	07:35	14:39 (HSK HR04)	08:20	14:51 (HSK HR05)	
22	21:40	20:49 (HSK ME08b)	20:57	19:45 (HSK B694 TLF)	19:51	19:24 (HSK ME01)	18:42	18:13 (HSK HR02)	16:43	16:01 (HSK HR04)	16:16	15:17 (HSK HR05)	
23	05:21	20:22 (HSK ME08b)	06:04	19:27 (HSK B694 TLF)	06:54		07:42	17:21 (HSK HR03)	07:36	14:39 (HSK HR04)	08:21	14:52 (HSK HR05)	
24	21:40	20:49 (HSK ME08b)	20:55	19:47 (HSK B694 TLF)	19:49		07:43	18:11 (HSK HR02)	16:41	16:01 (HSK HR04)	16:16	15:17 (HSK HR05)	
25	05:22	20:21 (HSK ME08b)	06:06	19:25 (HSK B694 TLF)	06:55		07:44	17:22 (HSK HR03)	07:38	14:37 (HSK HR05)	08:22	14:53 (HSK HR05)	
26	21:39	20:50 (HSK ME08b)	20:53	19:48 (HSK B694 TLF)	19:46		07:46	18:09 (HSK HR02)	16:40	15:59 (HSK HR04)	16:16	15:17 (HSK HR05)	
27	05:23	20:21 (HSK ME08b)	06:07	19:24 (HSK B694 TLF)	06:57		07:46	17:22 (HSK HR03)	07:40	14:37 (HSK HR05)	08:23	14:54 (HSK HR05)	
28	21:38	20:50 (HSK ME08b)	20:51	19:50 (HSK B694 TLF)	19:44		07:50	18:14 (HSK HR02)	16:38	15:58 (HSK HR04)	16:16	15:17 (HSK HR05)	
29	05:24	20:21 (HSK ME08b)	06:09	19:23 (HSK B694 TLF)	06:58		07:47	17:24 (HSK HR03)	07:42	14:37 (HSK HR05)	08:24	14:55 (HSK HR05)	
30	21:37	20:50 (HSK ME08b)	20:49	19:50 (HSK B694 TLF)	19:42		07:48	18:14 (HSK HR02)	16:37	15:58 (HSK HR04)	16:16	15:17 (HSK HR05)	
31	05:25	20:21 (HSK ME08b)	06:11	19:22 (HSK B694 TLF)	07:00		07:49	17:25 (HSK HR03)	07:43	14:37 (HSK HR05)	08:24	14:56 (HSK HR05)	
32	21:36	20:50 (HSK ME08b)	20:47	19:51 (HSK B694 TLF)	19:39		07:51	18:14 (HSK HR02)	16:36	15:57 (HSK HR04)	16:16	15:18 (HSK HR05)	
33	05:27	20:21 (HSK ME08b)	06:12	19:21 (HSK B694 TLF)	07:02		07:51	17:28 (HSK HR03)	07:45	14:37 (HSK HR05)	08:25	14:57 (HSK HR05)	
34	21:35	20:50 (HSK ME08b)	20:45	19:51 (HSK B694 TLF)	19:37		07:50	18:14 (HSK HR02)	16:34	15:55 (HSK HR04)	16:16	15:18 (HSK HR05)	
35	05:28	20:21 (HSK ME08b)	06:14	19:20 (HSK B694 TLF)	07:03		07:53	17:30 (HSK HR03)	07:47	14:37 (HSK HR05)	08:26	14:58 (HSK HR05)	
36	21:34	20:50 (HSK ME08b)	20:43	19:52 (HSK B694 TLF)	19:35		07:53	18:14 (HSK HR02)	16:33	15:52 (HSK HR04)	16:17	15:18 (HSK HR05)	
37	05:29	20:22 (HSK ME08b)	06:15	19:19 (HSK B694 TLF)	07:05		07:54	17:43 (HSK HR03)	07:48	14:38 (HSK HR05)	08:27	14:59 (HSK HR05)	
38	21:33	20:51 (HSK ME08b)	20:41	19:51 (HSK B694 TLF)	19:32		07:55	18:14 (HSK HR02)	16:32	15:51 (HSK HR04)	16:17	15:18 (HSK HR05)	
39	05:30	20:22 (HSK ME08b)	06:17	19:19 (HSK B694 TLF)	07:06		07:56	17:30 (HSK HR03)	07:50	14:37 (HSK HR05)	08:27	15:19 (HSK HR05)	
40	21:32	20:51 (HSK ME08b)	20:39	19:52 (HSK B694 TLF)	19:30		07:56	18:14 (HSK HR02)	16:30	15:51 (HSK HR04)	16:17	15:19 (HSK HR05)	
41	05:32	20:21 (HSK ME08b)	06:19	19:18 (HSK B694 TLF)	07:08		07:58	17:43 (HSK HR03)	07:52	14:38 (HSK HR05)	08:28	15:20 (HSK HR05)	
42	21:30	20:51 (HSK ME08b)	20:37	19:51 (HSK B694 TLF)	19:28		07:58	18:14 (HSK HR02)	16:29	15:51 (HSK HR04)	16:18	15:19 (HSK HR05)	
43	05:33	20:21 (HSK ME08b)	06:20	19:18 (HSK B694 TLF)	07:10		07:58	17:30 (HSK HR03)	07:53	14:38 (HSK HR05)	08:29	15:21 (HSK HR05)	
44	21:29	20:51 (HSK ME08b)	20:35	19:52 (HSK B694 TLF)	19:26		07:58	18:14 (HSK HR02)	16:28	15:51 (HSK HR04)	16:18	15:20 (HSK HR05)	
45	05:34	20:22 (HSK ME08b)	06:22	19:18 (HSK B694 TLF)	07:11		08:01	17:43 (HSK HR03)	07:55	14:39 (HSK HR05)	08:29	15:21 (HSK HR05)	
46	21:28	20:51 (HSK ME08b)	20:33	19:51 (HSK B694 TLF)	19:23		08:01	18:14 (HSK HR02)	16:27	15:51 (HSK HR04)	16:19	15:20 (HSK HR05)	
47	05:36	20:22 (HSK ME08b)	06:23	19:18 (HSK B694 TLF)	07:13		08:03	17:43 (HSK HR03)	08:03	14:40 (HSK HR05)	08:29	15:21 (HSK HR05)	
48	21:26	20:51 (HSK ME08b)	20:31	19:51 (HSK B694 TLF)	19:21		08:03	18:14 (HSK HR02)	16:26	15:51 (HSK HR04)	16:19	15:20 (HSK HR05)	
49	05:37	20:21 (HSK ME07)	06:25	19:17 (HSK B694 TLF)	07:14		08:03	17:43 (HSK HR03)	08:05	14:39 (HSK HR05)	08:30	15:21 (HSK HR05)	
50	21:25	20:50 (HSK ME08b)	20:29	19:50 (HSK B694 TLF)	19:19		08:05	18:14 (HSK HR02)	16:25	15:51 (HSK HR04)	16:20	15:21 (HSK HR05)	
51	05:39	20:20 (HSK ME07)	06:27	19:18 (HSK B694 TLF)	07:16		08:05	17:43 (HSK HR03)	08:06	14:40 (HSK HR05)	08:30	15:21 (HSK HR05)	
52	21:24	20:50 (HSK ME08b)	20:27	19:50 (HSK B694 TLF)	19:16		08:05	18:14 (HSK HR02)	16:24	15:51 (HSK HR04)	16:21	15:22 (HSK HR05)	
53	05:40	20:20 (HSK ME07)	06:28	19:18 (HSK B694 TLF)	07:18		08:05	17:43 (HSK HR03)	08:08	14:41 (HSK HR05)	08:30	15:22 (HSK HR05)	
54	21:22	20:50 (HSK ME08b)	20:24	19:48 (HSK B694 TLF)	19:14		08:05	18:14 (HSK HR02)	16:23	15:51 (HSK HR04)	16:21	15:22 (HSK HR05)	
55	05:41	20:19 (HSK ME07)	06:30	19:19 (HSK B694 TLF)	07:19		08:05	17:43 (HSK HR03)	08:09	14:41 (HSK HR05)	08:31	15:01 (HSK HR05)	
56	21:21	20:49 (HSK ME08b)	20:22	19:48 (HSK B694 TLF)	19:12		08:05	18:14 (HSK HR02)	16:22	15:51 (HSK HR04)	16:22	15:23 (HSK HR05)	
57	05:43	20:20 (HSK ME07)	06:31	19:18 (HSK B694 TLF)	07:21		08:05	17:43 (HSK HR03)	08:10	14:42 (HSK HR04)	08:31	15:01 (HSK HR05)	
58	21:19	20:49 (HSK ME08b)	20:20	19:46 (HSK B694 TLF)	19:09		08:05	18:14 (HSK HR02)	16:22	15:55 (HSK HR04)	16:23	15:24 (HSK HR05)	
59	05:44	20:19 (HSK ME07)	06:33	19:17 (HSK B694 TLF)	07:23		08:05	17:43 (HSK HR03)	08:11	14:42 (HSK HR04)	08:31	15:24 (HSK HR05)	
60	21:18	20:48 (HSK ME08b)	20:18	19:45 (HSK B694 TLF)	19:07		08:05	18:14 (HSK HR02)	16:21	15:57 (HSK HR04)	16:24	15:25 (HSK HR05)	
61	05:46	20:19 (HSK ME07)	06:34	19:15 (HSK ME01)			07:15	15:38 (HSK HR04)			08:31	15:01 (HSK HR05)	
62	21:16	20:46 (HSK ME08b)	20:16	19:42 (HSK B694 TLF)			07:20	15:58 (HSK HR04)			16:25	15:26 (HSK HR05)	
Sonnenscheinstunden		500		453		381		332		268		246	
astr. max.mögl. Beschattung		850		790		488		894		1302		827	
Red. Sonnenscheinwahrsch.		0,39		0,40		0,32		0,29		0,23		0,17	
Reduktion Betriebsdauer		0,96		0,96		0,96		0,96		0,96		0,96	
Reduktion Windrichtung		0,66		0,68		0,70		0,67		0,67		0,66	
Gesamte Reduktion		0,25		0,26		0,21		0,19		0,14		0,11	
Met. wahrsch. Beschattung		209		208		105		173		188		88	

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

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

Marsberg-Meerhof

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN31 - Meerhof, Taubenweg 2

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar			Februar			März			April			Mai			Juni		
1	08:31			08:05		16:06 (HSK HR05)	07:12		17:11 (HSK HR03)	07:03		19:07 (HSK 8694 TLF)	05:59		20:16 (HSK ME08a)	05:14		
	16:26			17:13	25	16:31 (HSK HR05)	18:04	23	17:34 (HSK HR03)	19:57	20	19:27 (HSK 8694 TLF)	20:47	3	20:19 (HSK ME08a)	21:32		
2	08:31			08:03		16:06 (HSK HR05)	07:10		17:10 (HSK HR03)	07:00		19:07 (HSK 8694 TLF)	05:57		20:15 (HSK ME08a)	05:13		
	16:27			17:15	25	16:31 (HSK HR05)	18:06	25	17:35 (HSK HR03)	19:59	19	19:26 (HSK 8694 TLF)	20:49	5	20:20 (HSK ME08a)	21:33		
3	08:31			08:02		16:05 (HSK HR05)	07:08		17:10 (HSK HR03)	06:58		19:07 (HSK 8694 TLF)	05:55		20:14 (HSK ME08a)	05:13		
	16:28			17:17	26	16:31 (HSK HR05)	18:07	25	17:35 (HSK HR03)	20:00	17	19:24 (HSK 8694 TLF)	20:50	8	20:22 (HSK ME08a)	21:34		
4	08:31			08:00		16:06 (HSK HR05)	07:06		17:10 (HSK HR03)	06:56		19:08 (HSK 8694 TLF)	05:53		20:14 (HSK ME08a)	05:12		
	16:29			17:19	26	16:32 (HSK HR05)	18:09	25	17:35 (HSK HR03)	20:02	15	19:23 (HSK 8694 TLF)	20:52	10	20:24 (HSK ME08a)	21:35		
5	08:30			07:59		16:06 (HSK HR05)	07:04		17:10 (HSK HR03)	06:54		19:10 (HSK 8694 TLF)	05:51		20:13 (HSK ME08a)	05:11		
	16:30			17:20	26	16:32 (HSK HR05)	18:11	25	17:35 (HSK HR03)	20:04	11	19:21 (HSK 8694 TLF)	20:53	12	20:25 (HSK ME08a)	21:36		
6	08:30			07:57		16:07 (HSK HR05)	07:01		17:10 (HSK HR03)	06:51		19:13 (HSK 8694 TLF)	05:49		20:13 (HSK ME08a)	05:11		
	16:32			17:22	24	16:31 (HSK HR05)	18:13	24	17:34 (HSK HR03)	20:05	5	19:18 (HSK 8694 TLF)	20:55	13	20:26 (HSK ME08a)	21:37		
7	08:30			07:55		16:07 (HSK HR05)	06:59		17:10 (HSK HR03)	06:49			05:48		20:12 (HSK ME08a)	05:10		
	16:33			17:24	24	16:31 (HSK HR05)	18:14	23	17:33 (HSK HR03)	20:07			20:57	15	20:27 (HSK ME08a)	21:38		
8	08:29			07:53		16:08 (HSK HR05)	06:57		17:11 (HSK HR03)	06:47			05:46		20:13 (HSK ME08a)	05:10		
	16:34			17:26	22	16:30 (HSK HR05)	18:16	22	17:33 (HSK HR03)	20:09			20:58	16	20:29 (HSK ME08a)	21:39		
9	08:29			07:52		16:09 (HSK HR05)	06:55		17:12 (HSK HR03)	06:45			05:44		20:13 (HSK ME08a)	05:09		
	16:35			17:28	21	16:30 (HSK HR05)	18:18	20	17:32 (HSK HR03)	20:10			21:00	17	20:30 (HSK ME08a)	21:40		
10	08:28			07:50		16:11 (HSK HR05)	06:53		17:12 (HSK HR03)	06:42			05:43		20:14 (HSK ME08a)	05:09		
	16:37			17:29	18	16:29 (HSK HR05)	18:20	17	17:29 (HSK HR03)	20:12			21:01	17	20:31 (HSK ME08a)	21:40		
11	08:28			07:48		16:12 (HSK HR05)	06:50		17:15 (HSK HR03)	06:40			05:41		20:14 (HSK ME08a)	05:08		
	16:38			17:31	15	16:27 (HSK HR05)	18:21	12	17:27 (HSK HR03)	20:14			21:03	16	20:30 (HSK ME08a)	21:41		
12	08:27			07:46		16:15 (HSK HR05)	06:48		17:20 (HSK HR03)	06:38		19:49 (HSK ME08b)	05:39		20:15 (HSK ME08a)	05:08		
	16:40			17:33	10	16:25 (HSK HR05)	18:23	2	17:22 (HSK HR03)	20:15	1	19:50 (HSK ME08b)	21:05	14	20:29 (HSK ME08a)	21:42		
13	08:26			07:45			06:46			06:36		19:46 (HSK ME08b)	05:38		20:15 (HSK ME08a)	05:08		
	16:41			17:35			18:25			20:17	4	19:50 (HSK ME08b)	21:06	13	20:28 (HSK ME08a)	21:42		
14	08:26			07:43			06:44			06:34		19:44 (HSK ME08b)	05:36		20:17 (HSK ME08a)	05:07		
	16:43			17:37			18:27			20:19	8	19:52 (HSK ME08b)	21:08	10	20:27 (HSK ME08a)	21:43		
15	08:25			07:41			06:41			06:31		19:43 (HSK ME08b)	05:35		20:19 (HSK ME08a)	05:07		
	16:44			17:39			18:28			20:20	11	19:54 (HSK ME08b)	21:09	5	20:24 (HSK ME08a)	21:44		
16	08:24			07:39			06:39			06:29		19:42 (HSK ME08b)	05:33			05:07		
	16:46			17:40			18:30			20:22	13	19:55 (HSK ME08b)	21:11			21:44		
17	08:23			07:37			06:37			06:27		19:42 (HSK ME08b)	05:32			05:07		
	16:47			17:42			18:32			20:24	15	19:57 (HSK ME08b)	21:12			21:45		
18	08:22			07:35			06:35			06:25		19:41 (HSK ME08b)	05:30			05:07		
	16:49			17:44			18:33			20:25	18	19:59 (HSK ME08b)	21:14			21:45		
19	08:21			07:33			06:32			06:23		19:41 (HSK ME08b)	05:29			05:07		
	16:51			17:46			18:35			20:27	19	20:00 (HSK ME08b)	21:15			21:45		
20	08:20			07:31			06:30			06:21		19:41 (HSK ME08b)	05:27			05:07		
	16:52			17:48			18:37			20:29	19	20:00 (HSK ME08b)	21:17			21:46		
21	08:19			07:29			06:28			06:19		19:41 (HSK ME08b)	05:26			05:07		
	16:54			17:50			18:38			20:30	19	20:00 (HSK ME08b)	21:18			21:46		
22	08:18			07:27			06:25			06:17		19:42 (HSK ME08b)	05:25			05:08		
	16:55			17:51			18:40			20:32	17	19:59 (HSK ME08b)	21:19			21:46		
23	08:17		16:12 (HSK HR05)	07:25			06:23			06:15		19:43 (HSK ME08b)	05:24			05:08		
	16:57	9	16:21 (HSK HR05)	17:53			18:42			20:34	14	19:57 (HSK ME08b)	21:21			21:46		
24	08:16		16:10 (HSK HR05)	07:23		17:21 (HSK HR03)	06:21			06:12		19:44 (HSK ME08b)	05:22			05:08		
	16:59	13	16:23 (HSK HR05)	17:55	5	17:26 (HSK HR03)	18:43			20:35	12	19:56 (HSK ME08b)	21:22			21:46		
25	08:15		16:08 (HSK HR05)	07:21		17:17 (HSK HR03)	06:19			06:10		19:46 (HSK ME08b)	05:21			05:08		
	17:01	16	16:24 (HSK HR05)	17:57	13	17:30 (HSK HR03)	18:45	7	18:20 (HSK 8694 TLF)	20:37	7	19:53 (HSK ME08b)	21:23			21:46		
26	08:13		16:08 (HSK HR05)	07:19		17:15 (HSK HR03)	06:16		18:11 (HSK 8694 TLF)	06:08			05:20			05:09		
	17:02	18	16:26 (HSK HR05)	17:59	17	17:32 (HSK HR03)	18:47	11	18:22 (HSK 8694 TLF)	20:39			21:25			21:46		
27	08:12		16:08 (HSK HR05)	07:17		17:14 (HSK HR03)	06:14		18:09 (HSK 8694 TLF)	06:06			05:19			05:09		
	17:04	20	16:28 (HSK HR05)	18:00	19	17:33 (HSK HR03)	06:14	14	18:23 (HSK 8694 TLF)	20:40			21:26			21:46		
28	08:11		16:06 (HSK HR05)	07:14		17:13 (HSK HR03)	06:12		18:08 (HSK 8694 TLF)	06:04			05:18			05:10		
	17:06	22	16:28 (HSK HR05)	18:02	21	17:34 (HSK HR03)	18:50	17	18:25 (HSK 8694 TLF)	20:42			21:27			21:46		
29	08:09		16:06 (HSK HR05)				07:09		19:08 (HSK 8694 TLF)	06:03			05:17			05:10		
	17:08	23	16:29 (HSK HR05)				19:52	19	19:27 (HSK 8694 TLF)	20:44			05:18			21:46		
30	08:08		16:06 (HSK HR05)				07:07		19:06 (HSK 8694 TLF)	06:01			05:16			05:11		
	17:09	24	16:30 (HSK HR05)				19:54	21	19:27 (HSK 8694 TLF)	20:45			21:30			21:46		
31	08:06		16:05 (HSK HR05)				07:05		19:06 (HSK 8694 TLF)				05:15					
	17:11	25	16:30 (HSK HR05)				19:55	21	19:27 (HSK 8694 TLF)				21:31					
Sonnenscheinstunden	261			278			367			415			483			496		
astr.max.mögl.Beschattung	170			337			353			264			174					
Red. Sonnenscheinwahrsch.	0.19			0.32			0.28			0.36			0.43					
Reduktion Betriebsdauer	0.96			0.96			0.96			0.96			0.96					
Reduktion Windrichtung	0.69			0.69			0.70			0.69			0.66					
Gesamte Reduktion	0.12			0.21			0.19			0.24			0.27					
Met.wahrsch.Beschattung	21			72			67			63			47					

Tabellen-Layout: Die Daten für jeden Tag 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)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnir / ulnir@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN31 - Meerhof, Taubenweg 2

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11 21:46	05:47 21:15	20:25 (HSK ME08a) 20:40 (HSK ME08a)	06:36 20:13		07:24 19:05		07:17 17:00	15:40 (HSK HR05) 19	08:07 15:59 (HSK HR05)	16:20
2	05:12 21:45	05:49 21:13	20:24 (HSK ME08a) 20:40 (HSK ME08a)	06:38 20:11		07:26 19:03	17:55 (HSK HR03) 10	07:19 18:05 (HSK HR03)	15:38 (HSK HR05) 21	08:09 15:57 (HSK HR05)	16:19
3	05:13 21:45	05:50 21:11	20:24 (HSK ME08a) 20:41 (HSK ME08a)	06:39 20:09		07:27 19:00	18:06 (HSK HR03) 15	07:21 18:06 (HSK HR03)	15:37 (HSK HR05) 23	08:10 15:57 (HSK HR05)	16:19
4	05:14 21:45	05:52 21:10	20:23 (HSK ME08a) 20:40 (HSK ME08a)	06:41 20:07		07:29 18:58	17:49 (HSK HR03) 19	07:22 18:08 (HSK HR03)	15:37 (HSK HR05) 23	08:11 16:00 (HSK HR05)	16:18
5	05:14 21:44	05:53 21:08	20:22 (HSK ME08a) 20:38 (HSK ME08a)	06:42 20:05		07:31 18:56	17:48 (HSK HR03) 21	07:24 18:09 (HSK HR03)	15:36 (HSK HR05) 25	08:13 16:01 (HSK HR05)	16:18
6	05:15 21:44	05:55 21:06	20:23 (HSK ME08a) 20:37 (HSK ME08a)	06:44 20:02	19:09 (HSK 8694 TLF) 5	07:32 18:54	17:46 (HSK HR03) 23	07:26 18:09 (HSK HR03)	15:36 (HSK HR05) 25	08:14 16:01 (HSK HR05)	16:17
7	05:16 21:43	05:56 21:04	20:22 (HSK ME08a) 20:35 (HSK ME08a)	06:46 20:00	19:05 (HSK 8694 TLF) 11	07:34 18:51	17:46 (HSK HR03) 24	07:28 18:10 (HSK HR03)	15:36 (HSK HR05) 26	08:15 16:02 (HSK HR05)	16:17
8	05:17 21:43	05:58 21:03	20:23 (HSK ME08a) 20:34 (HSK ME08a)	06:47 19:58	19:03 (HSK 8694 TLF) 15	07:36 18:49	17:45 (HSK HR03) 25	07:29 18:10 (HSK HR03)	15:36 (HSK HR05) 26	08:16 16:02 (HSK HR05)	16:17
9	05:18 21:42	06:00 21:01	20:23 (HSK ME08a) 20:32 (HSK ME08a)	06:49 19:55	19:01 (HSK 8694 TLF) 17	07:37 18:47	17:45 (HSK HR03) 25	07:31 18:10 (HSK HR03)	15:36 (HSK HR05) 26	08:18 16:02 (HSK HR05)	16:16
10	05:19 21:41	06:01 20:59	20:24 (HSK ME08a) 20:31 (HSK ME08a)	06:50 19:53	19:00 (HSK 8694 TLF) 19	07:39 18:45	17:44 (HSK HR03) 25	07:33 18:09 (HSK HR03)	15:37 (HSK HR05) 25	08:19 16:02 (HSK HR05)	16:16
11	05:20 21:40	06:03 20:57	20:24 (HSK ME08a) 20:28 (HSK ME08a)	06:52 19:51	18:59 (HSK 8694 TLF) 20	07:41 18:42	17:44 (HSK HR03) 25	07:35 18:09 (HSK HR03)	15:37 (HSK HR05) 25	08:20 16:02 (HSK HR05)	16:16
12	05:21 21:40	06:04 20:55	20:25 (HSK ME08a) 20:27 (HSK ME08a)	06:54 19:49	18:59 (HSK 8694 TLF) 20	07:42 18:40	17:45 (HSK HR03) 24	07:36 18:09 (HSK HR03)	15:38 (HSK HR05) 24	08:21 16:02 (HSK HR05)	16:16
13	05:22 21:39	06:06 20:53	20:25 (HSK ME08a) 20:33 (HSK ME08a)	06:55 19:46	18:58 (HSK 8694 TLF) 20	07:44 18:38	17:45 (HSK HR03) 23	07:38 18:08 (HSK HR03)	15:38 (HSK HR05) 23	08:22 16:01 (HSK HR05)	16:16
14	05:23 21:38	06:07 20:51	20:26 (HSK ME08a) 20:34 (HSK ME08a)	06:57 19:44	18:58 (HSK 8694 TLF) 19	07:46 18:36	17:45 (HSK HR03) 21	07:40 18:06 (HSK HR03)	15:38 (HSK HR05) 22	08:23 16:00 (HSK HR05)	16:16
15	05:24 21:37	06:09 20:49	20:27 (HSK ME08a) 20:35 (HSK ME08a)	06:58 19:42	18:58 (HSK 8694 TLF) 17	07:47 18:34	17:46 (HSK HR03) 19	07:42 18:05 (HSK HR03)	15:39 (HSK HR05) 21	08:24 16:00 (HSK HR05)	16:16
16	05:25 21:36	06:11 20:47	20:28 (HSK ME08a) 20:36 (HSK ME08a)	07:00 19:39	18:58 (HSK 8694 TLF) 15	07:49 18:32	17:48 (HSK HR03) 15	07:43 18:03 (HSK HR03)	15:41 (HSK HR05) 18	08:24 15:59 (HSK HR05)	16:16
17	05:27 21:35	06:12 20:45	20:29 (HSK ME08a) 20:43 (HSK ME08a)	07:02 19:37	19:00 (HSK 8694 TLF) 11	07:51 18:29	17:50 (HSK HR03) 11	07:45 18:01 (HSK HR03)	15:42 (HSK HR05) 16	08:25 15:58 (HSK HR05)	16:16
18	05:28 21:34	06:14 20:43	20:30 (HSK ME08a) 20:48 (HSK ME08a)	07:03 19:35	19:00 (HSK 8694 TLF) 8	07:53 18:27	18:01 (HSK HR03) 13	07:47 16:33	15:44 (HSK HR05) 13	08:26 15:57 (HSK HR05)	16:17
19	05:29 21:33	06:15 20:41	20:31 (HSK ME08a) 20:50 (HSK ME08a)	07:05 19:32	19:03 (HSK 8694 TLF) 3	07:54 18:25	18:02 (HSK HR03) 9	07:48 16:32	15:47 (HSK HR05) 9	08:27 15:56 (HSK HR05)	16:17
20	05:30 21:31	06:17 20:39	20:32 (HSK ME08a) 20:51 (HSK ME08a)	07:06 19:30		07:56 18:23		07:50 16:30		08:27 16:17	
21	05:32 21:30	06:18 20:37	20:33 (HSK ME08a) 20:52 (HSK ME08a)	07:08 19:28		07:58 18:21		07:52 16:29		08:28 16:18	
22	05:33 21:29	06:20 20:35	20:34 (HSK ME08a) 20:53 (HSK ME08a)	07:10 19:26		07:59 18:19		07:53 16:28		08:28 16:18	
23	05:34 21:28	06:22 20:33	20:35 (HSK ME08a) 20:54 (HSK ME08a)	07:11 19:23		08:01 18:17		07:55 16:27		08:29 16:19	
24	05:36 21:26	06:23 20:31	20:36 (HSK ME08a) 20:55 (HSK ME08a)	07:13 19:21		08:03 18:15		07:57 16:26		08:29 16:19	
25	05:37 21:25	06:25 20:29	20:37 (HSK ME08a) 20:56 (HSK ME08a)	07:14 19:19		07:05 17:13		07:58 16:25		08:30 16:20	
26	05:39 21:24	06:26 20:27	20:38 (HSK ME08a) 20:57 (HSK ME08a)	07:16 19:16		07:06 17:11		08:00 16:24		08:30 16:20	
27	05:40 21:22	06:28 20:24	20:39 (HSK ME08a) 20:58 (HSK ME08a)	07:18 19:14		07:08 17:09		08:01 16:23		08:30 16:21	
28	05:41 21:21	06:30 20:22	20:40 (HSK ME08a) 20:59 (HSK ME08a)	07:19 19:12		07:10 17:07		08:03 16:22		08:31 16:22	
29	05:43 21:19	06:31 20:20	20:41 (HSK ME08a) 20:36 (HSK ME08a)	07:21 19:09		07:12 17:05		08:04 16:22		08:31 16:23	
30	05:44 21:18	06:33 20:18	20:42 (HSK ME08a) 20:37 (HSK ME08a)	07:23 19:07		07:13 17:03	15:44 (HSK HR05) 11	08:06 16:21		08:31 16:24	
31	05:46 21:16	06:34 20:16	20:43 (HSK ME08a) 20:38 (HSK ME08a)			07:15 17:01	15:41 (HSK HR05) 16			08:31 16:25	
Sonnenscheinstunden		500	453	381	200	332	352	268	410	246	
astr. max. mögl. Beschattung		32	318	200	0,32	352	0,29	268	0,23		
Red. Sonnenscheinwahrsch.		0,39	0,40	0,32	0,29	0,29	0,29	0,23	0,23		
Reduktion Betriebsdauer		0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96		
Reduktion Windrichtung		0,66	0,67	0,70	0,70	0,70	0,69	0,69	0,69		
Gesamte Reduktion		0,25	0,26	0,22	0,19	0,19	0,15	0,15	0,15		
Met. wahrsch. Beschattung		8	82	43	68	61					

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnér / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN32 - Meerhof, Laurentiusstraße 10

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSRINGE]

Jan	Feb	Mär	Apr	Jun	Jul	Aug	Sep	Okt	Nov	Dez	
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Januar		Februar		März		April		Mai		Juni	
1	08:31	08:05	15:55 (HSK HR05)	07:12	17:00 (HSK HR03)	07:03	19:01 (HSK 8694 TLF)	05:59	20:11 (HSK ME08a)	05:14	
	16:26	17:13	25 16:20 (HSK HR05)	18:04	26 17:26 (HSK HR03)	19:57	16 19:17 (HSK 8694 TLF)	20:47	8 20:19 (HSK ME08a)	21:32	
2	08:31	08:03	15:55 (HSK HR05)	07:10	17:01 (HSK HR03)	07:00	19:03 (HSK 8694 TLF)	05:57	20:10 (HSK ME08a)	05:13	
	16:27	17:15	24 16:19 (HSK HR05)	18:06	25 17:26 (HSK HR03)	19:59	12 19:15 (HSK 8694 TLF)	20:49	10 20:20 (HSK ME08a)	21:33	
3	08:31	08:02	15:56 (HSK HR05)	07:08	17:01 (HSK HR03)	06:58	19:05 (HSK 8694 TLF)	05:55	20:09 (HSK ME08a)	05:13	
	16:28	17:17	23 16:19 (HSK HR05)	18:07	24 17:25 (HSK HR03)	20:00	6 19:11 (HSK 8694 TLF)	20:50	13 20:22 (HSK ME08a)	21:34	
4	08:31	08:00	15:57 (HSK HR05)	07:06	17:02 (HSK HR03)	06:56		05:53	20:09 (HSK ME08a)	05:12	
	16:29	17:19	22 16:19 (HSK HR05)	18:09	23 17:25 (HSK HR03)	20:02		20:52	15 20:24 (HSK ME08a)	21:35	
5	08:30	07:59	15:58 (HSK HR05)	07:04	17:03 (HSK HR03)	06:54		05:51	20:09 (HSK ME08a)	05:11	
	16:30	17:20	20 16:18 (HSK HR05)	18:11	21 17:24 (HSK HR03)	20:04		20:53	16 20:25 (HSK ME08a)	21:36	
6	08:30	07:57	16:00 (HSK HR05)	07:01	17:03 (HSK HR03)	06:51		05:49	20:09 (HSK ME08a)	05:11	
	16:32	17:22	16 16:16 (HSK HR05)	18:13	19 17:22 (HSK HR03)	20:05		20:55	17 20:26 (HSK ME08a)	21:37	
7	08:30	07:55	16:01 (HSK HR05)	06:59	17:05 (HSK HR03)	06:49		05:48	20:08 (HSK ME08a)	05:10	
	16:33	17:24	13 16:14 (HSK HR05)	18:14	15 17:20 (HSK HR03)	20:07		20:57	19 20:27 (HSK ME08a)	21:38	
8	08:29	07:53	16:05 (HSK HR05)	06:57	17:08 (HSK HR03)	06:47		05:46	20:09 (HSK ME08a)	05:10	
	16:34	17:26	6 16:11 (HSK HR05)	18:16	9 17:17 (HSK HR03)	20:09		20:58	19 20:28 (HSK ME08a)	21:39	
9	08:29	07:52		06:55		06:45		05:44	20:09 (HSK ME08a)	05:09	
	16:35	17:28		18:18		20:10		21:00	18 20:27 (HSK ME08a)	21:40	
10	08:28	07:50		06:53		06:42		05:43	20:10 (HSK ME08a)	05:09	
	16:37	17:29		18:20		20:12	4 19:46 (HSK ME08b)	21:01	16 20:26 (HSK ME08a)	21:40	
11	08:28	07:48		06:50		06:40		05:41	20:11 (HSK ME08a)	05:08	
	16:38	17:31		18:21		20:14	8 19:48 (HSK ME08b)	21:03	14 20:25 (HSK ME08a)	21:41	
12	08:27	07:46		06:48		06:38		05:39	20:13 (HSK ME08a)	05:08	
	16:40	17:33		18:23		20:15	11 19:50 (HSK ME08b)	21:05	11 20:24 (HSK ME08a)	21:42	
13	08:26	07:45		06:46		06:36		05:38	20:14 (HSK ME08a)	05:08	
	16:41	17:35		18:25		20:17	13 19:50 (HSK ME08b)	21:06	8 20:22 (HSK ME08a)	21:42	
14	08:26	07:43		06:44		06:34		05:36		05:07	
	16:43	17:37		18:27		20:19	16 19:52 (HSK ME08b)	21:08		21:43	
15	08:25	16:00 (HSK HR05)	07:41	06:41		06:31		05:35		05:07	
	16:44	4 16:04 (HSK HR05)	17:39	18:28		20:20	18 19:54 (HSK ME08b)	21:09		21:44	
16	08:24	15:58 (HSK HR05)	07:39	06:39		06:29		05:33		05:07	
	16:46	9 16:07 (HSK HR05)	17:40	18:30		20:22	19 19:55 (HSK ME08b)	21:11		21:44	
17	08:23	15:56 (HSK HR05)	07:37	06:37		06:27		05:32		05:07	
	16:47	13 16:09 (HSK HR05)	17:42	18:32		20:24	20 19:56 (HSK ME08b)	21:12		21:45	
18	08:22	15:55 (HSK HR05)	07:35	06:35		06:25		05:30		05:07	
	16:49	16 16:11 (HSK HR05)	17:44	18:33		20:25	19 19:55 (HSK ME08b)	21:14		21:45	
19	08:21	15:55 (HSK HR05)	07:33	06:32		06:23		05:29		05:07	
	16:51	18 16:13 (HSK HR05)	17:46	18:35		20:27	19 19:55 (HSK ME08b)	21:15		21:45	
20	08:20	15:54 (HSK HR05)	07:31	06:30		06:21		05:27		05:07	
	16:52	20 16:14 (HSK HR05)	17:48	18:37		20:29	17 19:54 (HSK ME08b)	21:17		21:46	
21	08:19	15:54 (HSK HR05)	07:29	06:28		06:19		05:26		05:07	
	16:54	21 16:15 (HSK HR05)	17:50	18:38	4 18:13 (HSK 8694 TLF)	20:30	14 19:52 (HSK ME08b)	21:18		21:46	
22	08:18	15:53 (HSK HR05)	07:27	06:25		06:17		05:25		05:08	
	16:55	23 16:16 (HSK HR05)	17:51	18:40	9 18:15 (HSK 8694 TLF)	20:32	12 19:51 (HSK ME08b)	21:19		21:46	
23	08:17	15:53 (HSK HR05)	07:25	06:23		06:15		05:24		05:08	
	16:57	24 16:17 (HSK HR05)	17:53	18:42	13 18:16 (HSK 8694 TLF)	20:34	5 19:47 (HSK ME08b)	21:21		21:46	
24	08:16	15:53 (HSK HR05)	07:23	06:21		06:12		05:22		05:08	
	16:59	25 16:18 (HSK HR05)	17:55	18:43	16 18:18 (HSK 8694 TLF)	20:35		21:22		21:46	
25	08:15	15:53 (HSK HR05)	07:21	06:19		06:10		05:21		05:08	
	17:01	25 16:18 (HSK HR05)	17:57	18:45	19 18:20 (HSK 8694 TLF)	20:37		21:23		21:46	
26	08:13	15:53 (HSK HR05)	07:19	06:16		06:08		05:20		05:09	
	17:02	26 16:19 (HSK HR05)	17:59	18:47	21 18:22 (HSK 8694 TLF)	20:39		21:25		21:46	
27	08:12	15:54 (HSK HR05)	07:17	06:14		06:06		05:19		05:09	
	17:04	26 16:20 (HSK HR05)	18:00	18:49	21 18:21 (HSK 8694 TLF)	20:40		21:26		21:46	
28	08:11	15:53 (HSK HR05)	07:14	06:12		06:04		05:18		05:10	
	17:06	26 16:19 (HSK HR05)	18:02	18:50	21 18:21 (HSK 8694 TLF)	20:42		21:27		21:46	
29	08:09	15:53 (HSK HR05)		07:09		06:03		05:17		05:10	
	17:08	26 16:19 (HSK HR05)		19:52	21 19:21 (HSK 8694 TLF)	20:44	2 20:13 (HSK ME08a)	05:17		05:10	
30	08:08	15:54 (HSK HR05)		07:07		06:01		05:16		05:11	
	17:09	26 16:20 (HSK HR05)		19:54	20 19:19 (HSK 8694 TLF)	20:45	6 20:12 (HSK ME08a)	05:16		05:11	
31	08:06	15:54 (HSK HR05)		07:05				05:15		05:11	
	17:11	26 16:20 (HSK HR05)		19:55	18 19:18 (HSK 8694 TLF)			05:15		05:11	
Sonnenscheinstunden	261		278	367		415		483		496	
astr.max.mögl.Beschattung	354		334	345		237		184			
Red.Sonnenscheinwahrsch.	0,19		0,32	0,28		0,36		0,43			
Reduktion Betriebsdauer	0,96		0,96	0,96		0,96		0,96			
Reduktion Windrichtung	0,68		0,69	0,71		0,69		0,66			
Gesamte Reduktion	0,12		0,21	0,19		0,24		0,27			
Met.wahrsch.Beschattung	43		72	66		57		50			

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

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnér / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN32 - Meerhof, Laurentiusstraße 10

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11 21:46	05:47 21:15	20:22 (HSK ME08a) 13 20:35 (HSK ME08a)	06:36 20:13	19:39 (HSK ME08b) 8 19:47 (HSK ME08b)	07:24 19:05		07:17 17:00		08:07 16:20	
2	05:12 21:45	05:49 21:13	20:21 (HSK ME08a) 15 20:36 (HSK ME08a)	06:38 20:11	19:40 (HSK ME08b) 4 19:44 (HSK ME08b)	07:26 19:03		07:19 16:58		08:09 16:19	
3	05:13 21:45	05:50 21:11	20:20 (HSK ME08a) 16 20:37 (HSK ME08a)	06:39 20:09		07:27 19:00		07:21 16:56	15:34 (HSK HR05)	08:10 16:19	
4	05:14 21:45	05:52 21:10	20:20 (HSK ME08a) 17 20:37 (HSK ME08a)	06:41 20:07		07:29 18:58		07:22 16:54	15:31 (HSK HR05) 13 15:44 (HSK HR05)	08:11 16:18	
5	05:14 21:44	05:53 21:08	20:19 (HSK ME08a) 18 20:37 (HSK ME08a)	06:42 20:05		07:31 18:56		07:24 16:53	15:29 (HSK HR05) 17 15:46 (HSK HR05)	08:13 16:18	
6	05:15 21:44	05:55 21:06	20:19 (HSK ME08a) 18 20:37 (HSK ME08a)	06:44 20:02		07:32 18:54	17:42 (HSK HR03)	07:26 16:51	15:28 (HSK HR05) 19 15:47 (HSK HR05)	08:14 16:17	
7	05:16 21:43	05:56 21:04	20:18 (HSK ME08a) 17 20:35 (HSK ME08a)	06:46 20:00		07:34 18:51	17:40 (HSK HR03)	07:28 16:49	15:27 (HSK HR05) 22 15:49 (HSK HR05)	08:15 16:17	
8	05:17 21:43	05:58 21:03	20:18 (HSK ME08a) 16 20:34 (HSK ME08a)	06:47 19:58		07:36 18:49	17:39 (HSK HR03)	07:29 16:48	15:26 (HSK HR05) 23 15:49 (HSK HR05)	08:16 16:17	
9	05:18 21:42	06:00 21:01	20:18 (HSK ME08a) 14 20:32 (HSK ME08a)	06:49 19:55	19:00 (HSK 8694 TLF)	07:37 18:47	17:37 (HSK HR03)	07:31 16:46	15:26 (HSK HR05) 24 15:50 (HSK HR05)	08:18 16:16	
10	05:19 21:41	06:01 20:59	20:19 (HSK ME08a) 12 20:31 (HSK ME08a)	06:50 19:53	18:56 (HSK 8694 TLF)	07:39 18:45	17:36 (HSK HR03)	07:33 16:44	15:26 (HSK HR05) 25 15:51 (HSK HR05)	08:19 16:16	
11	05:20 21:40	06:03 20:57	20:18 (HSK ME08a) 10 20:28 (HSK ME08a)	06:52 19:51	18:54 (HSK 8694 TLF)	07:41 18:42	17:35 (HSK HR03)	07:35 16:43	15:26 (HSK HR05) 25 15:51 (HSK HR05)	08:20 16:16	
12	05:21 21:40	06:04 20:55	20:19 (HSK ME08a) 8 20:27 (HSK ME08a)	06:54 19:49	18:52 (HSK 8694 TLF)	07:42 18:40	17:35 (HSK HR03)	07:36 16:41	15:26 (HSK HR05) 26 15:52 (HSK HR05)	08:21 16:16	
13	05:22 21:39	06:06 20:53	20:20 (HSK ME08a) 5 20:25 (HSK ME08a)	06:55 19:46	18:51 (HSK 8694 TLF)	07:44 18:38	17:34 (HSK HR03)	07:38 16:40	15:25 (HSK HR05) 26 15:51 (HSK HR05)	08:22 16:16	
14	05:23 21:38	06:07 20:51	20:21 (HSK ME08a) 2 20:23 (HSK ME08a)	06:57 19:44	18:50 (HSK 8694 TLF)	07:46 18:36	17:33 (HSK HR03)	07:40 16:38	15:25 (HSK HR05) 26 15:51 (HSK HR05)	08:23 16:16	
15	05:24 21:37	06:09 20:49		06:58 19:42	18:49 (HSK 8694 TLF)	07:47 18:34	17:34 (HSK HR03)	07:42 16:37	15:25 (HSK HR05) 27 15:52 (HSK HR05)	08:24 16:16	
16	05:25 21:36	06:11 20:47		07:00 19:39	18:49 (HSK 8694 TLF)	07:49 18:32	17:34 (HSK HR03)	07:43 16:36	15:26 (HSK HR05) 26 15:52 (HSK HR05)	08:24 16:16	
17	05:27 21:35	06:12 20:45		07:02 19:37	18:49 (HSK 8694 TLF)	07:51 18:29	17:34 (HSK HR03)	07:45 16:34	15:27 (HSK HR05) 25 15:52 (HSK HR05)	08:25 16:16	
18	05:28 21:34	06:14 20:43		07:03 19:35	18:49 (HSK 8694 TLF)	07:53 18:27	17:34 (HSK HR03)	07:47 16:33	15:27 (HSK HR05) 25 15:52 (HSK HR05)	08:26 16:17	
19	05:29 21:33	06:15 20:41		07:05 19:32	18:49 (HSK 8694 TLF)	07:54 18:25	17:35 (HSK HR03)	07:48 16:32	15:28 (HSK HR05) 24 15:52 (HSK HR05)	08:27 16:17	
20	05:30 21:31	06:17 20:39	19:47 (HSK ME08b) 7 19:54 (HSK ME08b)	07:06 19:30	18:49 (HSK 8694 TLF)	07:56 18:23	17:37 (HSK HR03)	07:50 16:30	15:28 (HSK HR05) 23 15:51 (HSK HR05)	08:27 16:17	
21	05:32 21:30	06:18 20:37	19:43 (HSK ME08b) 13 19:56 (HSK ME08b)	07:08 19:28	18:51 (HSK 8694 TLF)	07:58 18:21	17:39 (HSK HR03)	07:52 16:29	15:29 (HSK HR05) 21 15:50 (HSK HR05)	08:28 16:18	
22	05:33 21:29	06:20 20:35	19:42 (HSK ME08b) 15 19:57 (HSK ME08b)	07:10 19:26	18:52 (HSK 8694 TLF)	07:59 18:19	17:42 (HSK HR03)	07:53 16:28	15:30 (HSK HR05) 20 15:50 (HSK HR05)	08:28 16:18	
23	05:34 21:28	06:22 20:33	19:40 (HSK ME08b) 18 19:58 (HSK ME08b)	07:11 19:23	18:58 (HSK 8694 TLF)	08:01 18:17	17:48 (HSK HR03)	07:55 16:27	15:31 (HSK HR05) 18 15:50 (HSK HR05)	08:29 16:19	
24	05:36 21:26	06:23 20:31	19:40 (HSK ME08b) 19 19:59 (HSK ME08b)	07:13 19:21		08:03 18:15		07:57 16:26	15:32 (HSK HR05) 16 15:48 (HSK HR05)	08:29 16:19	
25	05:37 21:25	06:25 20:29	19:38 (HSK ME08b) 20 19:58 (HSK ME08b)	07:14 19:19		07:05 17:13		07:58 16:25	15:34 (HSK HR05) 14 15:48 (HSK HR05)	08:30 16:20	
26	05:39 21:24	06:26 20:27	19:38 (HSK ME08b) 21 19:59 (HSK ME08b)	07:16 19:16		07:06 17:11		08:00 16:24	15:37 (HSK HR05) 10 15:47 (HSK HR05)	08:30 16:20	
27	05:40 21:22	06:28 20:24	19:37 (HSK ME08b) 20 19:57 (HSK ME08b)	07:18 19:14		07:08 17:09		08:01 16:23	15:40 (HSK HR05) 4 15:44 (HSK HR05)	08:30 16:21	
28	05:41 21:21	06:30 20:22	19:38 (HSK ME08b) 17 19:55 (HSK ME08b)	07:19 19:12		07:10 17:07		08:03 16:22		08:31 16:22	
29	05:43 21:19	06:31 20:20	19:37 (HSK ME08b) 16 19:53 (HSK ME08b)	07:21 19:09		07:12 17:05		08:04 16:22		08:31 16:23	
30	05:44 21:18	20:26 (HSK ME08a) 5 20:31 (HSK ME08a)	06:33 20:18	19:38 (HSK ME08b) 13 19:51 (HSK ME08b)	07:23 19:07	07:13 17:03		08:06 16:21		08:31 16:24	
31	05:46 21:16	20:23 (HSK ME08a) 10 20:33 (HSK ME08a)	06:34 20:16	19:38 (HSK ME08b) 10 19:48 (HSK ME08b)		07:15 17:01				08:31 16:25	
Sonnenscheinstunden		500	453	381	332	347	268	506	246		
astr. max. mögl. Beschattung		15	370	233		0,29		0,23			
Red. Sonnenscheinwahrsch.		0,39	0,40	0,32		0,96		0,96			
Reduktion Betriebsdauer		0,96	0,96	0,96		0,70		0,68			
Reduktion Windrichtung		0,66	0,67	0,71		0,19		0,15			
Gesamte Reduktion		0,25	0,26	0,22							
Met. wahrsch. Beschattung		4	96	50	68			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) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	--------------------------------	---------------------------	----------------------------

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung Schattenrezeptor: IPN33 - Meerhof, Dalheimer Straße 1
Annahmen für SchattenwurfberechnungSonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Januar			Februar			März			April			Mai			Juni		
1	08:31	14:41 (HSK HR12)	08:05	16:24 (HSK HR05)	07:12				07:03	19:18 (HSK 8694 TLF)	05:59				05:14		
	16:26	13	14:54 (HSK HR12)	17:13	15	16:39 (HSK HR05)	18:04		19:57	13	19:31 (HSK 8694 TLF)	20:47			21:32		
2	08:31	14:42 (HSK HR12)	08:03	16:22 (HSK HR05)	07:10			17:29 (HSK HR03)	07:00		19:17 (HSK 8694 TLF)	05:57			21:33		
	16:27	12	14:54 (HSK HR12)	17:15	18	16:40 (HSK HR05)	18:06	10	17:39 (HSK HR03)	19:59	16	19:33 (HSK 8694 TLF)	20:49		21:33		
3	08:31	14:43 (HSK HR12)	08:02	16:21 (HSK HR05)	07:08			17:27 (HSK HR03)	06:58		19:16 (HSK 8694 TLF)	05:55			21:33		
	16:28	10	14:53 (HSK HR12)	17:17	20	16:41 (HSK HR05)	18:07	14	17:41 (HSK HR03)	20:00	18	19:34 (HSK 8694 TLF)	20:50		21:34		
4	08:31	14:45 (HSK HR12)	08:00	16:21 (HSK HR05)	07:06			17:25 (HSK HR03)	06:56		19:16 (HSK 8694 TLF)	05:53			21:34		
	16:29	8	14:53 (HSK HR12)	17:19	22	16:43 (HSK HR05)	18:09	18	17:43 (HSK HR03)	20:02	19	19:35 (HSK 8694 TLF)	20:52		21:35		
5	08:30	14:48 (HSK HR12)	07:59	16:20 (HSK HR05)	07:04			17:24 (HSK HR03)	06:54		19:16 (HSK 8694 TLF)	05:51		20:22 (HSK ME08a)	05:11		
	16:30	3	14:51 (HSK HR12)	17:20	23	16:43 (HSK HR05)	18:11	20	17:44 (HSK HR03)	20:04	19	19:35 (HSK 8694 TLF)	20:53	3	20:25 (HSK ME08a)	21:36	
6	08:30		07:57	16:20 (HSK HR05)	07:01			17:22 (HSK HR03)	06:51		19:16 (HSK 8694 TLF)	05:49		20:21 (HSK ME08a)	05:11		
	16:32		17:22	24	16:44 (HSK HR05)	18:13	22	17:44 (HSK HR03)	20:05	19	19:35 (HSK 8694 TLF)	20:55	5	20:26 (HSK ME08a)	21:37		
7	08:30		07:55	16:19 (HSK HR05)	06:59			17:21 (HSK HR03)	06:49		19:16 (HSK 8694 TLF)	05:48		20:20 (HSK ME08a)	05:10		
	16:33		17:24	25	16:44 (HSK HR05)	18:14	24	17:45 (HSK HR03)	20:07	18	19:34 (HSK 8694 TLF)	20:57	7	20:27 (HSK ME08a)	21:38		
8	08:29		07:53	16:19 (HSK HR05)	06:57			17:21 (HSK HR03)	06:47		19:16 (HSK 8694 TLF)	05:46		20:20 (HSK ME08a)	05:10		
	16:34		17:26	25	16:44 (HSK HR05)	18:16	24	17:45 (HSK HR03)	20:09	16	19:32 (HSK 8694 TLF)	20:58	9	20:29 (HSK ME08a)	21:39		
9	08:29		07:52	16:20 (HSK HR05)	06:55			17:21 (HSK HR03)	06:45		19:17 (HSK 8694 TLF)	05:44		20:19 (HSK ME08a)	05:09		
	16:35		17:28	25	16:45 (HSK HR05)	18:18	25	17:46 (HSK HR03)	20:10	14	19:31 (HSK 8694 TLF)	21:00	11	20:30 (HSK ME08a)	21:40		
10	08:28		07:50	16:20 (HSK HR05)	06:53			17:20 (HSK HR03)	06:42		19:19 (HSK 8694 TLF)	05:43		20:20 (HSK ME08a)	05:09		
	16:37		17:29	25	16:45 (HSK HR05)	18:20	24	17:44 (HSK HR03)	20:12	10	19:29 (HSK 8694 TLF)	21:01	12	20:32 (HSK ME08a)	21:40		
11	08:28		07:48	16:20 (HSK HR05)	06:50			17:20 (HSK HR03)	06:40			05:41		20:19 (HSK ME08a)	05:08		
	16:38		17:31	25	16:45 (HSK HR05)	18:21	24	17:44 (HSK HR03)	20:14			21:03	14	20:33 (HSK ME08a)	21:41		
12	08:27		07:46	16:20 (HSK HR05)	06:48			17:21 (HSK HR03)	06:38			05:39		20:20 (HSK ME08a)	05:08		
	16:40		17:33	25	16:45 (HSK HR05)	18:23	23	17:44 (HSK HR03)	20:15			21:05	15	20:35 (HSK ME08a)	21:42		
13	08:26		07:45	16:21 (HSK HR05)	06:46			17:21 (HSK HR03)	06:36			05:38		20:19 (HSK ME08a)	05:08		
	16:41		17:35	23	16:44 (HSK HR05)	18:25	21	17:42 (HSK HR03)	20:17			21:06	17	20:36 (HSK ME08a)	21:42		
14	08:26		07:43	16:21 (HSK HR05)	06:44			17:22 (HSK HR03)	06:34			05:36		20:20 (HSK ME08a)	05:07		
	16:43		17:37	22	16:43 (HSK HR05)	18:27	19	17:41 (HSK HR03)	20:19			21:08	16	20:36 (HSK ME08a)	21:43		
15	08:25		07:41	16:22 (HSK HR05)	06:41			17:23 (HSK HR03)	06:31			05:35		20:20 (HSK ME08a)	05:07		
	16:44		17:39	20	16:42 (HSK HR05)	18:28	17	17:40 (HSK HR03)	20:20			21:09	15	20:35 (HSK ME08a)	21:44		
16	08:24		07:39	16:23 (HSK HR05)	06:39			17:25 (HSK HR03)	06:29			05:33		20:22 (HSK ME08a)	05:07		
	16:46		17:40	18	16:41 (HSK HR05)	18:30	13	17:38 (HSK HR03)	20:22			21:11	13	20:35 (HSK ME08a)	21:44		
17	08:23		07:37	16:25 (HSK HR05)	06:37			17:29 (HSK HR03)	06:27		19:53 (HSK ME08b)	05:32		20:23 (HSK ME08a)	05:07		
	16:47		17:42	14	16:39 (HSK HR05)	18:32	3	17:32 (HSK HR03)	20:24	4		21:12	11	20:34 (HSK ME08a)	21:45		
18	08:22		07:35	16:28 (HSK HR05)	06:35			06:25			19:52 (HSK ME08b)	05:30		20:24 (HSK ME08a)	05:07		
	16:49		17:44	8	16:36 (HSK HR05)	18:33		20:25	7		19:59 (HSK ME08b)	21:14	8	20:32 (HSK ME08a)	21:45		
19	08:21		07:33		06:32			06:23			19:51 (HSK ME08b)	05:29		20:27 (HSK ME08a)	05:07		
	16:51		17:46		18:35			20:27	9		20:00 (HSK ME08b)	21:15	2	20:29 (HSK ME08a)	21:45		
20	08:20		07:31		06:30			06:21			19:50 (HSK ME08b)	05:27			05:07		
	16:52		17:48		18:37			20:29	12		20:02 (HSK ME08b)	21:17			21:46		
21	08:19		07:29		06:28			06:19			19:49 (HSK ME08b)	05:26			05:07		
	16:54		17:50		18:38			20:30	14		20:03 (HSK ME08b)	21:18			21:46		
22	08:18		07:27		06:25			06:17			19:49 (HSK ME08b)	05:25			05:08		
	16:55		17:51		18:40			20:32	16		20:05 (HSK ME08b)	21:19			21:46		
23	08:17		07:25		06:23			06:15			19:49 (HSK ME08b)	05:24			05:08		
	16:57		17:53		18:42			20:34	18		20:07 (HSK ME08b)	21:21			21:46		
24	08:16		07:23		06:21			06:12			19:49 (HSK ME08b)	05:22			05:08		
	16:59		17:55		18:43			20:35	18		20:07 (HSK ME08b)	21:22			21:46		
25	08:15		07:21		06:19			06:10			19:49 (HSK ME08b)	05:21			05:08		
	17:01		17:57		18:45			20:37	17		20:06 (HSK ME08b)	21:23			21:46		
26	08:13		07:19		06:16			06:08			19:49 (HSK ME08b)	05:20			05:09		
	17:02		17:59		18:47			20:39	16		20:05 (HSK ME08b)	21:25			21:46		
27	08:12		07:17		06:14			06:06			19:50 (HSK ME08b)	05:19			05:09		
	17:04		18:00		18:49			20:40	14		20:04 (HSK ME08b)	21:26			21:46		
28	08:11		07:14		06:12			06:04			19:51 (HSK ME08b)	05:18			05:10		
	17:06		18:02		18:50			20:42	11		20:02 (HSK ME08b)	21:27			21:46		
29	08:09				07:09			06:03			19:53 (HSK ME08b)	05:17			05:10		
	17:08				19:52	2	19:27 (HSK 8694 TLF)	20:44	7		20:00 (HSK ME08b)	21:28			05:11		
30	08:08		16:30 (HSK HR05)		07:07			06:01				05:16			05:11		
	17:09	2	16:32 (HSK HR05)		19:54	7	19:28 (HSK 8694 TLF)	20:45				21:30			21:46		
31	08:06		16:25 (HSK HR05)		07:05			06:00				05:15					
	17:11	11	16:36 (HSK HR05)		19:55	11	19:30 (HSK 8694 TLF)					21:31					
Sonnenscheinstunden			261			278			367			415			483		
astr.max.mögl.Beschattung			59			377			321			325			158		
Red.Sonnenscheinwahrsch.			0,19			0,32			0,28						0,43		
Reduktion Betriebsdauer			0,96			0,96			0,96						0,96		
Reduktion Windrichtung			0,66			0,69			0,70						0,66		
Gesamte Reduktion			0,12			0,22			0,19						0,27		
Met.wahrsch.Beschattung			7			81			61			78			43		

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnér / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN33 - Meerhof, Dalheimer Straße 1
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11 21:46	05:47 21:15	20:30 (HSK ME08a) 20:45 (HSK ME08a)	06:36 20:13		07:24 19:05	18:00 (HSK HR03) 18:22 (HSK HR03)	07:17 17:00	15:49 (HSK HR05) 16:15 (HSK HR05)	08:07 16:20	
2	05:12 21:45	05:49 21:13	20:29 (HSK ME08a) 20:43 (HSK ME08a)	06:38 20:11	10	07:26 19:03	17:59 (HSK HR03) 18:23 (HSK HR03)	07:19 16:58	15:48 (HSK HR05) 16:14 (HSK HR05)	08:09 16:19	
3	05:13 21:45	05:50 21:11	20:30 (HSK ME08a) 20:42 (HSK ME08a)	06:39 20:09	14	07:27 19:00	17:58 (HSK HR03) 18:22 (HSK HR03)	07:21 16:56	15:49 (HSK HR05) 16:14 (HSK HR05)	08:10 16:19	
4	05:14 21:45	05:52 21:10	20:30 (HSK ME08a) 20:40 (HSK ME08a)	06:41 20:07	16	07:29 19:03	17:58 (HSK HR03) 18:22 (HSK HR03)	07:22 16:54	15:49 (HSK HR05) 16:14 (HSK HR05)	08:11 16:18	
5	05:14 21:44	05:53 21:08	20:29 (HSK ME08a) 20:38 (HSK ME08a)	06:42 20:05	18	07:31 19:00	17:58 (HSK HR03) 18:22 (HSK HR03)	07:24 16:53	15:49 (HSK HR05) 16:14 (HSK HR05)	08:13 16:18	
6	05:15 21:44	05:55 21:06	20:30 (HSK ME08a) 20:37 (HSK ME08a)	06:44 20:02	19	07:32 19:00	17:57 (HSK HR03) 18:21 (HSK HR03)	07:25 16:51	15:50 (HSK HR05) 16:13 (HSK HR05)	08:14 16:17	
7	05:16 21:43	05:56 21:04	20:30 (HSK ME08a) 20:35 (HSK ME08a)	06:46 20:00	19	07:34 19:00	17:58 (HSK HR03) 18:21 (HSK HR03)	07:28 16:49	15:51 (HSK HR05) 16:13 (HSK HR05)	08:15 16:17	14:34 (HSK HR12)
8	05:17 21:43	05:58 21:03	20:32 (HSK ME08a) 20:34 (HSK ME08a)	06:47 19:58	20	07:36 19:00	17:58 (HSK HR03) 18:20 (HSK HR03)	07:29 16:48	15:52 (HSK HR05) 16:12 (HSK HR05)	08:16 16:17	14:33 (HSK HR12)
9	05:18 21:42	06:00 21:01	20:33 (HSK ME08a) 19:55	06:49 19:55	19	07:37 19:00	17:59 (HSK HR03) 18:19 (HSK HR03)	07:31 16:48	15:53 (HSK HR05) 16:11 (HSK HR05)	08:18 16:16	14:32 (HSK HR12)
10	05:19 21:41	06:01 20:59	20:34 (HSK ME08a) 20:59	06:50 19:53	19	07:39 19:00	18:00 (HSK HR03) 18:17 (HSK HR03)	07:33 16:44	15:55 (HSK HR05) 16:10 (HSK HR05)	08:19 16:16	14:31 (HSK HR12)
11	05:20 21:40	06:03 20:57	20:35 (HSK ME08a) 20:57	06:52 19:51	14	07:41 19:00	18:02 (HSK HR03) 18:15 (HSK HR03)	07:35 16:43	15:57 (HSK HR05) 16:08 (HSK HR05)	08:20 16:16	14:31 (HSK HR12)
12	05:21 21:40	06:04 20:55	20:36 (HSK ME08a) 20:55	06:54 19:49	11	07:42 19:00	18:06 (HSK HR03) 18:11 (HSK HR03)	07:36 16:41	16:08 (HSK HR05) 16:08 (HSK HR05)	08:21 16:16	14:30 (HSK HR12)
13	05:22 21:39	06:06 20:53	20:37 (HSK ME08a) 20:53	06:55 19:46	7	07:44 19:00	18:08 (HSK HR03) 18:13 (HSK HR03)	07:38 16:40	16:10 (HSK HR05) 16:08 (HSK HR05)	08:22 16:16	14:30 (HSK HR12)
14	05:23 21:38	06:07 20:51	20:38 (HSK ME08a) 20:51	06:57 19:44	19	07:46 19:00	18:10 (HSK HR03) 18:17 (HSK HR03)	07:40 16:38	16:11 (HSK HR05) 16:09 (HSK HR05)	08:23 16:16	14:31 (HSK HR12)
15	05:24 21:37	06:09 20:49	20:39 (HSK ME08a) 20:49	06:58 19:42	2	07:47 19:00	18:12 (HSK HR03) 18:19 (HSK HR03)	07:42 16:37	16:12 (HSK HR05) 16:09 (HSK HR05)	08:24 16:16	14:31 (HSK HR12)
16	05:25 21:36	06:11 20:47	20:40 (HSK ME08a) 20:47	07:00 19:39		07:49 19:00	18:20 (HSK HR03) 18:26 (HSK HR03)	07:43 16:36	16:13 (HSK HR05) 16:10 (HSK HR05)	08:25 16:16	14:31 (HSK HR12)
17	05:27 21:35	06:12 20:45	20:41 (HSK ME08a) 20:45	07:02 19:37		07:51 19:00	18:22 (HSK HR03) 18:28 (HSK HR03)	07:45 16:34	16:14 (HSK HR05) 16:11 (HSK HR05)	08:26 16:17	14:31 (HSK HR12)
18	05:28 21:34	06:14 20:43	20:42 (HSK ME08a) 20:43	07:03 19:35		07:53 19:00	18:24 (HSK HR03) 18:30 (HSK HR03)	07:47 16:33	16:15 (HSK HR05) 16:12 (HSK HR05)	08:27 16:17	14:31 (HSK HR12)
19	05:29 21:33	06:15 20:41	20:43 (HSK ME08a) 20:41	07:05 19:32		07:54 19:00	18:26 (HSK HR03) 18:32 (HSK HR03)	07:48 16:32	16:16 (HSK HR05) 16:13 (HSK HR05)	08:28 16:17	14:32 (HSK HR12)
20	05:30 21:31	06:17 20:39	20:44 (HSK ME08a) 20:39	07:06 19:30		07:56 19:00	18:28 (HSK HR03) 18:34 (HSK HR03)	07:50 16:30	16:17 (HSK HR05) 16:14 (HSK HR05)	08:29 16:17	14:32 (HSK HR12)
21	05:32 21:30	06:18 20:37	20:45 (HSK ME08a) 20:37	07:08 19:28		07:58 19:00	18:30 (HSK HR03) 18:36 (HSK HR03)	07:52 16:29	16:18 (HSK HR05) 16:15 (HSK HR05)	08:30 16:18	14:33 (HSK HR12)
22	05:33 21:29	06:20 20:35	20:46 (HSK ME08a) 20:35	07:10 19:26		07:59 19:00	18:32 (HSK HR03) 18:38 (HSK HR03)	07:53 16:28	16:19 (HSK HR05) 16:16 (HSK HR05)	08:31 16:18	14:33 (HSK HR12)
23	05:34 21:28	06:22 20:33	20:47 (HSK ME08a) 20:33	07:11 19:23		08:01 19:00	18:40 (HSK HR03) 18:46 (HSK HR03)	07:55 16:27	16:20 (HSK HR05) 16:17 (HSK HR05)	08:32 16:19	14:34 (HSK HR12)
24	05:36 21:26	06:23 20:31	20:48 (HSK ME08a) 20:31	07:13 19:21		08:03 19:00	18:42 (HSK HR03) 18:48 (HSK HR03)	07:57 16:26	16:21 (HSK HR05) 16:18 (HSK HR05)	08:33 16:19	14:34 (HSK HR12)
25	05:37 21:25	06:25 20:29	20:49 (HSK ME08a) 20:29	07:14 19:19		08:05 19:00	18:44 (HSK HR03) 18:50 (HSK HR03)	07:58 16:25	16:22 (HSK HR05) 16:19 (HSK HR05)	08:34 16:20	14:35 (HSK HR12)
26	05:39 21:24	06:26 20:27	20:50 (HSK ME08a) 20:27	07:16 19:16		08:07 19:00	18:46 (HSK HR03) 18:52 (HSK HR03)	08:00 16:24	16:23 (HSK HR05) 16:20 (HSK HR05)	08:35 16:21	14:35 (HSK HR12)
27	05:40 21:22	06:28 20:24	20:51 (HSK ME08a) 20:24	07:18 19:14		08:09 19:00	18:48 (HSK HR03) 18:54 (HSK HR03)	08:01 16:23	16:24 (HSK HR05) 16:21 (HSK HR05)	08:36 16:22	14:36 (HSK HR12)
28	05:41 21:21	06:30 20:22	20:52 (HSK ME08a) 20:22	07:19 19:12	10	08:11 19:00	18:50 (HSK HR03) 18:56 (HSK HR03)	08:03 16:22	16:25 (HSK HR05) 16:22 (HSK HR05)	08:37 16:23	14:37 (HSK HR12)
29	05:43 21:19	06:31 20:20	20:53 (HSK ME08a) 20:20	07:21 19:09	15	08:13 19:00	18:52 (HSK HR03) 18:58 (HSK HR03)	08:04 16:22	16:26 (HSK HR05) 16:23 (HSK HR05)	08:38 16:24	14:37 (HSK HR12)
30	05:44 21:18	06:33 20:18	20:54 (HSK ME08a) 20:18	07:23 19:07	18	08:15 19:00	18:54 (HSK HR03) 19:00 (HSK HR03)	08:06 16:21	16:27 (HSK HR05) 16:24 (HSK HR05)	08:39 16:25	14:38 (HSK HR12)
31	05:46 21:16	06:34 20:16	20:55 (HSK ME08a) 20:16	07:24 19:05	21	08:17 19:00	18:56 (HSK HR03) 19:02 (HSK HR03)	08:07 16:20	16:28 (HSK HR05) 16:25 (HSK HR05)	08:40 16:26	14:39 (HSK HR12)
Sonnenscheinstunden		500	453	381	250	332	268	236	246	394	
astr. max. mögl. Beschattung		89	239	250	0,39	402	236	0,23	246	0,17	
Red. Sonnenscheinwahrsch.		0,39	0,40	0,32	0,96	0,29	0,23	0,96	0,65	0,10	
Reduktion Betriebsdauer		0,96	0,96	0,96	0,70	0,19	0,15	0,69	0,10	0,10	
Reduktion Windrichtung		0,66	0,67	0,70	0,21	0,19	0,15	0,69	0,10	0,10	
Gesamte Reduktion		0,25	0,26	0,21	0,19	0,19	0,15	0,15	0,10	0,10	
Met. wahrsch. Beschattung		22	61	54	77	77	35	35	41	41	

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN34 - Meerhof, Zur Egge 29
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar			Februar			März			April			Mai			Juni		
1	08:31	15:36 (HSK HR12)	08:05				07:12		17:03 (HSK HR05)	07:03			05:59			05:14		
	16:26	13	15:49 (HSK HR12)	17:13			18:04	20	17:23 (HSK HR05)	19:57			20:47			21:32		
2	08:31	15:36 (HSK HR12)	08:03				07:10		17:04 (HSK HR05)	07:00			05:57			05:13		
	16:27	14	15:50 (HSK HR12)	17:15			18:06	19	17:23 (HSK HR05)	19:59			20:49			21:33		
3	08:31	15:35 (HSK HR12)	08:02				07:08		17:05 (HSK HR05)	06:58			05:55			05:13		
	16:28	15	15:50 (HSK HR12)	17:17			18:07	16	17:21 (HSK HR05)	20:00			20:50			21:34		
4	08:31	15:35 (HSK HR12)	08:00				07:06		17:07 (HSK HR05)	06:56			05:53			05:12		
	16:29	17	15:52 (HSK HR12)	17:18			18:09	13	17:20 (HSK HR05)	20:02			20:52			21:35		
5	08:30	15:35 (HSK HR12)	07:58				07:04		17:10 (HSK HR05)	06:54			05:51			05:11		
	16:30	17	15:52 (HSK HR12)	17:20			18:11	6	17:16 (HSK HR05)	20:04			20:53			21:36		
6	08:30	15:35 (HSK HR12)	07:57				07:01			06:51			05:49			05:11		
	16:32	19	15:54 (HSK HR12)	17:22			18:13			20:05			20:55			21:37		
7	08:30	15:36 (HSK HR12)	07:55				06:59			06:49			05:48			05:10		
	16:33	19	15:55 (HSK HR12)	17:24			18:14			20:07			20:57			21:38		
8	08:29	15:35 (HSK HR12)	07:53				06:57			06:47			05:46			05:10		
	16:34	20	15:55 (HSK HR12)	17:26			18:16			20:09			20:58			21:39		
9	08:29	15:35 (HSK HR12)	07:52				06:55			06:45		19:40 (HSK 8694 TLF)	05:44			05:09		
	16:35	21	15:56 (HSK HR12)	17:28			18:18			20:10	4	19:44 (HSK 8694 TLF)	21:00			21:40		
10	08:28	15:35 (HSK HR12)	07:50				06:53			06:42		19:39 (HSK 8694 TLF)	05:43			05:09		
	16:37	22	15:57 (HSK HR12)	17:29			18:20			20:12	7	19:46 (HSK 8694 TLF)	21:01			21:40		
11	08:28	15:35 (HSK HR12)	07:48				06:50			06:40		19:38 (HSK 8694 TLF)	05:41			05:08		
	16:38	23	15:58 (HSK HR12)	17:31			18:21			20:14	10	19:48 (HSK 8694 TLF)	21:03			21:41		
12	08:27	15:35 (HSK HR12)	07:46				06:48			06:38		19:38 (HSK 8694 TLF)	05:39			05:08		
	16:40	24	15:59 (HSK HR12)	17:33			18:23			20:15	12	19:50 (HSK 8694 TLF)	21:05			21:42		
13	08:26	15:35 (HSK HR12)	07:44				06:46			06:36		19:37 (HSK 8694 TLF)	05:38			05:08		
	16:41	24	15:59 (HSK HR12)	17:35			18:25			20:17	13	19:50 (HSK 8694 TLF)	21:06			21:42		
14	08:26	15:35 (HSK HR12)	07:43				06:44			06:34		19:37 (HSK 8694 TLF)	05:36			05:07		
	16:43	25	16:00 (HSK HR12)	17:37			18:26			20:19	15	19:52 (HSK 8694 TLF)	21:08			21:43		
15	08:25	15:35 (HSK HR12)	07:41				06:41		17:59 (HSK HR03)	06:31		19:38 (HSK 8694 TLF)	05:35			05:07		
	16:44	25	16:00 (HSK HR12)	17:39			18:28	4	18:03 (HSK HR03)	20:20	14	19:52 (HSK 8694 TLF)	21:09			21:44		
16	08:24	15:35 (HSK HR12)	07:39				06:39		17:57 (HSK HR03)	06:29		19:39 (HSK 8694 TLF)	05:33			05:07		
	16:46	26	16:01 (HSK HR12)	17:40			18:30	8	18:05 (HSK HR03)	20:22	12	19:51 (HSK 8694 TLF)	21:11			21:44		
17	08:23	15:35 (HSK HR12)	07:37				06:37		17:54 (HSK HR03)	06:27		19:40 (HSK 8694 TLF)	05:32			05:07		
	16:47	26	16:01 (HSK HR12)	17:42			18:32	12	18:06 (HSK HR03)	20:24	9	19:49 (HSK 8694 TLF)	21:12			21:45		
18	08:22	15:36 (HSK HR12)	07:35				06:34		17:53 (HSK HR03)	06:25			05:30			05:07		
	16:49	26	16:02 (HSK HR12)	17:44			18:33	15	18:08 (HSK HR03)	20:25			21:14			21:45		
19	08:21	15:36 (HSK HR12)	07:33			17:10 (HSK HR05)	06:32		17:52 (HSK HR03)	06:23			05:29			05:07		
	16:50	26	16:02 (HSK HR12)	17:46	9	17:19 (HSK HR05)	18:35	18	18:10 (HSK HR03)	20:27			21:15			21:45		
20	08:20	15:37 (HSK HR12)	07:31			17:07 (HSK HR05)	06:30		17:51 (HSK HR03)	06:21			05:27			05:07		
	16:52	26	16:03 (HSK HR12)	17:48	14	17:21 (HSK HR05)	18:37	20	18:11 (HSK HR03)	20:29			21:17			21:46		
21	08:19	15:37 (HSK HR12)	07:29			17:06 (HSK HR05)	06:28		17:51 (HSK HR03)	06:19			05:26			05:07		
	16:54	26	16:03 (HSK HR12)	17:50	17	17:23 (HSK HR05)	18:38	21	18:12 (HSK HR03)	20:30			21:18			21:46		
22	08:18	15:37 (HSK HR12)	07:27			17:05 (HSK HR05)	06:25		17:51 (HSK HR03)	06:17			05:25			05:08		
	16:55	25	16:02 (HSK HR12)	17:51	20	17:25 (HSK HR05)	18:40	21	18:12 (HSK HR03)	20:32			21:19			21:46		
23	08:17	15:38 (HSK HR12)	07:25			17:03 (HSK HR05)	06:23		17:50 (HSK HR03)	06:15			05:24			05:08		
	16:57	25	16:03 (HSK HR12)	17:53	21	17:24 (HSK HR05)	18:42	21	18:11 (HSK HR03)	20:34			21:21			21:46		
24	08:16	15:39 (HSK HR12)	07:23			17:03 (HSK HR05)	06:21		17:51 (HSK HR03)	06:12			05:22			05:08		
	16:59	24	16:03 (HSK HR12)	17:55	22	17:25 (HSK HR05)	18:43	19	18:10 (HSK HR03)	20:35			21:22			21:46		
25	08:14	15:39 (HSK HR12)	07:21			17:03 (HSK HR05)	06:19		17:52 (HSK HR03)	06:10			05:21			05:08		
	17:01	23	16:02 (HSK HR12)	17:57	22	17:25 (HSK HR05)	18:45	17	18:09 (HSK HR03)	20:37			21:23			21:46		
26	08:13	15:40 (HSK HR12)	07:19			17:03 (HSK HR05)	06:16		17:53 (HSK HR03)	06:08			05:20			05:09		
	17:02	22	16:02 (HSK HR12)	17:58	22	17:25 (HSK HR05)	18:47	15	18:08 (HSK HR03)	20:39			21:25			21:46		
27	08:12	15:41 (HSK HR12)	07:17			17:03 (HSK HR05)	06:14		17:54 (HSK HR03)	06:06			05:19			05:09		
	17:04	20	16:01 (HSK HR12)	18:00	22	17:25 (HSK HR05)	18:49	10	18:04 (HSK HR03)	20:40			21:26			21:46		
28	08:11	15:43 (HSK HR12)	07:14			17:03 (HSK HR05)	06:12			06:04			05:18			05:10		
	17:06	18	16:01 (HSK HR12)	18:02	22	17:25 (HSK HR05)	18:50			20:42			21:27			21:46		
29	08:09	15:44 (HSK HR12)					07:09			06:03			05:17			05:10		
	17:08	16	16:00 (HSK HR12)				19:52			20:44			21:28			21:46		
30	08:08	15:46 (HSK HR12)					07:07			06:01			05:16			05:11		
	17:09	13	15:59 (HSK HR12)				19:54			20:45			21:30			21:46		
31	08:06	15:49 (HSK HR12)					07:05						05:15					
	17:11	6	15:55 (HSK HR12)				19:55						21:31					
Sonnenscheinstunden	261			278			367			415			483			496		
astr.max.mögl.Beschattung		646		191				275			96							
Red.Sonnenscheinwahrsch.		0,19		0,32				0,28			0,36							
Reduktion Betriebsdauer		0,96		0,96				0,96			0,96							
Reduktion Windrichtung		0,66		0,70				0,71			0,69							
Gesamte Reduktion		0,12		0,22				0,19			0,24							
Met.wahrsch.Beschattung		77		42				53			23							

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN34 - Meerhof, Zur Egge 29
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Jul	August	September	Oktober	November	Dezember
1	05:11 21:46	05:47 21:15	06:36 20:13	19:37 (HSK 8694 TLF) 19:05	07:24 17:00	08:07 16:20
2	05:12 21:45	05:49 21:13	06:38 20:11	19:37 (HSK 8694 TLF) 19:03	07:26 16:58	08:09 16:19
3	05:13 21:45	05:50 21:11	06:39 20:09	19:38 (HSK 8694 TLF) 19:00	07:27 16:56	08:10 16:19
4	05:14 21:45	05:52 21:10	06:41 20:07	19:42 (HSK 8694 TLF) 18:58	07:29 16:54	08:11 16:18
5	05:14 21:44	05:53 21:08	06:42 20:04		07:24 16:53	08:13 16:18
6	05:15 21:44	05:55 21:06	06:44 20:02		07:26 16:51	08:14 16:17
7	05:16 21:43	05:56 21:04	06:46 20:00		07:28 16:49	08:15 16:17
8	05:17 21:42	05:58 21:03	06:47 19:58		07:29 16:48	08:16 16:17
9	05:18 21:42	05:59 21:01	06:49 19:55		07:31 16:46	08:17 16:16
10	05:19 21:41	06:01 20:59	06:50 19:53		07:33 16:44	08:19 16:16
11	05:20 21:40	06:03 20:57	06:52 19:51		07:35 16:43	08:20 16:16
12	05:21 21:40	06:04 20:55	06:54 19:49		07:36 16:41	08:21 16:16
13	05:22 21:39	06:06 20:53	06:55 19:46		07:38 16:40	08:22 16:16
14	05:23 21:38	06:07 20:51	06:57 19:44		07:40 16:38	08:23 16:16
15	05:24 21:37	06:09 20:49	06:58 19:42		07:42 16:37	08:24 16:16
16	05:25 21:36	06:11 20:47	07:00 19:39	18:44 (HSK HR03) 18:53 (HSK HR03)	07:43 18:32	08:24 16:16
17	05:27 21:35	06:12 20:45	07:02 19:37	18:42 (HSK HR03) 18:56 (HSK HR03)	07:45 18:29	08:25 16:16
18	05:28 21:34	06:14 20:43	07:03 19:35	18:40 (HSK HR03) 18:56 (HSK HR03)	07:47 18:27	08:26 16:17
19	05:29 21:33	06:15 20:41	07:05 19:32	18:39 (HSK HR03) 18:57 (HSK HR03)	07:48 18:25	08:27 16:17
20	05:30 21:31	06:17 20:39	07:06 19:30	18:37 (HSK HR03) 18:57 (HSK HR03)	07:50 18:23	08:27 16:17
21	05:32 21:30	06:18 20:37	07:08 19:28	18:37 (HSK HR03) 18:57 (HSK HR03)	07:52 18:21	08:28 16:18
22	05:33 21:29	06:20 20:35	07:10 19:26	18:36 (HSK HR03) 18:57 (HSK HR03)	07:53 18:19	08:28 16:18
23	05:34 21:28	06:22 20:33	07:11 19:23	18:36 (HSK HR03) 18:56 (HSK HR03)	07:55 18:17	08:29 16:19
24	05:36 21:26	06:23 20:31	07:13 19:21	18:36 (HSK HR03) 18:54 (HSK HR03)	07:57 18:15	08:29 16:19
25	05:37 21:25	06:25 20:29	07:14 19:19	18:36 (HSK HR03) 18:51 (HSK HR03)	07:58 18:13	08:30 16:20
26	05:39 21:24	06:26 20:27	07:16 19:16	18:36 (HSK HR03) 18:50 (HSK HR03)	07:59 17:11	08:30 16:20
27	05:40 21:22	06:28 20:24	07:18 19:14	18:37 (HSK HR03) 18:47 (HSK HR03)	08:00 17:09	08:31 16:21
28	05:41 21:21	06:30 20:22	07:19 19:12	18:39 (HSK HR03) 18:45 (HSK HR03)	08:03 17:07	08:31 16:22
29	05:43 21:19	06:31 20:20	07:21 19:09	19:38 (HSK 8694 TLF) 19:53 (HSK 8694 TLF)	08:04 17:05	08:31 16:23
30	05:44 21:18	06:33 20:18	07:23 19:07	19:38 (HSK 8694 TLF) 19:51 (HSK 8694 TLF)	08:06 17:03	08:31 16:24
31	05:46 21:16	06:34 20:16	07:25 19:48 (HSK 8694 TLF)	19:37 (HSK 8694 TLF)	08:07 17:01	08:31 16:25
Sonnenscheinstunden	500	453	381	332	268	246
astr.max.mögl.Beschattung		77	222	271	450	435
Red.Sonnenscheinwahrsch.		0.40	0.32	0.29	0.23	0.17
Reduktion Betriebsdauer		0.96	0.96	0.96	0.96	0.96
Reduktion Windrichtung		0.69	0.71	0.70	0.66	0.66
Gesamte Reduktion		0.26	0.22	0.19	0.14	0.11
Met.wahrsch.Beschattung		20	48	53	64	46

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN35 - Meerhof, Elsterweg 2
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

Januar		Februar		März		April		Mai		Juni	
1	08:31	15:22 (HSK HR05)	08:05	07:12	07:03	19:07 (HSK ME08b)	05:59	05:14		20:58 (HSK 9990371 D3)	
2	16:26	15:44 (HSK HR05)	17:13	18:04	19:57	19:25 (HSK ME08b)	20:47	21:32	2	21:00 (HSK 9990371 D3)	
3	08:31	15:23 (HSK HR05)	08:03	07:10	07:00	19:08 (HSK ME08b)	05:57	05:13		20:58 (HSK 9990371 D3)	
4	16:27	15:45 (HSK HR05)	17:15	18:06	19:59	19:24 (HSK ME08b)	20:49	21:33	3	21:01 (HSK 9990371 D3)	
5	08:31	15:22 (HSK HR05)	08:02	07:08	19:58	19:09 (HSK ME08b)	05:55	05:13		20:58 (HSK 9990371 D3)	
6	16:28	15:45 (HSK HR05)	17:17	18:07	20:00	19:21 (HSK ME08b)	20:55	21:34	4	21:02 (HSK 9990371 D3)	
7	08:31	15:23 (HSK HR05)	08:00	07:06	19:56	19:12 (HSK ME08b)	05:53	05:12		20:58 (HSK 9990371 D3)	
8	16:29	15:46 (HSK HR05)	17:18	18:09	20:02	19:17 (HSK ME08b)	20:52	21:35	4	21:02 (HSK 9990371 D3)	
9	08:30	15:24 (HSK HR05)	07:59	07:04	19:54	17:35 (HSK ME08b)	05:51	05:11		20:58 (HSK 9990371 D3)	
10	16:30	15:47 (HSK HR05)	17:20	18:11	20:04	17:46 (HSK ME08b)	20:54	21:36	6	21:04 (HSK 9990371 D3)	
11	08:30	15:23 (HSK HR05)	07:57	07:01	19:51	17:33 (HSK ME08b)	05:49	05:11		20:58 (HSK 9990371 D3)	
12	16:32	15:47 (HSK HR05)	17:22	18:13	20:05	17:47 (HSK ME08b)	20:55	21:37	6	21:05 (HSK 9990371 D3)	
13	08:30	15:24 (HSK HR05)	07:55	06:59	19:49	17:32 (HSK ME08b)	05:49	05:10		20:59 (HSK 9990371 D3)	
14	16:33	15:48 (HSK HR05)	17:24	18:14	20:07	17:49 (HSK ME08b)	20:57	21:38	6	21:05 (HSK 9990371 D3)	
15	08:29	15:24 (HSK HR05)	07:53	06:57	19:47	17:31 (HSK ME08b)	05:47	05:10		20:59 (HSK 9990371 D3)	
16	16:34	15:48 (HSK HR05)	17:26	18:16	20:09	17:51 (HSK ME08b)	20:58	21:39	8	21:07 (HSK 9990371 D3)	
17	08:29	15:24 (HSK HR05)	07:52	06:55	19:45	17:31 (HSK ME08b)	05:44	05:09		20:59 (HSK 9990371 D3)	
18	16:35	15:48 (HSK HR05)	17:28	18:18	20:10	17:52 (HSK ME08b)	21:00	21:40	8	21:07 (HSK 9990371 D3)	
19	08:28	15:25 (HSK HR05)	07:50	06:53	19:42	17:30 (HSK ME08b)	05:42	05:09		20:59 (HSK 9990371 D3)	
20	16:37	15:49 (HSK HR05)	17:29	18:20	20:12	17:51 (HSK ME08b)	21:01	21:40	9	21:08 (HSK 9990371 D3)	
21	08:28	15:26 (HSK HR05)	07:48	06:50	19:40	17:31 (HSK ME08b)	05:40	05:08		21:00 (HSK 9990371 D3)	
22	16:38	15:49 (HSK HR05)	17:31	18:21	20:14	19:44 (HSK ME08a)	21:01	21:41	9	21:09 (HSK 9990371 D3)	
23	08:27	15:26 (HSK HR05)	07:46	06:48	19:38	17:31 (HSK ME08b)	05:39	05:08		21:00 (HSK 9990371 D3)	
24	16:40	15:49 (HSK HR05)	17:33	18:23	20:15	19:50 (HSK ME08a)	21:05	21:42	9	21:09 (HSK 9990371 D3)	
25	08:26	15:26 (HSK HR05)	07:45	06:46	19:36	17:31 (HSK ME08b)	05:36	05:08		21:00 (HSK 9990371 D3)	
26	16:41	15:49 (HSK HR05)	17:35	18:25	20:17	17:48 (HSK ME08b)	21:06	21:42	9	21:09 (HSK 9990371 D3)	
27	08:26	15:27 (HSK HR05)	07:43	06:44	19:34	17:33 (HSK ME08b)	05:34	05:07		21:01 (HSK 9990371 D3)	
28	16:43	15:50 (HSK HR05)	17:37	18:27	20:19	19:52 (HSK ME08a)	21:08	21:43	9	21:10 (HSK 9990371 D3)	
29	08:25	15:27 (HSK HR05)	07:41	06:41	19:31	17:35 (HSK ME08b)	05:35	05:07		21:01 (HSK 9990371 D3)	
30	16:44	15:50 (HSK HR05)	17:39	18:28	20:20	19:54 (HSK ME08a)	21:09	21:44	10	21:11 (HSK 9990371 D3)	
31	08:24	15:28 (HSK HR05)	07:39	06:39	19:29	17:45 (HSK ME08b)	05:33	05:07		21:01 (HSK 9990371 D3)	
1	16:46	15:50 (HSK HR05)	17:40	18:30	20:22	19:55 (HSK ME08a)	21:11	21:44	10	21:11 (HSK 9990371 D3)	
2	08:23	15:29 (HSK HR05)	07:37	06:37	19:27	17:39 (HSK ME08b)	05:32	05:07		21:02 (HSK 9990371 D3)	
3	16:47	15:50 (HSK HR05)	17:42	18:32	20:24	19:57 (HSK ME08a)	21:12	21:45	10	21:12 (HSK 9990371 D3)	
4	08:22	15:30 (HSK HR05)	07:35	06:35	19:25	17:39 (HSK ME08b)	05:30	05:07		21:02 (HSK 9990371 D3)	
5	16:49	15:50 (HSK HR05)	17:44	18:33	20:25	19:58 (HSK ME08a)	21:14	21:45	10	21:12 (HSK 9990371 D3)	
6	08:21	15:31 (HSK HR05)	07:33	06:32	19:23	17:39 (HSK ME08b)	05:29	05:07		21:02 (HSK 9990371 D3)	
7	16:50	15:49 (HSK HR05)	17:46	18:35	20:27	19:57 (HSK ME08a)	21:15	21:45	10	21:12 (HSK 9990371 D3)	
8	08:20	15:32 (HSK HR05)	07:31	06:30	19:21	17:40 (HSK ME08b)	05:27	05:07		21:02 (HSK 9990371 D3)	
9	16:52	15:49 (HSK HR05)	17:48	18:37	20:29	19:56 (HSK ME08a)	21:17	21:46	10	21:12 (HSK 9990371 D3)	
10	08:19	15:34 (HSK HR05)	07:29	06:28	19:19	17:41 (HSK ME08b)	05:26	05:07		21:02 (HSK 9990371 D3)	
11	16:54	15:49 (HSK HR05)	17:50	18:38	20:30	19:55 (HSK ME08a)	21:18	21:46	10	21:12 (HSK 9990371 D3)	
12	08:18	15:35 (HSK HR05)	07:27	06:25	19:17	17:42 (HSK ME08b)	05:25	05:08		21:03 (HSK 9990371 D3)	
13	16:55	15:47 (HSK HR05)	17:51	18:40	20:32	19:53 (HSK ME08a)	21:19	21:46	10	21:13 (HSK 9990371 D3)	
14	08:17	15:38 (HSK HR05)	07:25	06:23	19:15	17:46 (HSK ME08b)	05:24	05:08		21:03 (HSK 9990371 D3)	
15	16:57	15:45 (HSK HR05)	17:53	18:42	20:34	19:49 (HSK ME08a)	21:21	21:46	10	21:13 (HSK 9990371 D3)	
16	08:16	15:40 (HSK HR05)	07:23	06:21	19:11	17:41 (HSK ME08b)	05:22	05:08		21:03 (HSK 9990371 D3)	
17	16:59	15:47 (HSK HR05)	17:55	18:43	20:35	19:51 (HSK ME08a)	21:22	21:46	10	21:13 (HSK 9990371 D3)	
18	08:15	15:40 (HSK HR05)	07:21	06:19	19:10	17:40 (HSK ME08b)	05:21	05:08		21:04 (HSK 9990371 D3)	
19	17:01	15:47 (HSK HR05)	17:57	18:45	20:37	19:52 (HSK ME08a)	21:23	21:46	10	21:14 (HSK 9990371 D3)	
20	08:13	15:41 (HSK HR05)	07:19	06:16	19:08	17:39 (HSK ME08b)	05:20	05:09		21:03 (HSK 9990371 D3)	
21	17:02	15:48 (HSK HR05)	17:59	18:47	20:39	19:54 (HSK ME08a)	21:25	21:47	10	21:13 (HSK 9990371 D3)	
22	08:12	15:42 (HSK HR05)	07:17	06:14	19:07	17:38 (HSK ME08b)	05:19	05:09		21:03 (HSK 9990371 D3)	
23	17:04	15:49 (HSK HR05)	17:50	18:49	20:40	19:56 (HSK ME08a)	21:26	21:46	10	21:13 (HSK 9990371 D3)	
24	08:11	15:43 (HSK HR05)	07:14	06:12	19:07	17:37 (HSK ME08b)	05:18	05:10		21:04 (HSK 9990371 D3)	
25	17:06	15:50 (HSK HR05)	18:02	18:50	20:42	19:57 (HSK ME08a)	21:27	21:46	9	21:13 (HSK 9990371 D3)	
26	08:09	15:44 (HSK HR05)	07:12	06:10	19:05	17:36 (HSK ME08b)	05:17	05:10		21:03 (HSK 9990371 D3)	
27	17:08	15:51 (HSK HR05)	18:03	18:51	20:44	19:58 (HSK ME08a)	21:28	21:46	10	21:13 (HSK 9990371 D3)	
28	08:08	15:45 (HSK HR05)	07:10	06:07	19:04	17:35 (HSK ME08b)	05:16	05:11		21:04 (HSK 9990371 D3)	
29	17:09	15:52 (HSK HR05)	18:04	18:52	20:45	19:59 (HSK ME08a)	21:30	21:46	9	21:13 (HSK 9990371 D3)	
30	08:06	15:46 (HSK HR05)	07:08	06:05	19:03	17:34 (HSK ME08b)	05:15	05:11		21:04 (HSK 9990371 D3)	
31	17:11	15:53 (HSK HR05)	18:05	18:53	20:46	19:59 (HSK ME08a)	21:31	21:46	9	21:13 (HSK 9990371 D3)	
Sonnenscheinstunden		261	278	367	415	483		497			
astr. max. mögl. Beschattung		480	330	321	215	1		250			
Red. Sonnenscheinwahrsch.		0,19	0,32	0,28	0,36	0,43		0,34			
Reduktion Betriebsdauer		0,96	0,96	0,96	0,96	0,96		0,96			
Reduktion Windrichtung		0,66	0,70	0,70	0,69	0,64		0,64			
Gesamte Reduktion		0,12	0,22	0,19	0,24	0,26		0,21			
Met. wahrsch. Beschattung		57	72	61	52	0		52			

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

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

Projekt:

Marsberg-Meerhof

Beschreibung:

Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:

PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN35 - Meerhof, Elsterweg 2

Sonneneinstrahlungswahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11	21:04 (HSK 9990371 D3)	05:47	06:36	19:43 (HSK ME08a)	07:24	18:10 (HSK 8694 TLF)	07:17	16:04 (HSK HR03)	08:07	15:08 (HSK HR05)
2	21:46	21:13 (HSK 9990371 D3)	21:15	20:13	19:47 (HSK ME08a)	19:05	18:29 (HSK 8694 TLF)	17:00	16:27 (HSK HR03)	16:20	15:31 (HSK HR05)
3	05:12	21:04 (HSK 9990371 D3)	05:49	06:38		07:26	18:10 (HSK 8694 TLF)	07:19	16:03 (HSK HR03)	08:09	15:08 (HSK HR05)
4	21:45	21:12 (HSK 9990371 D3)	21:13	20:11		19:03	18:29 (HSK 8694 TLF)	16:58	16:26 (HSK HR03)	16:19	15:31 (HSK HR05)
5	05:13	21:04 (HSK 9990371 D3)	05:50	06:39		07:27	18:08 (HSK 8694 TLF)	07:21	16:04 (HSK HR03)	08:10	15:08 (HSK HR05)
6	21:45	21:12 (HSK 9990371 D3)	21:11	20:09		19:00	18:29 (HSK 8694 TLF)	16:56	16:25 (HSK HR03)	16:19	15:32 (HSK HR05)
7	05:14	21:05 (HSK 9990371 D3)	05:52	06:41		07:29	18:08 (HSK 8694 TLF)	07:22	16:05 (HSK HR03)	08:11	15:08 (HSK HR05)
8	21:45	21:12 (HSK 9990371 D3)	21:10	20:07		18:58	18:29 (HSK 8694 TLF)	16:54	16:24 (HSK HR03)	16:18	15:32 (HSK HR05)
9	05:14	21:05 (HSK 9990371 D3)	05:53	06:42		07:31	18:08 (HSK 8694 TLF)	07:24	16:06 (HSK HR03)	08:13	15:09 (HSK HR05)
10	21:44	21:12 (HSK 9990371 D3)	21:08	20:05		18:56	18:29 (HSK 8694 TLF)	16:53	16:23 (HSK HR03)	16:18	15:33 (HSK HR05)
11	05:15	21:04 (HSK 9990371 D3)	05:55	06:44		07:32	18:08 (HSK 8694 TLF)	07:26	16:08 (HSK HR03)	08:14	15:10 (HSK HR05)
12	21:44	21:11 (HSK 9990371 D3)	21:06	20:02		18:54	18:26 (HSK 8694 TLF)	16:51	16:21 (HSK HR03)	16:17	15:33 (HSK HR05)
13	05:16	21:05 (HSK 9990371 D3)	05:56	06:46		07:34	18:08 (HSK 8694 TLF)	07:28	16:10 (HSK HR03)	08:15	15:10 (HSK HR05)
14	21:43	21:10 (HSK 9990371 D3)	21:04	20:00		18:51	18:24 (HSK 8694 TLF)	16:49	16:19 (HSK HR03)	16:17	15:33 (HSK HR05)
15	05:17	21:05 (HSK 9990371 D3)	05:58	06:47		07:36	18:09 (HSK 8694 TLF)	07:29	16:15 (HSK HR03)	08:16	15:11 (HSK HR05)
16	21:43	21:10 (HSK 9990371 D3)	21:03	19:58		19:12 (HSK ME08b)	18:49	13	18:22 (HSK 8694 TLF)	16:48	15:34 (HSK HR05)
17	05:18	21:05 (HSK 9990371 D3)	06:00	06:49		19:03 (HSK ME08b)	07:37		18:10 (HSK 8694 TLF)	07:31	15:11 (HSK HR05)
18	21:42	21:10 (HSK 9990371 D3)	21:01	19:55		19:18 (HSK ME08b)	18:40	10	18:20 (HSK 8694 TLF)	16:46	15:34 (HSK HR05)
19	05:19	21:05 (HSK 9990371 D3)	06:01	06:50		19:02 (HSK ME08b)	07:39		18:12 (HSK 8694 TLF)	07:33	15:12 (HSK HR05)
20	21:41	21:09 (HSK 9990371 D3)	20:59	19:53		19:17 (HSK ME08b)	18:45	5	18:17 (HSK 8694 TLF)	16:44	15:34 (HSK HR05)
21	05:20	21:06 (HSK 9990371 D3)	06:03	06:52		19:00 (HSK ME08b)	07:41		17:35	08:20	15:12 (HSK HR05)
22	21:40	21:08 (HSK 9990371 D3)	20:57	19:51		19:17 (HSK ME08b)	18:42		16:43	16:16	15:35 (HSK HR05)
23	05:21	21:06 (HSK 9990371 D3)	06:04	06:54		18:59 (HSK ME08b)	07:42		17:36	08:21	15:13 (HSK HR05)
24	21:40	21:08 (HSK 9990371 D3)	20:55	19:49		19:18 (HSK ME08b)	18:40		16:41	16:16	15:35 (HSK HR05)
25	05:22	21:08 (HSK 9990371 D3)	06:06	06:55		18:57 (HSK ME08b)	07:44		17:38	08:22	15:13 (HSK HR05)
26	21:39		20:53	19:46		19:17 (HSK ME08b)	18:38		16:40	16:16	15:35 (HSK HR05)
27	05:23		06:07	06:57		18:57 (HSK ME08b)	07:46		17:40	08:23	15:14 (HSK HR05)
28	21:38		20:51	19:44		19:17 (HSK ME08b)	18:36		16:38	16:16	15:36 (HSK HR05)
29	05:24		06:09	06:58		18:56 (HSK ME08b)	07:47		17:42	08:24	15:15 (HSK HR05)
30	21:37		20:49	19:42		19:15 (HSK ME08b)	18:34		16:37	16:16	15:36 (HSK HR05)
31	05:25		06:11	07:00		18:57 (HSK ME08b)	07:49		17:43	08:24	15:15 (HSK HR05)
32	21:36		20:47	19:39		19:13 (HSK ME08b)	18:32		16:36	16:16	15:36 (HSK HR05)
33	05:27		06:12	07:02		18:57 (HSK ME08b)	07:51		17:45	08:25	15:16 (HSK HR05)
34	21:35		20:45	19:37		19:11 (HSK ME08b)	18:29		16:34	16:16	15:37 (HSK HR05)
35	05:28		06:14	07:03		18:57 (HSK ME08b)	07:53		17:47	08:26	15:16 (HSK HR05)
36	21:34		20:43	19:35		19:08 (HSK ME08b)	18:27		16:33	16:17	15:37 (HSK HR05)
37	05:29		06:15	07:05		18:58 (HSK ME08b)	07:54		17:48	08:27	15:17 (HSK HR05)
38	21:33		20:41	19:32		19:06 (HSK ME08b)	18:25		16:32	16:17	15:37 (HSK HR05)
39	05:30		06:17	07:06		18:59 (HSK ME08b)	07:56		17:50	08:27	15:18 (HSK HR05)
40	21:31		20:39	19:30		19:03 (HSK ME08b)	18:23		16:30	16:17	15:38 (HSK HR05)
41	05:32		06:18	07:08		18:57 (HSK ME08b)	07:58		17:52	08:28	15:18 (HSK HR05)
42	21:30		20:37	19:28		19:04 (HSK ME08b)	18:24		16:29	16:18	15:38 (HSK HR05)
43	05:33		06:20	07:10		18:55 (HSK ME08b)	07:59		17:53	08:29	15:19 (HSK HR05)
44	21:29		20:35	19:26		19:03 (HSK ME08b)	18:21	11	17:22 (HSK HR03)	16:28	15:39 (HSK HR05)
45	05:34		06:22	07:11		18:59 (HSK ME08b)	07:55		17:09 (HSK HR03)	16:28	15:39 (HSK HR05)
46	21:28		20:33	19:23		19:03 (HSK ME08b)	18:17	15	17:24 (HSK HR03)	16:27	15:39 (HSK HR05)
47	05:36		06:23	07:13		18:58 (HSK ME08b)	07:57		17:06 (HSK HR03)	16:27	15:39 (HSK HR05)
48	21:26		20:31	19:21		18:58 (HSK ME08b)	07:58		17:24 (HSK HR03)	16:26	15:39 (HSK HR05)
49	05:37		06:25	07:14		19:00 (HSK ME08b)	18:15	18	16:05 (HSK HR03)	16:25	15:40 (HSK HR05)
50	21:25		20:29	19:19		19:01 (HSK ME08b)	17:13	20	16:25 (HSK HR03)	16:25	15:41 (HSK HR05)
51	05:38		06:26	07:16		19:02 (HSK ME08b)	17:14		16:04 (HSK HR03)	16:24	15:41 (HSK HR05)
52	21:24		20:27	19:16		19:03 (HSK ME08b)	17:11	22	16:26 (HSK HR03)	16:24	15:41 (HSK HR05)
53	05:40		06:28	07:18		19:04 (HSK ME08b)	17:08		16:04 (HSK HR03)	16:23	15:41 (HSK HR05)
54	21:22		20:24	19:14		19:05 (HSK ME08b)	17:09	23	16:27 (HSK HR03)	16:23	15:41 (HSK HR05)
55	05:41		06:30	07:19		19:06 (HSK ME08b)	17:10		16:03 (HSK HR03)	16:23	15:41 (HSK HR05)
56	21:21		20:22	19:12	9	18:25 (HSK 8694 TLF)	17:07	24	16:27 (HSK HR03)	16:22	15:42 (HSK HR05)
57	05:43		06:31	07:21		19:07 (HSK ME08b)	17:12		16:03 (HSK HR03)	16:24	15:42 (HSK HR05)
58	21:19		20:20	19:09	13	18:27 (HSK 8694 TLF)	17:05	24	16:27 (HSK HR03)	16:22	15:42 (HSK HR05)
59	05:44		06:33	07:23		19:08 (HSK ME08b)	17:13		16:03 (HSK HR03)	16:24	15:42 (HSK HR05)
60	21:18		20:18	19:07	17	18:28 (HSK 8694 TLF)	17:03	24	16:27 (HSK HR03)	16:21	15:43 (HSK HR05)
61	05:46		06:34	07:24		19:09 (HSK ME08b)	17:15		16:03 (HSK HR03)	16:22	15:43 (HSK HR05)
62	21:16		20:16	19:08	7	19:48 (HSK ME08b)	17:01	24	16:27 (HSK HR03)	16:20	15:44 (HSK HR05)
63	Sonnenscheinstunden		500	453		381	332		268		246
64	astr. max. mögl. Beschattung		69	164		222	368		351		675
65	Red. Sonnenscheinwahrsch.		0.39	0.40		0.32	0.29		0.23		0.17
66	Reduktion Betriebsdauer		0.96	0.96		0.96	0.96		0.96		0.96
67	Reduktion Windrichtung		0.64	0.68		0.70	0.70		0.67		0.66
68	Gesamte Reduktion		0.24	0.26		0.22	0.19		0.15		0.11
69	Met. wahrsch. Beschattung		16	43		48	71		51		72

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN36 - Meerhof, Drosselgasse 18

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Januar			Februar			März			April			Mai			Juni		
1	08:31	14:49 (HSK HR05)	08:05	16:12 (HSK HR03)	07:12				07:03	19:06 (HSK ME08b)	05:59		19:46 (HSK ME08a)	05:14			
	16:26	26 15:15 (HSK HR05)	17:13	24 16:36 (HSK HR03)	18:04				19:57	24 19:30 (HSK ME08b)	20:47	22	20:08 (HSK ME08a)	21:32			
2	08:31	14:50 (HSK HR05)	08:03	16:12 (HSK HR03)	07:10				07:00	19:05 (HSK ME08b)	05:57		19:46 (HSK ME08a)	05:13			
	16:27	26 15:16 (HSK HR05)	17:15	24 16:36 (HSK HR03)	18:06				19:59	25 19:30 (HSK ME08b)	20:49	21	20:07 (HSK ME08a)	21:33			
3	08:31	14:50 (HSK HR05)	08:02	16:11 (HSK HR03)	07:08		17:28 (HSK B694 TLF)	06:58		19:04 (HSK ME08b)	05:55		19:46 (HSK ME08a)	05:13			
	16:28	25 15:15 (HSK HR05)	17:17	26 16:37 (HSK HR03)	18:07	11	17:39 (HSK B694 TLF)	20:00	30	19:34 (HSK ME07)	20:50	20	20:06 (HSK ME08a)	21:34			
4	08:31	14:51 (HSK HR05)	08:00	16:11 (HSK HR03)	07:06		17:26 (HSK B694 TLF)	06:56		19:04 (HSK ME08b)	05:53		19:48 (HSK ME08a)	05:12			
	16:29	25 15:16 (HSK HR05)	17:19	27 16:38 (HSK HR03)	18:09	16	17:42 (HSK B694 TLF)	20:02	32	19:36 (HSK ME07)	20:52	18	20:06 (HSK ME08a)	21:35			
5	08:30	14:52 (HSK HR05)	07:59	16:10 (HSK HR03)	07:04		17:24 (HSK B694 TLF)	06:54		19:04 (HSK ME08b)	05:51		19:49 (HSK ME08a)	05:11			
	16:30	24 15:16 (HSK HR05)	17:20	29 16:39 (HSK HR03)	18:11	19	17:43 (HSK B694 TLF)	20:04	34	19:38 (HSK ME07)	20:53	19	20:25 (HSK ME09)	21:36			
6	08:30	14:52 (HSK HR05)	07:57	16:10 (HSK HR03)	07:01		17:22 (HSK B694 TLF)	06:51		19:04 (HSK ME08b)	05:49		19:50 (HSK ME08a)	05:11			
	16:32	24 15:16 (HSK HR05)	17:22	29 16:39 (HSK HR03)	18:13	25	17:47 (HSK ME01)	20:05	36	19:40 (HSK ME07)	20:55	20	20:26 (HSK ME09)	21:37			
7	08:30	14:54 (HSK HR05)	07:55	16:10 (HSK HR03)	06:59		17:21 (HSK B694 TLF)	06:49		19:05 (HSK ME08b)	05:48		19:53 (HSK ME08a)	05:10			
	16:33	23 15:17 (HSK HR05)	17:24	29 16:39 (HSK HR03)	18:14	28	17:49 (HSK ME01)	20:07	37	19:42 (HSK ME07)	20:57	16	20:27 (HSK ME09)	21:38			
8	08:29	14:54 (HSK HR05)	07:53	16:10 (HSK HR03)	06:57		17:21 (HSK B694 TLF)	06:47		19:04 (HSK ME08b)	05:46		20:16 (HSK ME09)	05:10			
	16:34	22 15:16 (HSK HR05)	17:26	29 16:39 (HSK HR03)	18:16	30	17:51 (HSK ME01)	20:09	37	19:41 (HSK ME07)	20:58	13	20:29 (HSK ME09)	21:39			
9	08:29	14:55 (HSK HR05)	07:52	16:11 (HSK HR03)	06:55		17:20 (HSK B694 TLF)	06:45		19:05 (HSK ME08b)	05:44		20:15 (HSK ME09)	05:09			
	16:35	21 15:16 (HSK HR05)	17:28	29 16:40 (HSK HR03)	18:18	33	17:53 (HSK ME01)	20:10	36	19:41 (HSK ME07)	21:00	16	20:31 (HSK ME09)	21:40			
10	08:28	14:56 (HSK HR05)	07:50	16:11 (HSK HR03)	06:53		17:19 (HSK B694 TLF)	06:42		19:07 (HSK ME08b)	05:43		20:15 (HSK ME09)	05:09			
	16:37	20 15:16 (HSK HR05)	17:30	28 16:39 (HSK HR03)	18:20	35	17:54 (HSK ME01)	20:12	34	19:41 (HSK ME07)	21:01	18	20:33 (HSK ME09)	21:40			
11	08:28	14:57 (HSK HR05)	07:48	16:11 (HSK HR03)	06:50		17:19 (HSK B694 TLF)	06:40		19:08 (HSK ME08b)	05:41		20:14 (HSK ME09)	05:08			
	16:38	19 15:16 (HSK HR05)	17:31	28 16:39 (HSK HR03)	18:21	35	17:54 (HSK ME01)	20:14	32	19:40 (HSK ME07)	21:03	19	20:33 (HSK ME09)	21:41			
12	08:27	14:58 (HSK HR05)	07:46	16:12 (HSK HR03)	06:48		17:19 (HSK B694 TLF)	06:38		19:12 (HSK ME08b)	05:39		20:14 (HSK ME09)	05:08			
	16:40	17 15:15 (HSK HR05)	17:33	27 16:39 (HSK HR03)	18:23	35	17:54 (HSK ME01)	20:15	23	19:39 (HSK ME07)	21:05	21	20:35 (HSK ME09)	21:42			
13	08:26	14:59 (HSK HR05)	07:45	16:12 (HSK HR03)	06:46		17:19 (HSK B694 TLF)	06:36		19:22 (HSK ME08b)	05:38		20:14 (HSK ME09)	05:08			
	16:41	16 15:15 (HSK HR05)	17:35	26 16:38 (HSK HR03)	18:25	34	17:53 (HSK ME01)	20:17	15	19:37 (HSK ME07)	21:06	21	20:35 (HSK ME09)	21:43			
14	08:26	15:01 (HSK HR05)	07:43	16:13 (HSK HR03)	06:44		17:19 (HSK B694 TLF)	06:34		19:23 (HSK ME08b)	05:36		20:14 (HSK ME09)	05:07			
	16:43	13 15:14 (HSK HR05)	17:37	24 16:37 (HSK HR03)	18:27	33	17:52 (HSK ME01)	20:19	13	19:36 (HSK ME07)	21:08	21	20:35 (HSK ME09)	21:43			
15	08:25	15:03 (HSK HR05)	07:41	16:14 (HSK HR03)	06:41		17:20 (HSK B694 TLF)	06:31		19:25 (HSK ME08b)	05:35		20:14 (HSK ME09)	05:07			
	16:44	9 15:12 (HSK HR05)	17:39	22 16:36 (HSK HR03)	18:28	31	17:51 (HSK ME01)	20:20	8	19:33 (HSK ME07)	21:09	21	20:35 (HSK ME09)	21:44			
16	08:24	15:07 (HSK HR05)	07:39	16:16 (HSK HR03)	06:39		17:21 (HSK B694 TLF)	06:29			05:33		20:14 (HSK ME09)	05:07			
	16:46	2 15:09 (HSK HR05)	17:40	19 16:35 (HSK HR03)	18:30	28	17:49 (HSK ME01)	20:22			21:11	21	20:35 (HSK ME09)	21:44			
17	08:23		07:37	16:18 (HSK HR03)	06:37		17:22 (HSK B694 TLF)	06:27			05:32		20:15 (HSK ME09)	05:07			
	16:47		17:42	15 16:33 (HSK HR03)	18:32	21	17:45 (HSK ME01)	20:24			21:12	20	20:35 (HSK ME09)	21:45			
18	08:22		07:35	16:21 (HSK HR03)	06:35		17:25 (HSK B694 TLF)	06:25			05:30		20:14 (HSK ME09)	05:07			
	16:49		17:44	8 16:29 (HSK HR03)	18:33	11	17:36 (HSK B694 TLF)	20:25			21:14	20	20:34 (HSK ME09)	21:45			
19	08:21		07:33		06:32			06:23		19:54 (HSK ME08a)	05:29		20:15 (HSK ME09)	05:07			
	16:51		17:46		18:35			20:27	6	20:00 (HSK ME08a)	21:15	19	20:34 (HSK ME09)	21:45			
20	08:20		07:31		06:30			06:21		19:52 (HSK ME08a)	05:27		20:16 (HSK ME09)	05:07			
	16:52		17:48		18:37			20:29	10	20:02 (HSK ME08a)	21:17	18	20:34 (HSK ME09)	21:46			
21	08:19		07:29		06:28			06:19		19:50 (HSK ME08a)	05:26		20:17 (HSK ME09)	05:07			
	16:54		17:50		18:38			20:30	14	20:04 (HSK ME08a)	21:18	16	20:33 (HSK ME09)	21:46			
22	08:18		07:27		06:25			06:17		19:49 (HSK ME08a)	05:25		20:18 (HSK ME09)	05:08			
	16:55		17:51		18:40			20:32	16	20:05 (HSK ME08a)	21:19	15	20:33 (HSK ME09)	21:46			
23	08:17		07:25		06:23			06:15		19:47 (HSK ME08a)	05:24		20:19 (HSK ME09)	05:08			
	16:57		17:53		18:42			20:34	20	20:07 (HSK ME08a)	21:21	13	20:32 (HSK ME09)	21:46			
24	08:16		07:23		06:21			06:12		19:47 (HSK ME08a)	05:22		20:19 (HSK ME09)	05:08			
	16:59		17:55		18:43			20:35	21	20:08 (HSK ME08a)	21:22	11	20:30 (HSK ME09)	21:46			
25	08:15		07:21		06:19			06:10		19:46 (HSK ME08a)	05:21		20:21 (HSK ME09)	05:08			
	17:01		17:57		18:45			20:37	24	20:10 (HSK ME08a)	21:23	7	20:28 (HSK ME09)	21:47			
26	08:13		07:19		06:16			06:08		19:45 (HSK ME08a)	05:20						
	17:02		17:59		18:47			20:39	25	20:10 (HSK ME08a)	21:25						
27	08:12		07:17		06:14			06:06		19:45 (HSK ME08a)	05:19						
	17:04	4 16:21 (HSK HR03)	18:00		18:49	8	18:15 (HSK ME08b)	20:40	25	20:10 (HSK ME08a)	21:26						
28	08:11		07:14		06:12			06:04		19:45 (HSK ME08a)	05:18						
	17:06	12 16:29 (HSK HR03)	18:02		18:50	13	18:12 (HSK ME08b)	20:42	24	20:09 (HSK ME08a)	21:27						
29	08:09				07:09			06:03		19:45 (HSK ME08a)	05:17						
	17:08	16 16:32 (HSK HR03)			19:52	17	19:10 (HSK ME08b)	20:44	24	20:09 (HSK ME08a)	21:28						
30	08:08				07:07			06:01		19:46 (HSK ME08a)	05:16						
	17:09	19 16:33 (HSK HR03)			19:54	20	19:08 (HSK ME08b)	20:45	23	20:09 (HSK ME08a)	21:30						
31	08:06				07:05			06:00			05:15						
	17:11	21 16:34 (HSK HR03)			19:55	22	19:07 (HSK ME08b)	20:46			21:31						
		261			367			415			483						497
Sonnenscheinstunden																	
astr.max.mögl.Beschattung		384		443		505		648				446					
Red.Sonnenscheinwahrsch.		0,19		0,32		0,28		0,36				0,43					
Reduktion Betriebsdauer		0,96		0,96		0,96		0,96				0,96					
Reduktion Windrichtung		0,66		0,69		0,70		0,69				0,66					
Gesamte Reduktion		0,12		0,21		0,19		0,24				0,27					
Met.wahrsch.Beschattung		46		95		96		156				122					

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN36 - Meerhof, Drosselgasse 18

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Jul	August	September	Oktober	November	Dezember					
1	05:11 21:46	05:47 21:15	20:25 (HSK ME09) 20:45 (HSK ME09)	06:36 20:13	19:07 (HSK ME08b) 19:39 (HSK ME07)	07:24 19:05	17:58 (HSK 8694 TLF) 18:33 (HSK ME01)	07:17 17:00	15:40 (HSK HR03) 16:09 (HSK HR03)	08:07 16:20	14:39 (HSK HR05) 14:58 (HSK HR05)
2	05:12 21:45	05:49 21:13	20:25 (HSK ME09) 20:43 (HSK ME09)	06:38 20:11	19:05 (HSK ME08b) 19:39 (HSK ME07)	07:26 19:03	17:58 (HSK 8694 TLF) 18:33 (HSK ME01)	07:19 16:58	15:39 (HSK HR03) 16:08 (HSK HR03)	08:09 16:19	14:38 (HSK HR05) 14:59 (HSK HR05)
3	05:13 21:45	05:50 21:11	20:26 (HSK ME09) 20:42 (HSK ME09)	06:39 20:09	19:03 (HSK ME08b) 19:39 (HSK ME07)	07:27 19:00	17:57 (HSK 8694 TLF) 18:32 (HSK ME01)	07:21 16:56	15:39 (HSK HR03) 16:09 (HSK HR03)	08:10 16:19	14:39 (HSK HR05) 15:00 (HSK HR05)
4	05:14 21:45	05:52 21:10	20:26 (HSK ME09) 20:40 (HSK ME09)	06:41 20:07	19:01 (HSK ME08b) 19:38 (HSK ME07)	07:29 18:58	17:57 (HSK 8694 TLF) 18:31 (HSK ME01)	07:22 16:54	15:40 (HSK HR03) 16:09 (HSK HR03)	08:11 16:18	14:38 (HSK HR05) 15:00 (HSK HR05)
5	05:14 21:44	05:53 21:08	20:26 (HSK ME09) 20:38 (HSK ME09)	06:42 20:05	19:01 (HSK ME08b) 19:38 (HSK ME07)	07:31 18:56	17:57 (HSK 8694 TLF) 18:29 (HSK ME01)	07:24 16:53	15:40 (HSK HR03) 16:08 (HSK HR03)	08:13 16:18	14:39 (HSK HR05) 15:02 (HSK HR05)
6	05:15 21:44	05:55 21:06	20:02 (HSK ME08a) 20:37 (HSK ME09)	06:44 20:02	19:00 (HSK ME08b) 19:36 (HSK ME07)	07:32 18:54	17:57 (HSK 8694 TLF) 18:26 (HSK ME01)	07:26 16:51	15:40 (HSK HR03) 16:08 (HSK HR03)	08:14 16:17	14:38 (HSK HR05) 15:02 (HSK HR05)
7	05:16 21:43	05:56 21:05	19:59 (HSK ME08a) 20:35 (HSK ME09)	06:46 20:00	18:59 (HSK ME08b) 19:33 (HSK ME07)	07:34 18:51	17:58 (HSK 8694 TLF) 18:24 (HSK ME01)	07:28 16:49	15:41 (HSK HR03) 16:08 (HSK HR03)	08:15 16:17	14:39 (HSK HR05) 15:03 (HSK HR05)
8	05:17 21:43	05:58 21:03	19:58 (HSK ME08a) 20:34 (HSK ME09)	06:47 19:58	18:59 (HSK ME08b) 19:31 (HSK ME07)	07:36 18:49	17:59 (HSK 8694 TLF) 18:22 (HSK ME01)	07:29 16:48	15:42 (HSK HR03) 16:08 (HSK HR03)	08:16 16:17	14:39 (HSK HR05) 15:04 (HSK HR05)
9	05:18 21:42	06:00 21:01	19:56 (HSK ME08a) 20:15 (HSK ME08a)	06:49 19:55	18:58 (HSK ME08b) 19:29 (HSK ME07)	07:37 18:47	18:00 (HSK 8694 TLF) 18:18 (HSK 8694 TLF)	07:31 16:46	15:42 (HSK HR03) 16:07 (HSK HR03)	08:18 16:16	14:39 (HSK HR05) 15:04 (HSK HR05)
10	05:19 21:41	06:01 20:59	19:56 (HSK ME08a) 20:16 (HSK ME08a)	06:50 19:53	18:59 (HSK ME08b) 19:23 (HSK ME08b)	07:39 18:45	18:01 (HSK 8694 TLF) 18:15 (HSK 8694 TLF)	07:33 16:44	15:43 (HSK HR03) 16:07 (HSK HR03)	08:19 16:16	14:39 (HSK HR05) 15:05 (HSK HR05)
11	05:20 21:40	06:03 20:57	19:54 (HSK ME08a) 20:16 (HSK ME08a)	06:52 19:51	18:58 (HSK ME08b) 19:22 (HSK ME08b)	07:41 18:42	18:05 (HSK 8694 TLF) 18:11 (HSK 8694 TLF)	07:35 16:43	15:45 (HSK HR03) 16:06 (HSK HR03)	08:20 16:16	14:39 (HSK HR05) 15:05 (HSK HR05)
12	05:21 21:40	06:04 20:55	19:54 (HSK ME08a) 20:17 (HSK ME08a)	06:54 19:49	18:59 (HSK ME08b) 19:22 (HSK ME08b)	07:42 18:40	18:11 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:36 16:41	15:46 (HSK HR03) 16:05 (HSK HR03)	08:21 16:16	14:40 (HSK HR05) 15:06 (HSK HR05)
13	05:22 21:39	06:06 20:53	19:53 (HSK ME08a) 20:17 (HSK ME08a)	06:55 19:46	18:59 (HSK ME08b) 19:19 (HSK ME08b)	07:44 18:38	18:18 (HSK 8694 TLF) 18:01 (HSK 8694 TLF)	07:38 16:40	15:47 (HSK HR03) 16:02 (HSK HR03)	08:22 16:16	14:40 (HSK HR05) 15:06 (HSK HR05)
14	05:23 21:38	06:07 20:51	19:53 (HSK ME08a) 20:17 (HSK ME08a)	06:57 19:44	19:00 (HSK ME08b) 19:17 (HSK ME08b)	07:46 18:36	18:15 (HSK 8694 TLF) 18:05 (HSK 8694 TLF)	07:40 16:38	15:49 (HSK HR03) 16:01 (HSK HR03)	08:23 16:16	14:40 (HSK HR05) 15:07 (HSK HR05)
15	05:24 21:37	06:09 20:49	19:52 (HSK ME08a) 20:17 (HSK ME08a)	06:58 19:42	19:01 (HSK ME08b) 19:15 (HSK ME08b)	07:47 18:34	18:05 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:42 16:37	15:54 (HSK HR03) 15:57 (HSK HR03)	08:24 16:16	14:41 (HSK HR05) 15:08 (HSK HR05)
16	05:25 21:36	06:11 20:47	19:53 (HSK ME08a) 20:17 (HSK ME08a)	07:00 19:39	19:04 (HSK ME08b) 19:13 (HSK ME08b)	07:49 18:32	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:43 16:36	15:57 (HSK HR03) 16:00 (HSK HR03)	08:24 16:16	14:41 (HSK HR05) 15:08 (HSK HR05)
17	05:27 21:35	06:12 20:45	19:52 (HSK ME08a) 20:16 (HSK ME08a)	07:02 19:37	19:13 (HSK ME08b) 18:29	07:51 18:29	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:45 16:34	16:00 (HSK HR03) 16:00 (HSK HR03)	08:25 16:16	14:42 (HSK HR05) 15:09 (HSK HR05)
18	05:28 21:34	20:33 (HSK ME09) 20:36 (HSK ME09)	19:53 (HSK ME08a) 20:16 (HSK ME08a)	07:03 19:35	18:08 (HSK 8694 TLF) 18:05 (HSK 8694 TLF)	07:53 18:15	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:47 16:33	16:00 (HSK HR03) 16:00 (HSK HR03)	08:26 16:17	14:42 (HSK HR05) 15:09 (HSK HR05)
19	05:29 21:33	20:31 (HSK ME09) 20:39 (HSK ME09)	19:52 (HSK ME08a) 20:13 (HSK ME08a)	07:05 19:32	18:05 (HSK 8694 TLF) 18:25	07:54 18:25	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:48 16:32	16:00 (HSK HR03) 16:00 (HSK HR03)	08:27 16:17	14:43 (HSK HR05) 15:10 (HSK HR05)
20	05:30 21:32	20:29 (HSK ME09) 20:41 (HSK ME09)	19:53 (HSK ME08a) 20:13 (HSK ME08a)	07:06 19:32	18:05 (HSK 8694 TLF) 18:25	07:56 18:25	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:50 16:30	16:00 (HSK HR03) 16:00 (HSK HR03)	08:27 16:17	14:43 (HSK HR05) 15:10 (HSK HR05)
21	05:32 21:30	20:28 (HSK ME09) 20:42 (HSK ME09)	19:53 (HSK ME08a) 20:13 (HSK ME08a)	07:08 19:28	18:05 (HSK 8694 TLF) 18:25	07:58 18:21	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:52 16:29	16:00 (HSK HR03) 16:00 (HSK HR03)	08:28 16:18	14:43 (HSK HR05) 15:10 (HSK HR05)
22	05:33 21:29	20:27 (HSK ME09) 20:42 (HSK ME09)	19:55 (HSK ME08a) 20:13 (HSK ME08a)	07:10 19:26	18:05 (HSK 8694 TLF) 18:25	08:00 18:19	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:53 16:28	16:00 (HSK HR03) 16:00 (HSK HR03)	08:29 16:18	14:44 (HSK HR05) 15:11 (HSK HR05)
23	05:34 21:28	20:27 (HSK ME09) 20:44 (HSK ME09)	19:56 (HSK ME08a) 20:13 (HSK ME08a)	07:11 19:23	18:05 (HSK 8694 TLF) 18:25	08:01 18:17	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:55 16:27	16:00 (HSK HR03) 16:00 (HSK HR03)	08:29 16:19	14:44 (HSK HR05) 15:11 (HSK HR05)
24	05:36 21:26	20:26 (HSK ME09) 20:44 (HSK ME09)	19:59 (HSK ME08a) 20:13 (HSK ME08a)	07:13 19:21	18:05 (HSK 8694 TLF) 18:25	08:03 18:15	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:57 16:26	16:00 (HSK HR03) 16:00 (HSK HR03)	08:29 16:19	14:45 (HSK HR05) 15:11 (HSK HR05)
25	05:37 21:25	20:25 (HSK ME09) 20:45 (HSK ME09)	19:59 (HSK ME08a) 20:13 (HSK ME08a)	07:14 19:21	18:05 (HSK 8694 TLF) 18:25	08:03 18:15	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	07:58 16:25	16:00 (HSK HR03) 16:00 (HSK HR03)	08:30 16:20	14:46 (HSK HR05) 15:13 (HSK HR05)
26	05:39 21:24	20:25 (HSK ME09) 20:45 (HSK ME09)	19:59 (HSK ME08a) 20:13 (HSK ME08a)	07:16 19:16	18:05 (HSK 8694 TLF) 18:25	08:03 18:15	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	08:00 16:24	16:00 (HSK HR03) 16:00 (HSK HR03)	08:30 16:20	14:46 (HSK HR05) 15:13 (HSK HR05)
27	05:40 21:22	20:25 (HSK ME09) 20:46 (HSK ME09)	19:59 (HSK ME08a) 20:13 (HSK ME08a)	07:18 19:14	18:04 (HSK 8694 TLF) 18:25	08:03 18:15	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	08:01 16:23	16:00 (HSK HR03) 16:00 (HSK HR03)	08:30 16:21	14:46 (HSK HR05) 15:13 (HSK HR05)
28	05:41 21:21	20:24 (HSK ME09) 20:46 (HSK ME09)	19:59 (HSK ME08a) 20:13 (HSK ME08a)	07:19 19:12	18:01 (HSK 8694 TLF) 18:25	08:03 18:15	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	08:03 16:22	16:00 (HSK HR03) 16:00 (HSK HR03)	08:31 16:22	14:47 (HSK HR05) 15:14 (HSK HR05)
29	05:43 21:19	20:25 (HSK ME09) 20:46 (HSK ME09)	19:59 (HSK ME08a) 20:13 (HSK ME08a)	07:21 19:10	18:00 (HSK 8694 TLF) 18:25	08:03 18:15	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	08:04 16:21	16:00 (HSK HR03) 16:00 (HSK HR03)	08:31 16:23	14:47 (HSK HR05) 15:14 (HSK HR05)
30	05:44 21:18	20:24 (HSK ME09) 20:46 (HSK ME09)	19:59 (HSK ME08a) 20:13 (HSK ME08a)	07:23 19:07	17:59 (HSK 8694 TLF) 18:25	08:03 18:15	18:00 (HSK 8694 TLF) 18:00 (HSK 8694 TLF)	08:06 16:21	16:00 (HSK HR03) 16:00 (HSK HR03)	08:31 16:24	14:48 (HSK HR05) 15:15 (HSK HR05)
31	05:46 21:16	20:24 (HSK ME09) 20:46 (HSK ME09)	19:59 (HSK ME08a) 20:13 (HSK ME08a)	07:23 19:07	18:32 (HSK ME01) 17:02	08:03 17:02	18:32 (HSK ME01) 16:09 (HSK HR03)	08:06 16:21	16:00 (HSK HR03) 16:00 (HSK HR03)	08:31 16:25	14:48 (HSK HR05) 15:15 (HSK HR05)
Sonnenscheinstunden	500	453	381	332	268	246	792				
astr. max.mögl. Beschattung	234	510	585	462	400	792					
Red. Sonnenscheinwahrsch.	0,39	0,40	0,32	0,29	0,23	0,17					
Reduktion Betriebsdauer	0,96	0,96	0,96	0,96	0,96	0,96					
Reduktion Windrichtung	0,66	0,67	0,70	0,70	0,69	0,65					
Gesamte Reduktion	0,25	0,26	0,21	0,19	0,15	0,11					
Met. wahrsch. Beschattung	58	131	125	89	59	84					

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN37 - Meerhof, Zur Egge 19
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar	Februar	März	April	Mai	June
1	08:31 16:26 27	15:06 (HSK HR12) 15:33 (HSK HR12) 17:13	08:05 17:13	07:12 18:04		05:59 20:47 21:32
2	08:31 16:27 27	15:07 (HSK HR12) 15:34 (HSK HR12) 17:15	08:03 17:15	07:10 18:06		05:57 20:49 21:33
3	08:31 16:28 26	15:07 (HSK HR12) 15:33 (HSK HR12) 17:17	08:02 17:17	07:08 18:07		05:55 20:50 21:34
4	08:31 16:29 27	15:07 (HSK HR12) 15:34 (HSK HR12) 17:18	08:00 17:18	07:06 18:09	19:35 (HSK 8694 TLF)	05:53 20:52 21:35
5	08:30 16:30 27	15:08 (HSK HR12) 15:35 (HSK HR12) 17:20	07:59 17:20	07:04 18:11	19:36 (HSK 8694 TLF)	05:51 20:53 21:36
6	08:30 16:32 27	15:08 (HSK HR12) 15:35 (HSK HR12) 17:22	07:57 17:22	07:01 18:13	19:38 (HSK 8694 TLF)	05:49 20:55 21:37
7	08:30 16:33 27	15:09 (HSK HR12) 15:36 (HSK HR12) 17:24	07:55 17:24	06:59 18:14	19:31 (HSK 8694 TLF)	05:48 20:57 21:38
8	08:29 16:34 27	15:09 (HSK HR12) 15:36 (HSK HR12) 17:26	07:53 17:26	06:57 18:16	19:42 (HSK 8694 TLF)	05:46 20:58 21:39
9	08:29 16:35 27	15:09 (HSK HR12) 15:36 (HSK HR12) 17:28	07:52 17:28	06:55 18:18	19:29 (HSK 8694 TLF)	05:44 21:00 21:40
10	08:28 16:37 26	15:11 (HSK HR12) 15:37 (HSK HR12) 17:29	07:50 17:29	06:53 18:20	19:44 (HSK 8694 TLF)	05:43 21:01 21:40
11	08:28 16:38 25	15:11 (HSK HR12) 15:36 (HSK HR12) 17:31	07:48 17:31	06:50 18:21	17:47 (HSK HR03)	05:41 21:03 21:41
12	08:27 16:40 25	15:11 (HSK HR12) 15:36 (HSK HR12) 17:33	07:46 17:33	06:48 18:23	17:54 (HSK HR03)	05:39 21:05 21:42
13	08:26 16:41 24	15:12 (HSK HR12) 15:36 (HSK HR12) 17:35	07:44 17:35	06:46 18:25	17:44 (HSK HR03)	05:38 21:06 21:42
14	08:26 16:43 23	15:13 (HSK HR12) 15:36 (HSK HR12) 17:37	07:43 17:37	06:44 18:26	17:59 (HSK HR03)	05:36 21:08 21:43
15	08:25 16:44 23	15:13 (HSK HR12) 15:36 (HSK HR12) 17:39	07:41 17:39	06:41 18:28	17:40 (HSK HR03)	05:35 21:09 21:44
16	08:24 16:46 22	15:14 (HSK HR12) 15:36 (HSK HR12) 17:40	07:39 17:40	06:39 18:30	19:35 (HSK 8694 TLF)	05:33 21:09 21:44
17	08:23 16:47 21	15:15 (HSK HR12) 15:36 (HSK HR12) 17:42	07:37 17:42	06:37 18:32	19:31 (HSK 8694 TLF)	05:32 21:10 21:45
18	08:22 16:49 18	15:17 (HSK HR12) 15:35 (HSK HR12) 17:44	07:35 17:44	06:34 18:33	19:41 (HSK 8694 TLF)	05:30 21:11 21:45
19	08:21 16:50 17	15:18 (HSK HR12) 15:35 (HSK HR12) 17:46	07:33 17:46	06:32 18:35	17:39 (HSK HR03)	05:29 21:12 21:45
20	08:20 16:52 14	15:20 (HSK HR12) 15:34 (HSK HR12) 17:48	07:31 17:48	06:30 18:37	18:00 (HSK HR03)	05:27 21:13 21:46
21	08:19 16:54 11	15:22 (HSK HR12) 15:33 (HSK HR12) 17:50	07:29 17:50	06:28 18:38	17:39 (HSK HR03)	05:26 21:14 21:46
22	08:18 16:55 2	15:26 (HSK HR12) 15:28 (HSK HR12) 17:51	07:27 17:51	06:25 18:40	17:57 (HSK HR03)	05:25 21:15 21:46
23	08:17 16:57 16	15:28 (HSK HR12) 17:53	07:25 17:53	06:23 18:42	17:42 (HSK HR03)	05:24 21:16 21:46
24	08:16 16:59 15	17:55	07:23 17:55	06:21 18:43	17:52 (HSK HR03)	05:22 21:17 21:46
25	08:15 17:01 14	17:57	07:21 17:57	06:19 18:45	18:00 (HSK HR03)	05:21 21:18 21:46
26	08:13 17:02 13	17:59	07:19 17:59	06:16 18:47	17:39 (HSK HR03)	05:20 21:19 21:46
27	08:12 17:04 12	18:00	07:17 18:00	06:14 18:49	17:59 (HSK HR03)	05:19 21:20 21:46
28	08:11 17:06 11	18:02	07:14 18:02	06:12 18:50	17:44 (HSK HR03)	05:18 21:21 21:46
29	08:09 17:08 10		07:09 18:01	06:09 18:51	18:00 (HSK HR03)	05:17 21:22 21:46
30	08:08 17:09 9		07:07 18:03	06:07 18:53	17:39 (HSK HR03)	05:16 21:23 21:46
31	08:06 17:11 8		07:05 18:05	06:05 18:55	17:57 (HSK HR03)	05:15 21:24 21:46
Sonnenscheinstunden	261	278	367	415	483	496
astr. max. mögl. Beschattung	493	315	241	129		
Red. Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36		
Reduktion Betriebsdauer	0,96	0,96	0,96	0,96		
Reduktion Windrichtung	0,66	0,70	0,71	0,69		
Gesamte Reduktion	0,12	0,22	0,19	0,24		
Met. wahrsch. Beschattung	59	69	46	31		

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN37 - Meerhof, Zur Egge 19
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Jul	August	September	Oktober	November	Dezember				
1	05:11 21:46	05:47 21:15	06:36 20:13	19:28 (HSK 8694 TLF) 19:45 (HSK 8694 TLF)	07:24 19:05	18:21 (HSK HR03) 18:38 (HSK HR03)	07:17 17:00	08:07 16:20	14:53 (HSK HR12) 15:19 (HSK HR12)	
2	05:12 21:45	05:49 21:13	06:38 20:11	19:27 (HSK 8694 TLF) 19:44 (HSK 8694 TLF)	07:26 19:03	18:23 (HSK HR03) 18:36 (HSK HR03)	07:19 16:58	08:09 16:19	14:53 (HSK HR12) 15:19 (HSK HR12)	
3	05:13 21:45	05:50 21:11	06:39 20:09	19:27 (HSK 8694 TLF) 19:42 (HSK 8694 TLF)	07:27 19:00	18:23 (HSK HR03) 18:33 (HSK HR03)	07:21 16:56	08:10 16:19	14:54 (HSK HR12) 15:20 (HSK HR12)	
4	05:14 21:45	05:52 21:10	06:41 20:07	19:26 (HSK 8694 TLF) 19:39 (HSK 8694 TLF)	07:29 18:58	18:27 (HSK HR03) 18:31 (HSK HR03)	07:22 16:54	08:11 16:18	14:53 (HSK HR12) 15:20 (HSK HR12)	
5	05:14 21:44	05:53 21:08	06:42 20:05	19:27 (HSK 8694 TLF) 19:38 (HSK 8694 TLF)	07:31 18:56		07:24 16:53	08:13 16:18	14:54 (HSK HR12) 15:21 (HSK HR12)	
6	05:15 21:44	05:55 21:06	06:44 20:02	19:28 (HSK 8694 TLF) 19:36 (HSK 8694 TLF)	07:32 18:54		07:26 16:51	08:14 16:17	14:54 (HSK HR12) 15:21 (HSK HR12)	
7	05:16 21:43	05:56 21:04	06:46 20:00	19:28 (HSK 8694 TLF) 19:33 (HSK 8694 TLF)	07:34 18:51		07:28 16:49	08:15 16:17	14:54 (HSK HR12) 15:21 (HSK HR12)	
8	05:17 21:42	05:58 21:03	06:47 19:58	19:30 (HSK 8694 TLF) 19:31 (HSK 8694 TLF)	07:36 18:49		07:29 16:48	08:16 16:17	14:56 (HSK HR12) 15:22 (HSK HR12)	
9	05:18 21:42	06:00 21:01	06:49 19:55		07:37 18:47		07:31 16:46	08:18 16:16	14:56 (HSK HR12) 15:22 (HSK HR12)	
10	05:19 21:41	06:01 20:59	06:50 19:53		07:39 18:45		07:33 16:44	08:19 16:16	14:56 (HSK HR12) 15:23 (HSK HR12)	
11	05:20 21:40	06:03 20:57	06:52 19:51		07:41 18:42		07:35 16:43	08:20 16:16	14:56 (HSK HR12) 15:23 (HSK HR12)	
12	05:21 21:40	06:04 20:55	06:54 19:49		07:42 18:40		07:36 16:41	08:21 16:16	14:57 (HSK HR12) 15:23 (HSK HR12)	
13	05:22 21:39	06:06 20:53	06:55 19:46		07:44 18:38		07:38 16:40	08:22 16:16	14:57 (HSK HR12) 15:24 (HSK HR12)	
14	05:23 21:38	06:07 20:51	06:57 19:44		07:46 18:36		07:40 16:38	08:23 16:16	14:58 (HSK HR12) 15:24 (HSK HR12)	
15	05:24 21:37	06:09 20:49	06:58 19:42		07:47 18:34	17:24 (HSK HR05)	07:42 16:37	08:24 16:16	14:58 (HSK HR12) 15:25 (HSK HR12)	
16	05:25 21:36	06:11 20:47	07:00 19:39		07:49 18:32	17:22 (HSK HR05)	07:43 16:36	08:24 16:16	14:59 (HSK HR12) 15:25 (HSK HR12)	
17	05:27 21:35	06:12 20:45	07:02 19:37		07:51 18:29	17:20 (HSK HR05)	07:45 16:34	08:25 16:16	14:59 (HSK HR12) 15:25 (HSK HR12)	
18	05:28 21:34	06:14 20:43	07:03 19:35		07:53 18:27	17:18 (HSK HR05)	07:47 16:33	08:26 16:17	14:59 (HSK HR12) 15:26 (HSK HR12)	
19	05:29 21:33	06:15 20:41	07:05 19:32		07:54 18:25	17:17 (HSK HR05)	07:48 16:32	08:27 16:17	15:00 (HSK HR12) 15:26 (HSK HR12)	
20	05:30 21:31	06:17 20:39	07:06 19:30	18:31 (HSK HR03)	07:56 18:23	17:17 (HSK HR05)	07:50 16:30	08:27 16:17	15:00 (HSK HR12) 15:26 (HSK HR12)	
21	05:32 21:30	06:18 20:37	07:08 19:28	18:37 (HSK HR03)	07:58 18:21	17:40 (HSK HR05)	07:52 16:29	2 15:01 (HSK HR12)	08:27 16:17	15:00 (HSK HR12) 15:26 (HSK HR12)
22	05:33 21:29	06:20 20:35	07:10 19:26	18:28 (HSK HR03)	07:59 18:19	17:16 (HSK HR05)	07:53 16:28	14:58 (HSK HR12)	08:28 16:18	15:01 (HSK HR12) 15:27 (HSK HR12)
23	05:34 21:28	06:22 20:33	07:11 19:23	18:41 (HSK HR03)	08:01 18:17	17:40 (HSK HR05)	07:55 16:27	10 15:08 (HSK HR12)	08:28 16:19	15:01 (HSK HR12) 15:28 (HSK HR12)
24	05:36 21:26	06:23 20:31	07:13 19:21	18:25 (HSK HR03)	08:03 18:15	17:16 (HSK HR05)	07:57 16:26	14:56 (HSK HR12)	08:29 16:19	15:02 (HSK HR12) 15:28 (HSK HR12)
25	05:37 21:25	06:25 20:29	07:14 19:19	18:42 (HSK HR03)	08:05 17:13	17:39 (HSK HR05)	07:58 16:25	14 15:12 (HSK HR12)	08:30 16:20	15:03 (HSK HR12) 15:30 (HSK HR12)
26	05:39 21:24	06:26 20:27	07:16 19:16	18:22 (HSK HR03)	08:06 17:11	16:39 (HSK HR05)	08:00 16:24	14:54 (HSK HR12)	08:30 16:20	15:04 (HSK HR12) 15:30 (HSK HR12)
27	05:40 21:22	06:28 20:24	07:18 19:14	18:44 (HSK HR03)	08:08 17:09	16:38 (HSK HR05)	08:01 16:23	22 15:15 (HSK HR12)	08:30 16:21	15:04 (HSK HR12) 15:30 (HSK HR12)
28	05:41 21:21	06:30 20:22	07:19 19:12	18:20 (HSK HR03)	08:09 17:07	16:17 (HSK HR05)	08:03 16:22	22 15:16 (HSK HR12)	08:31 16:22	15:04 (HSK HR12) 15:31 (HSK HR12)
29	05:43 21:19	06:31 20:20	07:21 19:09	18:21 (HSK HR03)	08:12 17:05	16:36 (HSK HR05)	08:04 16:22	23 14:53 (HSK HR12)	08:31 16:23	15:05 (HSK HR12) 15:31 (HSK HR12)
30	05:44 21:18	06:33 20:18	07:23 19:07	19:32 (HSK 8694 TLF)	08:13 17:03	16:20 (HSK HR05)	08:06 16:21	23 14:53 (HSK HR12)	08:31 16:24	15:05 (HSK HR12) 15:32 (HSK HR12)
31	05:46 21:16	06:34 20:16	07:25 19:05	18:40 (HSK HR03)	07:15 17:01	16:22 (HSK HR05)	08:08 16:20	24 15:17 (HSK HR12)	08:31 16:25	15:06 (HSK HR12) 15:32 (HSK HR12)
Sonnenscheinstunden	500	453	381	294	332	268	196	246	818	
astr. max. mögl. Beschattung		0,40	0,32	0,29	0,29	0,23	0,23		0,17	
Red. Sonnenscheinwahrsch.		0,96	0,96	0,96	0,96	0,96	0,96		0,96	
Reduktion Betriebsdauer		0,69	0,70	0,70	0,70	0,66	0,66		0,66	
Reduktion Windrichtung		0,27	0,21	0,21	0,19	0,14	0,14		0,11	
Gesamte Reduktion		11	63	70	70	28	28		87	
Met. wahrsch. Beschattung										

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulnér / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN38 - Meerhof, Dalheimer Straße 20

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar	Februar	März	April	Mai	Jun
1	08:31 16:26 19	15:29 (HSK HR05) 15:48 (HSK HR05) 17:13	08:05 17:13 18:04	07:12 18:04 19:57	19:16 (HSK ME08b) 19:31 (HSK ME08b) 20:47	05:59 20:47 21:32
2	08:31 16:27 19	15:30 (HSK HR05) 15:49 (HSK HR05) 17:15	08:03 17:15 18:06	07:10 18:06 19:59	19:16 (HSK ME08b) 19:33 (HSK ME08b) 20:49	05:57 20:49 21:33
3	08:31 16:28 20	15:29 (HSK HR05) 15:49 (HSK HR05) 17:17	08:02 17:17 18:07	07:08 18:07 19:58	19:15 (HSK ME08b) 19:34 (HSK ME08b) 20:50	05:55 20:50 21:34
4	08:31 16:29 20	15:30 (HSK HR05) 15:50 (HSK HR05) 17:19	08:00 17:19 18:09	07:06 18:09 19:59	19:15 (HSK ME08b) 19:35 (HSK ME08b) 20:52	05:53 20:52 21:35
5	08:30 16:30 21	15:30 (HSK HR05) 15:51 (HSK HR05) 17:20	07:59 17:20 18:11	07:04 18:11 19:59	19:15 (HSK ME08b) 19:35 (HSK ME08b) 20:53	05:51 20:53 21:36
6	08:30 16:32 21	15:30 (HSK HR05) 15:51 (HSK HR05) 17:22	07:57 17:22 18:13	07:01 18:13 19:59	19:16 (HSK ME08b) 19:34 (HSK ME08b) 20:55	05:49 20:55 21:37
7	08:30 16:33 23	15:30 (HSK HR05) 15:53 (HSK HR05) 17:24	07:55 17:24 18:14	06:59 18:14 19:59	19:16 (HSK ME08b) 19:33 (HSK ME08b) 20:57	05:48 20:57 21:38
8	08:29 16:34 23	15:30 (HSK HR05) 15:53 (HSK HR05) 17:26	07:53 17:26 18:16	06:57 18:16 19:59	19:17 (HSK ME08b) 19:31 (HSK ME08b) 20:58	05:46 20:58 21:39
9	08:29 16:35 23	15:30 (HSK HR05) 15:53 (HSK HR05) 17:28	07:52 17:28 18:18	06:55 18:18 19:59	19:19 (HSK ME08b) 19:29 (HSK ME08b) 21:00	05:44 21:00 21:40
10	08:28 16:37 24	15:31 (HSK HR05) 15:55 (HSK HR05) 17:29	07:50 17:29 18:20	06:53 18:20 19:59	17:43 (HSK ME08b TLF) 17:54 (HSK ME08b TLF) 20:12	06:42 20:12 21:01
11	08:28 16:38 24	15:31 (HSK HR05) 15:55 (HSK HR05) 17:31	07:48 17:31 18:21	06:50 18:21 19:59	17:41 (HSK ME08b TLF) 17:56 (HSK ME08b TLF) 20:14	06:40 20:14 21:03
12	08:27 16:40 24	15:31 (HSK HR05) 15:55 (HSK HR05) 17:33	07:46 17:33 18:23	06:48 18:23 19:59	17:41 (HSK ME08b TLF) 17:58 (HSK ME08b TLF) 20:15	06:38 20:15 21:05
13	08:26 16:41 25	15:31 (HSK HR05) 15:56 (HSK HR05) 17:35	07:45 17:35 18:25	06:46 18:25 19:59	17:39 (HSK ME08b TLF) 17:59 (HSK ME08b TLF) 20:17	06:36 20:17 21:06
14	08:26 16:43 25	15:31 (HSK HR05) 15:56 (HSK HR05) 17:37	07:43 17:37 18:27	06:44 18:27 19:59	17:39 (HSK ME08b TLF) 18:00 (HSK ME08b TLF) 20:19	06:34 20:19 21:09
15	08:25 16:44 24	15:32 (HSK HR05) 15:56 (HSK HR05) 17:39	07:41 17:39 18:28	06:41 18:28 19:59	17:39 (HSK ME08b TLF) 18:00 (HSK ME08b TLF) 20:20	06:31 20:20 21:09
16	08:24 16:46 25	15:32 (HSK HR05) 15:57 (HSK HR05) 17:40	07:39 17:40 18:30	06:39 18:30 19:59	17:39 (HSK ME08b TLF) 18:00 (HSK ME08b TLF) 20:22	06:29 20:22 21:11
17	08:23 16:47 25	15:32 (HSK HR05) 15:57 (HSK HR05) 17:42	07:37 17:42 18:32	06:37 18:32 19:59	17:39 (HSK ME08b TLF) 17:58 (HSK ME08b TLF) 20:24	06:27 20:24 21:12
18	08:22 16:49 24	15:33 (HSK HR05) 15:57 (HSK HR05) 17:44	07:35 17:44 18:33	06:35 18:33 19:59	17:40 (HSK ME08b TLF) 17:58 (HSK ME08b TLF) 20:25	06:25 20:25 21:14
19	08:21 16:50 23	15:33 (HSK HR05) 15:57 (HSK HR05) 17:46	07:33 17:46 18:35	06:32 18:35 19:59	17:41 (HSK ME08b TLF) 17:56 (HSK ME08b TLF) 20:27	06:23 20:27 21:15
20	08:20 16:52 24	15:34 (HSK HR05) 15:58 (HSK HR05) 17:48	07:31 17:48 18:37	06:30 18:37 19:59	17:42 (HSK ME08b TLF) 17:54 (HSK ME08b TLF) 20:29	06:21 20:29 21:17
21	08:19 16:54 23	15:35 (HSK HR05) 15:58 (HSK HR05) 17:50	07:29 17:50 18:38	06:28 18:38 19:59	17:45 (HSK ME08b TLF) 17:50 (HSK ME08b TLF) 20:30	06:19 20:30 21:18
22	08:18 16:55 22	15:35 (HSK HR05) 15:57 (HSK HR05) 17:51	07:27 17:51 18:40	06:25 18:40 19:59	17:48 (HSK ME08b TLF) 20:05 (HSK ME08b TLF) 20:32	06:17 20:32 21:19
23	08:17 16:57 20	15:37 (HSK HR05) 15:57 (HSK HR05) 17:53	07:25 17:53 18:42	06:23 18:42 19:59	19:48 (HSK ME08b) 20:07 (HSK ME08b) 20:34	06:15 20:34 21:21
24	08:16 16:59 19	15:38 (HSK HR05) 15:57 (HSK HR05) 17:55	07:23 17:55 18:43	06:21 18:43 19:59	19:48 (HSK ME08b) 20:07 (HSK ME08b) 20:35	06:12 20:35 21:22
25	08:15 17:01 16	15:39 (HSK HR05) 15:55 (HSK HR05) 17:57	07:21 17:57 18:45	06:19 18:45 19:59	19:48 (HSK ME08b) 20:06 (HSK ME08b) 20:37	06:10 20:37 21:23
26	08:13 17:02 13	15:41 (HSK HR05) 15:54 (HSK HR05) 17:59	07:19 17:59 18:47	06:16 18:47 19:59	19:49 (HSK ME08b) 20:05 (HSK ME08b) 20:39	06:08 20:39 21:25
27	08:12 17:04 9	15:44 (HSK HR05) 15:53 (HSK HR05) 18:00	07:17 18:00 18:49	06:14 18:49 19:59	19:50 (HSK ME08b) 20:04 (HSK ME08b) 20:40	06:06 20:40 21:26
28	08:11 17:06 08	15:44 (HSK HR05) 15:53 (HSK HR05) 18:02	07:14 18:02 18:50	06:12 18:50 19:59	19:51 (HSK ME08b) 20:05 (HSK ME08b) 20:42	06:04 20:42 21:27
29	08:09 17:08 08	15:44 (HSK HR05) 15:53 (HSK HR05) 18:04	07:12 18:04 18:52	06:10 18:52 19:59	19:51 (HSK ME08b) 20:05 (HSK ME08b) 20:44	06:02 20:44 21:28
30	08:08 17:09 08	15:44 (HSK HR05) 15:53 (HSK HR05) 18:06	07:10 18:06 18:54	06:08 18:54 19:59	19:51 (HSK ME08b) 20:05 (HSK ME08b) 20:46	06:00 20:46 21:30
31	08:06 17:11 08	15:44 (HSK HR05) 15:53 (HSK HR05) 18:08	07:08 18:08 18:56	06:06 18:56 19:59	19:51 (HSK ME08b) 20:05 (HSK ME08b) 20:48	06:00 20:48 21:32
Sonnenscheinstunden	261	278	367	415	483	497
astr.max.mögl.Beschattung	578	337	236	326		43
Red.Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36		0,34
Reduktion Betriebsdauer	0,96	0,96	0,96	0,96		0,96
Reduktion Windrichtung	0,66	0,70	0,70	0,68		0,63
Gesamte Reduktion	0,12	0,22	0,19	0,24		0,20
Met.wahrsch.Beschattung	69	74	45	78		9

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN38 - Meerhof, Dalheimer Straße 20
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor												
N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Jul	August	September	Oktober	November	Dezember			
1	05:11 21:46	05:47 21:15	06:36 20:13	07:24 19:05	18:19 (HSK 8694 TLF) 18:38 (HSK 8694 TLF)	07:17 17:00	16:15 (HSK HR03) 16:31 (HSK HR03)	08:07 16:20	15:13 (HSK HR05) 15:37 (HSK HR05)
2	05:12 21:45	05:49 21:13	06:38 20:11	07:26 19:03	18:20 (HSK 8694 TLF) 18:36 (HSK 8694 TLF)	07:19 16:58	16:16 (HSK HR03) 16:28 (HSK HR03)	08:09 16:19	15:13 (HSK HR05) 15:37 (HSK HR05)
3	05:13 21:45	05:50 21:11	06:39 20:09	07:27 19:00	18:20 (HSK 8694 TLF) 18:33 (HSK 8694 TLF)	07:21 16:56	16:19 (HSK HR03) 16:26 (HSK HR03)	08:10 16:19	15:14 (HSK HR05) 15:37 (HSK HR05)
4	05:14 21:45	05:52 21:10	06:41 20:07	07:29 18:58	18:21 (HSK 8694 TLF) 18:31 (HSK 8694 TLF)	07:22 16:54	16:19 (HSK HR03) 16:18	08:11 16:18	15:14 (HSK HR05) 15:37 (HSK HR05)
5	05:14 21:44	05:53 21:08	06:42 20:05	07:31 18:56	18:24 (HSK 8694 TLF) 18:29 (HSK 8694 TLF)	07:24 16:53	16:18 16:18	08:13 16:18	15:16 (HSK HR05) 15:38 (HSK HR05)
6	05:15 21:44	05:55 21:06	06:44 20:02	07:32 18:54	19:12 (HSK ME08b) 19:30 (HSK ME08b)	07:26 16:51	16:18 16:17	08:14 16:17	15:16 (HSK HR05) 15:38 (HSK HR05)
7	05:16 21:43	05:56 21:04	06:46 20:00	07:34 18:51	19:10 (HSK ME08b) 19:30 (HSK ME08b)	07:28 16:49	16:18 16:17	08:15 16:17	15:16 (HSK HR05) 15:37 (HSK HR05)
8	05:17 21:43	05:58 21:03	06:47 19:58	07:36 18:49	19:10 (HSK ME08b) 19:30 (HSK ME08b)	07:29 16:48	16:18 16:17	08:16 16:17	15:18 (HSK HR05) 15:38 (HSK HR05)
9	05:18 21:42	06:00 21:01	06:49 19:55	07:37 18:47	19:09 (HSK ME08b) 19:29 (HSK ME08b)	07:31 16:46	16:18 16:16	08:18 16:16	15:18 (HSK HR05) 15:38 (HSK HR05)
10	05:19 21:41	06:01 20:59	06:50 19:53	07:39 18:45	19:09 (HSK ME08b) 19:27 (HSK ME08b)	07:33 16:44	16:19 16:16	08:19 16:16	15:19 (HSK HR05) 15:38 (HSK HR05)
11	05:20 21:40	06:03 20:57	06:52 19:51	07:41 18:42	19:09 (HSK ME08b) 19:24 (HSK ME08b)	07:35 16:43	16:20 16:16	08:20 16:16	15:19 (HSK HR05) 15:38 (HSK HR05)
12	05:21 21:40	06:04 20:55	06:54 19:49	07:42 18:40	19:09 (HSK ME08b) 19:22 (HSK ME08b)	07:36 16:41	16:21 16:16	08:21 16:16	15:20 (HSK HR05) 15:38 (HSK HR05)
13	05:22 21:39	06:06 20:53	06:55 19:46	07:44 18:38	19:09 (HSK ME08b) 19:19 (HSK ME08b)	07:38 16:40	16:22 16:16	08:22 16:16	15:21 (HSK HR05) 15:38 (HSK HR05)
14	05:23 21:38	06:07 20:51	06:57 19:44	07:46 18:36	19:11 (HSK ME08b) 19:17 (HSK ME08b)	07:40 16:38	16:23 16:16	08:23 16:16	15:22 (HSK HR05) 15:39 (HSK HR05)
15	05:24 21:37	06:09 20:49	06:58 19:42	07:47 18:34	19:12 (HSK ME08b) 19:15 (HSK ME08b)	07:42 16:37	15:16 (HSK HR05) 15:25 (HSK HR05)	08:24 16:16	15:23 (HSK HR05) 15:39 (HSK HR05)
16	05:25 21:36	06:11 20:47	07:00 19:39	07:49 18:32	19:15 (HSK ME08b) 19:19 (HSK ME08b)	07:43 16:36	15:14 (HSK HR05) 15:27 (HSK HR05)	08:24 16:16	15:23 (HSK HR05) 15:39 (HSK HR05)
17	05:27 21:35	06:12 20:45	07:02 19:37	07:51 18:29	17:22 (HSK HR03) 17:28 (HSK HR03)	07:45 16:34	15:13 (HSK HR05) 15:29 (HSK HR05)	08:25 16:16	15:24 (HSK HR05) 15:40 (HSK HR05)
18	05:28 21:34	06:14 20:43	07:03 19:35	07:53 18:27	17:17 (HSK HR03) 17:30 (HSK HR03)	07:47 16:33	15:12 (HSK HR05) 15:31 (HSK HR05)	08:26 16:17	15:24 (HSK HR05) 15:39 (HSK HR05)
19	05:29 21:33	06:15 20:41	07:05 19:32	07:54 18:25	17:15 (HSK HR03) 17:32 (HSK HR03)	07:48 16:32	15:12 (HSK HR05) 15:32 (HSK HR05)	08:27 16:17	15:25 (HSK HR05) 15:40 (HSK HR05)
20	05:30 21:31	06:17 20:39	07:06 19:30	07:56 18:23	17:14 (HSK HR03) 17:33 (HSK HR03)	07:50 16:30	15:10 (HSK HR05) 15:32 (HSK HR05)	08:27 16:17	15:26 (HSK HR05) 15:41 (HSK HR05)
21	05:32 21:30	06:18 20:37	07:08 19:28	07:58 18:21	17:13 (HSK HR03) 17:34 (HSK HR03)	07:52 16:29	15:10 (HSK HR05) 15:33 (HSK HR05)	08:28 16:18	15:26 (HSK HR05) 15:41 (HSK HR05)
22	05:33 21:29	06:20 20:35	07:10 19:26	07:59 18:19	17:12 (HSK HR03) 17:35 (HSK HR03)	07:53 16:28	15:11 (HSK HR05) 15:34 (HSK HR05)	08:29 16:18	15:27 (HSK HR05) 15:42 (HSK HR05)
23	05:34 21:28	06:22 20:33	07:11 19:23	08:01 18:17	17:12 (HSK HR03) 17:36 (HSK HR03)	07:55 16:27	15:11 (HSK HR05) 15:34 (HSK HR05)	08:29 16:19	15:27 (HSK HR05) 15:42 (HSK HR05)
24	05:36 21:26	06:23 20:31	07:13 19:21	08:03 18:15	17:10 (HSK HR03) 17:35 (HSK HR03)	07:57 16:26	15:11 (HSK HR05) 15:35 (HSK HR05)	08:29 16:19	15:27 (HSK HR05) 15:42 (HSK HR05)
25	05:37 21:25	06:25 20:29	07:14 19:19	08:05 18:13	17:10 (HSK HR03) 17:35 (HSK HR03)	07:58 16:25	15:10 (HSK HR05) 15:35 (HSK HR05)	08:30 16:20	15:28 (HSK HR05) 15:43 (HSK HR05)
26	05:39 21:24	06:26 20:27	07:16 19:16	08:06 18:11	17:10 (HSK HR03) 17:35 (HSK HR03)	08:00 16:24	15:11 (HSK HR05) 15:36 (HSK HR05)	08:30 16:20	15:28 (HSK HR05) 15:44 (HSK HR05)
27	05:40 21:22	06:28 20:24	07:18 19:14	08:08 18:09	17:11 (HSK HR03) 17:36 (HSK HR03)	08:01 16:23	15:12 (HSK HR05) 15:36 (HSK HR05)	08:30 16:21	15:28 (HSK HR05) 15:44 (HSK HR05)
28	05:41 21:21	06:30 20:22	07:19 19:12	08:10 18:07	17:11 (HSK HR03) 17:36 (HSK HR03)	08:02 16:22	15:11 (HSK HR05) 15:36 (HSK HR05)	08:31 16:22	15:28 (HSK HR05) 15:45 (HSK HR05)
29	05:43 21:19	06:31 20:20	07:21 19:09	08:12 18:05	17:12 (HSK HR03) 17:37 (HSK HR03)	08:04 16:22	15:12 (HSK HR05) 15:37 (HSK HR05)	08:31 16:23	15:29 (HSK HR05) 15:45 (HSK HR05)
30	05:44 21:18	06:33 20:18	07:23 19:07	08:13 18:03	17:13 (HSK HR03) 17:38 (HSK HR03)	08:06 16:21	15:12 (HSK HR05) 15:38 (HSK HR05)	08:31 16:24	15:29 (HSK HR05) 15:46 (HSK HR05)
31	05:46 21:16	06:34 20:16	07:25 19:05	08:15 18:01	17:14 (HSK HR03) 17:39 (HSK HR03)	08:08 16:20	15:13 (HSK HR05) 15:39 (HSK HR05)	08:31 16:25	15:29 (HSK HR05) 15:47 (HSK HR05)
Sonnenscheinstunden	500	453	381	332	268	246			
astr.max.mögl.Beschattung			328	372	375	557			
Red.Sonnenscheinwahrsch.		176	0,40	0,29	0,23	0,17			
Reduktion Betriebsdauer		0,96	0,96	0,96	0,96	0,96			
Reduktion Windrichtung		0,67	0,70	0,70	0,66	0,66			
Gesamte Reduktion		0,26	0,22	0,19	0,14	0,11			
Met.wahrsch.Beschattung		45	71	72	54	60			

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung Schattenrezeptor: IPN42 - Meerhof, Drosselgasse 24
Annahmen für SchattenwurfberechnungSonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar			Februar			März			April			Mai			Juni		
1	08:31		14:41 (HSK HR05)	08:05		15:55 (HSK HR03)	07:12		17:07 (HSK 8694 TLF)	07:03		18:52 (HSK ME08b)	05:59		19:40 (HSK ME08a)	05:14		
	16:26	17	14:58 (HSK HR05)	17:13	29	16:24 (HSK HR03)	18:04	31	17:38 (HSK ME01)	19:57	39	19:31 (HSK ME07)	20:47	17	20:19 (HSK ME09)	21:32		
2	08:31		14:42 (HSK HR05)	08:03		15:55 (HSK HR03)	07:10		17:05 (HSK 8694 TLF)	07:00		18:53 (HSK ME08b)	05:57		20:11 (HSK ME09)	05:13		
	16:27	16	14:58 (HSK HR05)	17:15	29	16:24 (HSK HR03)	18:06	34	17:39 (HSK ME01)	19:59	40	19:33 (HSK ME07)	20:49	9	20:20 (HSK ME09)	21:33		
3	08:31		14:43 (HSK HR05)	08:02		15:55 (HSK HR03)	07:08		17:05 (HSK 8694 TLF)	06:58		18:53 (HSK ME08b)	05:55		20:09 (HSK ME09)	05:13		
	16:28	14	14:57 (HSK HR05)	17:17	29	16:24 (HSK HR03)	18:07	37	17:42 (HSK ME01)	20:00	40	19:33 (HSK ME07)	20:50	13	20:22 (HSK ME09)	21:34		
4	08:31		14:44 (HSK HR05)	08:00		15:56 (HSK HR03)	07:06		17:05 (HSK 8694 TLF)	06:56		18:54 (HSK ME08b)	05:53		20:09 (HSK ME09)	05:12		
	16:29	13	14:57 (HSK HR05)	17:19	28	16:24 (HSK HR03)	18:09	39	17:44 (HSK ME01)	20:02	38	19:33 (HSK ME07)	20:52	15	20:24 (HSK ME09)	21:35		
5	08:30		14:46 (HSK HR05)	07:59		15:57 (HSK HR03)	07:04		17:05 (HSK 8694 TLF)	06:54		18:56 (HSK ME08b)	05:51		20:08 (HSK ME09)	05:11		
	16:30	11	14:57 (HSK HR05)	17:20	27	16:24 (HSK HR03)	18:11	40	17:45 (HSK ME01)	20:04	34	19:33 (HSK ME07)	20:53	17	20:25 (HSK ME09)	21:36		
6	08:30		14:47 (HSK HR05)	07:57		15:57 (HSK HR03)	07:01		17:04 (HSK 8694 TLF)	06:51		18:59 (HSK ME08b)	05:49		20:07 (HSK ME09)	05:11		
	16:32	8	14:55 (HSK HR05)	17:22	26	16:23 (HSK HR03)	18:13	40	17:44 (HSK ME01)	20:05	28	19:33 (HSK ME07)	20:55	19	20:28 (HSK ME09)	21:37		
7	08:30		14:51 (HSK HR05)	07:55		15:58 (HSK HR03)	06:59		17:05 (HSK 8694 TLF)	06:49		19:13 (HSK ME07)	20:58		20:06 (HSK ME09)	05:10		
	16:33	2	14:53 (HSK HR05)	17:24	25	16:23 (HSK HR03)	18:14	39	17:44 (HSK ME01)	20:07	19	19:32 (HSK ME07)	20:57	21	20:27 (HSK ME09)	21:38		
8	08:29			07:54		15:58 (HSK HR03)	06:57		17:06 (HSK 8694 TLF)	06:47		19:13 (HSK ME07)	20:56		20:06 (HSK ME09)	05:10		
	16:34			17:26	24	16:22 (HSK HR03)	18:16	38	17:44 (HSK ME01)	20:09	18	19:31 (HSK ME07)	20:58	22	20:28 (HSK ME09)	21:39		
9	08:29			07:52		16:00 (HSK HR03)	06:55		17:07 (HSK 8694 TLF)	06:45		19:14 (HSK ME07)	20:54		20:05 (HSK ME09)	05:09		
	16:35			17:28	21	16:21 (HSK HR03)	18:18	36	17:43 (HSK ME01)	20:10	15	19:29 (HSK ME07)	21:00	23	20:28 (HSK ME09)	21:40		
10	08:28			07:50		16:02 (HSK HR03)	06:53		17:07 (HSK 8694 TLF)	06:42		19:15 (HSK ME07)	20:53		20:06 (HSK ME09)	05:09		
	16:37			17:30	18	16:20 (HSK HR03)	18:20	34	17:41 (HSK ME01)	20:12	13	19:28 (HSK ME07)	21:01	22	20:28 (HSK ME09)	21:40		
11	08:28			07:48		16:04 (HSK HR03)	06:50		17:09 (HSK 8694 TLF)	06:40		19:18 (HSK ME07)	20:51		20:06 (HSK ME09)	05:08		
	16:38			17:31	14	16:18 (HSK HR03)	18:21	28	17:40 (HSK ME01)	20:14	7	19:25 (HSK ME07)	21:03	22	20:28 (HSK ME09)	21:41		
12	08:27			07:46		16:07 (HSK HR03)	06:48		17:13 (HSK 8694 TLF)	06:38			20:59		20:06 (HSK ME09)	05:08		
	16:40			17:33	7	16:14 (HSK HR03)	18:23	14	17:37 (HSK ME01)	20:15			21:05	22	20:28 (HSK ME09)	21:42		
13	08:26			07:45			06:46			06:36			20:58		20:06 (HSK ME09)	05:08		
	16:41			17:35			18:25			20:17			21:06	21	20:27 (HSK ME09)	21:43		
14	08:26			07:43			06:44			06:34		19:43 (HSK ME08a)	20:56		20:07 (HSK ME09)	05:07		
	16:43			17:37			18:27			20:19	9	19:52 (HSK ME08a)	21:08	20	20:27 (HSK ME09)	21:43		
15	08:25			07:41			06:41			06:31		19:40 (HSK ME08a)	20:53		20:07 (HSK ME09)	05:07		
	16:44			17:39			18:28			20:20	14	19:54 (HSK ME08a)	21:09	19	20:26 (HSK ME09)	21:44		
16	08:24			07:39			06:39			06:29		19:39 (HSK ME08a)	20:53		20:08 (HSK ME09)	05:07		
	16:46			17:40			18:30			20:22	16	19:55 (HSK ME08a)	21:11	18	20:26 (HSK ME09)	21:44		
17	08:23			07:37			06:37			06:27		19:37 (HSK ME08a)	20:52		20:09 (HSK ME09)	05:07		
	16:47			17:42			18:32			20:24	20	19:57 (HSK ME08a)	21:12	16	20:25 (HSK ME09)	21:45		
18	08:22			07:35			06:35			06:25		19:36 (HSK ME08a)	20:50		20:09 (HSK ME09)	05:07		
	16:49			17:44			18:33			20:25	23	19:59 (HSK ME08a)	21:14	15	20:24 (HSK ME09)	21:45		
19	08:21		16:01 (HSK HR03)	07:33			06:32			06:23		19:36 (HSK ME08a)	20:59		20:11 (HSK ME09)	05:07		
	16:51	10	16:11 (HSK HR03)	17:46			18:35			20:27	24	20:00 (HSK ME08a)	21:15	12	20:23 (HSK ME09)	21:45		
20	08:20		16:00 (HSK HR03)	07:31			06:30			06:21		19:35 (HSK ME08a)	20:57		20:13 (HSK ME09)	05:07		
	16:52	13	16:13 (HSK HR03)	17:48			18:37			20:29	25	20:00 (HSK ME08a)	21:17	8	20:21 (HSK ME09)	21:46		
21	08:19		15:59 (HSK HR03)	07:29			06:28		18:03 (HSK ME08b)	06:19		19:35 (HSK ME08a)	20:56			05:07		
	16:54	16	16:15 (HSK HR03)	17:50			18:38	9	18:12 (HSK ME08b)	20:30	25	20:00 (HSK ME08a)	21:18			21:46		
22	08:18		15:57 (HSK HR03)	07:27			06:25		18:00 (HSK ME08b)	06:17		19:34 (HSK ME08a)	20:55			05:08		
	16:55	19	16:16 (HSK HR03)	17:51			18:40	15	18:15 (HSK ME08b)	20:32	26	20:00 (HSK ME08a)	21:19			21:46		
23	08:17		15:57 (HSK HR03)	07:25			06:23		17:58 (HSK ME08b)	06:15		19:34 (HSK ME08a)	20:54			05:08		
	16:57	21	16:18 (HSK HR03)	17:53			18:42	19	18:17 (HSK ME08b)	20:34	26	20:00 (HSK ME08a)	21:21			21:46		
24	08:16		15:56 (HSK HR03)	07:23		17:13 (HSK 8694 TLF)	06:21		17:55 (HSK ME08b)	06:12		19:34 (HSK ME08a)	20:52			05:08		
	16:59	23	16:19 (HSK HR03)	17:55	12	17:25 (HSK 8694 TLF)	18:43	22	18:17 (HSK ME08b)	20:35	25	19:59 (HSK ME08a)	21:22			21:46		
25	08:15		15:55 (HSK HR03)	07:21		17:11 (HSK 8694 TLF)	06:19		17:55 (HSK ME08b)	06:10		19:34 (HSK ME08a)	20:51			05:08		
	17:01	25	16:20 (HSK HR03)	17:57	16	17:27 (HSK 8694 TLF)	18:45	23	18:18 (HSK ME08b)	20:37	25	19:59 (HSK ME08a)	21:23			21:47		
26	08:13		15:55 (HSK HR03)	07:19		17:09 (HSK 8694 TLF)	06:16		17:54 (HSK ME08b)	06:08		19:34 (HSK ME08a)	20:50			05:09		
	17:02	26	16:21 (HSK HR03)	17:59	20	17:29 (HSK 8694 TLF)	18:47	25	18:19 (HSK ME08b)	20:39	24	19:58 (HSK ME08a)	21:25			21:47		
27	08:12		15:56 (HSK HR03)	07:17		17:08 (HSK 8694 TLF)	06:14		17:52 (HSK ME08b)	06:06		19:35 (HSK ME08a)	20:59			05:09		
	17:04	26	16:22 (HSK HR03)	18:00	22	17:30 (HSK 8694 TLF)	18:49	26	18:18 (HSK ME08b)	20:40	22	19:57 (HSK ME08a)	21:26			21:46		
28	08:11		15:55 (HSK HR03)	07:14		17:07 (HSK 8694 TLF)	06:12		17:52 (HSK ME08b)	06:04		19:35 (HSK ME08a)	20:58			05:10		
	17:06	27	16:22 (HSK HR03)	18:02	26	17:36 (HSK ME01)	18:50	26	18:18 (HSK ME08b)	20:42	21	19:56 (HSK ME08a)	21:27			21:46		
29	08:09		15:55 (HSK HR03)				07:09		18:52 (HSK ME08b)	06:03		19:36 (HSK ME08a)	20:57			05:10		
	17:08	29	16:24 (HSK HR03)				19:52	29	19:27 (HSK ME07)	20:44	18	19:54 (HSK ME08a)	21:28			21:46		
30	08:08		15:55 (HSK HR03)				07:07		18:51 (HSK ME08b)	06:01		19:39 (HSK ME08a)	20:56			05:11		
	17:09	29	16:24 (HSK HR03)				19:54	35	19:28 (HSK ME07)	20:45	15	19:54 (HSK ME08a)	21:30			21:46		
31	08:06		15:54 (HSK HR03)				07:05		18:51 (HSK ME08b)				20:55					
	17:11	29	16:23 (HSK HR03)				19:55	39	19:30 (HSK ME07)				21:31					
Sonnenscheinstunden		261		278			367			415		483		351		497		
astr.max.mögl.Beschattung		374		373			678			649				0,43				
Red.Sonnenscheinwahrsch.		0,19		0,32			0,28			0,36				0,96				
Reduktion Betriebsdauer		0,96		0,96			0,96			0,96				0,66				
Reduktion Windrichtung		0,67		0,69			0,70			0,69				0,27				
Gesamte Reduktion		0,12		0,21			0,19			0,24								
Met.wahrsch.Beschattung		45		79			129			156				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) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	--------------------------------	---------------------------	----------------------------

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung Schattenrezeptor: IPN42 - Meerhof, Drosselgasse 24
Annahmen für Schattenwurfberechnung Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11 21:46	05:47 21:15	20:17 (HSK ME09) 20:38 (HSK ME09)	06:36 20:13	7	19:17 (HSK ME07) 19:24 (HSK ME07)	07:24 19:05	07:17 17:00	15:31 (HSK HR03) 15:50 (HSK HR03)	08:07 16:20	
2	05:12 21:45	05:49 21:13	20:16 (HSK ME09) 20:38 (HSK ME09)	06:38 20:11	13	19:13 (HSK ME07) 19:26 (HSK ME07)	07:26 19:03	07:19 16:58	15:29 (HSK HR03) 15:50 (HSK HR03)	08:09 16:19	
3	05:13 21:45	05:50 21:11	20:16 (HSK ME09) 20:39 (HSK ME09)	06:39 20:09	15	19:12 (HSK ME07) 19:27 (HSK ME07)	07:27 19:00	07:21 16:56	15:28 (HSK HR03) 15:51 (HSK HR03)	08:10 16:19	
4	05:14 21:45	05:52 21:10	20:16 (HSK ME09) 20:38 (HSK ME09)	06:41 20:07	18	19:10 (HSK ME07) 19:28 (HSK ME07)	07:29 18:58	07:22 16:54	15:27 (HSK HR03) 15:52 (HSK HR03)	08:11 16:18	
5	05:14 21:44	05:53 21:08	20:16 (HSK ME09) 20:37 (HSK ME09)	06:42 20:05	19	19:09 (HSK ME07) 19:28 (HSK ME07)	07:31 18:56	07:24 16:53	15:27 (HSK HR03) 15:53 (HSK HR03)	08:13 16:18	
6	05:15 21:44	05:55 21:06	20:16 (HSK ME09) 20:37 (HSK ME09)	06:44 20:02	28	18:55 (HSK ME08b) 19:29 (HSK ME07)	07:32 18:54	07:26 16:51	15:26 (HSK HR03) 15:54 (HSK HR03)	08:14 16:17	14:34 (HSK HR05)
7	05:16 21:43	05:56 21:04	20:16 (HSK ME09) 20:35 (HSK ME09)	06:46 20:00	34	18:51 (HSK ME08b) 19:28 (HSK ME07)	07:34 18:51	07:28 16:49	15:26 (HSK HR03) 15:54 (HSK HR03)	08:15 16:17	14:41 (HSK HR05)
8	05:17 21:43	05:58 21:03	20:17 (HSK ME09) 20:34 (HSK ME09)	06:47 19:58	38	18:49 (HSK ME08b) 19:28 (HSK ME07)	07:36 18:49	07:29 16:48	15:26 (HSK HR03) 15:55 (HSK HR03)	08:16 16:17	14:43 (HSK HR05)
9	05:18 21:42	06:00 21:01	20:17 (HSK ME09) 20:32 (HSK ME09)	06:49 19:55	40	18:47 (HSK ME08b) 19:27 (HSK ME07)	07:37 18:47	07:31 16:46	15:26 (HSK HR03) 15:55 (HSK HR03)	08:18 16:16	14:42 (HSK HR05)
10	05:19 21:41	06:01 20:59	20:19 (HSK ME09) 20:31 (HSK ME09)	06:50 19:53	41	18:46 (HSK ME08b) 19:27 (HSK ME07)	07:39 18:45	07:33 16:44	15:26 (HSK HR03) 15:55 (HSK HR03)	08:19 16:16	14:42 (HSK HR05)
11	05:20 21:40	06:03 20:57	19:51 (HSK ME08a) 20:28 (HSK ME09)	06:52 19:51	40	18:44 (HSK ME08b) 19:24 (HSK ME07)	07:41 18:42	07:35 16:43	15:26 (HSK HR03) 15:55 (HSK HR03)	08:20 16:16	14:41 (HSK HR05)
12	05:21 21:40	06:04 20:55	19:48 (HSK ME08a) 20:27 (HSK ME09)	06:54 19:49	38	18:44 (HSK ME08b) 19:22 (HSK ME07)	07:42 18:40	07:36 16:41	15:27 (HSK HR03) 15:55 (HSK HR03)	08:21 16:16	14:41 (HSK HR05)
13	05:22 21:39	06:06 20:53	19:46 (HSK ME08a) 20:02 (HSK ME08a)	06:55 19:46	36	18:42 (HSK ME08b) 19:19 (HSK ME07)	07:44 18:38	07:38 16:40	15:26 (HSK HR03) 15:54 (HSK HR03)	08:22 16:16	14:41 (HSK HR05)
14	05:23 21:38	06:07 20:51	19:45 (HSK ME08a) 20:03 (HSK ME08a)	06:57 19:44	31	18:42 (HSK ME08b) 19:17 (HSK ME07)	07:46 18:36	07:40 16:38	15:27 (HSK HR03) 15:54 (HSK HR03)	08:23 16:16	14:42 (HSK HR05)
15	05:24 21:37	06:09 20:49	19:43 (HSK ME08a) 20:04 (HSK ME08a)	06:58 19:42	27	18:41 (HSK ME08b) 19:08 (HSK ME08b)	07:47 18:34	07:42 16:37	15:28 (HSK HR03) 15:54 (HSK HR03)	08:24 16:16	14:42 (HSK HR05)
16	05:25 21:36	06:11 20:47	19:42 (HSK ME08a) 20:05 (HSK ME08a)	07:00 19:39	26	18:42 (HSK ME08b) 19:08 (HSK ME08b)	07:49 18:32	07:43 16:36	15:28 (HSK HR03) 15:54 (HSK HR03)	08:24 16:16	14:42 (HSK HR05)
17	05:26 21:35	06:12 20:45	19:41 (HSK ME08a) 20:05 (HSK ME08a)	07:02 19:37	25	18:42 (HSK ME08b) 19:07 (HSK ME08b)	07:51 18:29	07:45 16:34	15:29 (HSK HR03) 15:54 (HSK HR03)	08:25 16:16	14:43 (HSK HR05)
18	05:28 21:34	06:14 20:43	19:41 (HSK ME08a) 20:05 (HSK ME08a)	07:03 19:35	24	18:42 (HSK ME08b) 19:06 (HSK ME08b)	07:53 18:27	07:47 16:33	15:30 (HSK HR03) 15:53 (HSK HR03)	08:26 16:17	14:43 (HSK HR05)
19	05:29 21:33	06:15 20:41	19:40 (HSK ME08a) 20:05 (HSK ME08a)	07:05 19:32	22	18:43 (HSK ME08b) 19:05 (HSK ME08b)	07:54 18:25	07:48 16:32	15:32 (HSK HR03) 15:53 (HSK HR03)	08:27 16:17	14:43 (HSK HR05)
20	05:30 21:32	06:17 20:39	19:40 (HSK ME08a) 20:05 (HSK ME08a)	07:06 19:30	20	18:43 (HSK ME08b) 19:03 (HSK ME08b)	07:56 18:23	07:50 16:30	15:32 (HSK HR03) 15:51 (HSK HR03)	08:27 16:17	14:43 (HSK HR05)
21	05:32 21:30	06:19 20:37	19:39 (HSK ME08a) 20:05 (HSK ME08a)	07:08 19:28	16	18:45 (HSK ME08b) 19:01 (HSK ME08b)	07:58 18:21	07:52 16:29	15:34 (HSK HR03) 15:51 (HSK HR03)	08:28 16:18	14:44 (HSK HR05)
22	05:33 21:29	06:20 20:35	19:39 (HSK ME08a) 20:05 (HSK ME08a)	07:10 19:26	12	18:46 (HSK ME08b) 18:58 (HSK ME08b)	08:00 18:19	07:53 16:28	15:36 (HSK HR03) 15:50 (HSK HR03)	08:29 16:18	14:45 (HSK HR05)
23	05:34 21:28	06:22 20:30	19:39 (HSK ME08a) 20:04 (HSK ME08a)	07:11 19:23		08:01 18:17	07:55 16:27	16:28 10	15:38 (HSK HR03) 15:48 (HSK HR03)	08:29 16:19	14:45 (HSK HR05)
24	05:36 21:26	06:23 20:22	19:39 (HSK ME08a) 20:04 (HSK ME08a)	07:13 19:21		08:03 18:15	07:57 16:26			08:29 16:19	14:45 (HSK HR05)
25	05:37 21:25	06:25 20:21	19:39 (HSK ME08a) 20:04 (HSK ME08a)	07:14 19:19		07:05 17:13	07:58 16:25			08:30 16:20	14:46 (HSK HR05)
26	05:39 21:24	06:26 20:19	19:40 (HSK ME08a) 20:04 (HSK ME09)	07:16 19:16		07:06 17:11	08:00 16:24			08:30 16:20	14:47 (HSK HR05)
27	05:40 21:22	06:28 20:18	19:41 (HSK ME08a) 20:04 (HSK ME09)	07:18 19:14		07:08 17:09	08:01 16:23			08:30 16:21	14:47 (HSK HR05)
28	05:41 21:21	06:30 20:16	19:42 (HSK ME08a) 20:03 (HSK ME09)	07:19 19:12		07:10 17:07	08:03 16:22			08:31 16:22	14:48 (HSK HR05)
29	05:43 21:19	06:31 20:18	19:44 (HSK ME08a) 20:03 (HSK ME09)	07:21 19:09		07:12 17:05	08:04 16:22			08:31 16:23	14:48 (HSK HR05)
30	05:44 21:18	06:33 20:17	19:45 (HSK ME08a) 20:03 (HSK ME09)	07:23 19:07		07:14 17:03	08:06 16:21			08:31 16:24	14:49 (HSK HR05)
31	05:46 21:16	06:34 20:16	19:46 (HSK ME08a) 20:03 (HSK ME09)	07:24 19:06		07:15 17:02	08:07 16:20			08:31 16:25	14:50 (HSK HR05)
Sonnenscheinstunden		500	453	381		332	268		246		
astr.max.mögl.Beschattung		141	581	570		535	550		462		
Red. Sonnenscheinwahrsch.		0,39	0,40	0,32		0,29	0,23		0,17		
Reduktion Betriebsdauer		0,96	0,96	0,96		0,96	0,96		0,96		
Reduktion Windrichtung		0,66	0,67	0,70		0,70	0,68		0,65		
Gesamte Reduktion		0,25	0,26	0,22		0,19	0,15		0,11		
Met. wahrsch. Beschattung		35	150	123		103	81		49		

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN43 - Meerhof, Drosselgasse 14
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

	Januar		Februar		März		April		Mai		Juni	
1	08:31	14:57 (HSK HR05)	08:05		07:12		07:03		05:59	19:55 (HSK ME08a)	05:14	20:32 (HSK ME09)
	16:26	28 15:25 (HSK HR05)	17:13		18:04		19:57		20:47	23 20:18 (HSK ME08a)	21:32	2 20:34 (HSK ME09)
2	08:31	14:58 (HSK HR05)	08:03		07:10		07:00		05:57	19:54 (HSK ME08a)	05:13	
	16:27	28 15:26 (HSK HR05)	17:15		18:06		19:59	10	19:33 (HSK ME08b)	20:49	24 20:18 (HSK ME08a)	21:33
3	08:31	14:58 (HSK HR05)	08:02		07:08		06:58		05:55	19:54 (HSK ME08a)	05:13	
	16:28	28 15:26 (HSK HR05)	17:17	11	16:40 (HSK HR03)	18:07	20:00	14	19:34 (HSK ME08b)	20:50	24 20:18 (HSK ME08a)	21:34
4	08:31	14:58 (HSK HR05)	08:00		07:06		06:54		05:53	19:18 (HSK ME08b)	05:12	
	16:29	28 15:26 (HSK HR05)	17:19	16	16:43 (HSK HR03)	18:09	20:02	18	19:36 (HSK ME08b)	20:52	23 20:18 (HSK ME08a)	21:35
5	08:30	14:59 (HSK HR05)	07:59		07:04		06:54		05:51	19:17 (HSK ME08b)	05:11	
	16:30	28 15:27 (HSK HR05)	17:20	19	16:45 (HSK HR03)	18:11	20:04	21	19:38 (HSK ME08b)	20:53	23 20:18 (HSK ME08a)	21:36
6	08:30	14:59 (HSK HR05)	07:57		07:01		06:51		05:49	19:16 (HSK ME08b)	05:11	
	16:32	28 15:27 (HSK HR05)	17:22	22	16:46 (HSK HR03)	18:13	20:05	23	19:39 (HSK ME08b)	20:55	23 20:17 (HSK ME08a)	21:37
7	08:30	15:00 (HSK HR05)	07:55		06:59		06:49		05:48	19:15 (HSK ME08b)	05:10	
	16:33	28 15:28 (HSK HR05)	17:24	24	16:47 (HSK HR03)	18:14	20:07	27	19:42 (HSK ME07)	20:57	21 20:16 (HSK ME08a)	21:38
8	08:29	15:00 (HSK HR05)	07:53		06:57		06:47		05:46	19:14 (HSK ME08b)	05:10	
	16:34	28 15:28 (HSK HR05)	17:26	26	16:48 (HSK HR03)	18:16	20:09	28	19:42 (HSK ME07)	20:58	20 20:16 (HSK ME08a)	21:39
9	08:29	15:01 (HSK HR05)	07:52		06:55	17:39 (HSK ME01)	06:45		05:44	19:14 (HSK ME08b)	05:09	
	16:35	27 15:28 (HSK HR05)	17:28	27	16:49 (HSK HR03)	18:18	12 17:51 (HSK ME01)	30	19:44 (HSK ME07)	21:00	22 20:30 (HSK ME09)	21:40
10	08:28	15:02 (HSK HR05)	07:50		06:53	17:36 (HSK ME01)	06:42		05:43	19:14 (HSK ME08b)	05:09	
	16:37	27 15:29 (HSK HR05)	17:30	28	16:50 (HSK HR03)	18:20	18 17:54 (HSK ME01)	32	19:46 (HSK ME07)	21:01	23 20:33 (HSK ME09)	21:40
11	08:28	15:02 (HSK HR05)	07:48		06:50	17:34 (HSK ME01)	06:40		05:41	19:14 (HSK ME08b)	05:08	
	16:38	27 15:29 (HSK HR05)	17:31	29	16:50 (HSK HR03)	18:21	22 17:56 (HSK ME01)	34	19:48 (HSK ME07)	21:03	23 20:33 (HSK ME09)	21:41
12	08:27	15:03 (HSK HR05)	07:46		06:48	17:33 (HSK ME01)	06:38		05:39	19:14 (HSK ME08b)	05:08	
	16:40	25 15:28 (HSK HR05)	17:33	29	16:50 (HSK HR03)	18:23	25 17:58 (HSK ME01)	34	19:48 (HSK ME07)	21:05	21 20:35 (HSK ME09)	21:42
13	08:26	15:03 (HSK HR05)	07:45		06:46	17:31 (HSK ME01)	06:36		05:38	19:14 (HSK ME08b)	05:08	
	16:41	25 15:28 (HSK HR05)	17:35	29	16:50 (HSK HR03)	18:25	28 17:59 (HSK ME01)	33	19:47 (HSK ME07)	21:06	17 20:36 (HSK ME09)	21:43
14	08:26	15:04 (HSK HR05)	07:43		06:44	17:31 (HSK ME01)	06:34		05:36	19:14 (HSK ME08b)	05:07	
	16:43	24 15:28 (HSK HR05)	17:37	29	16:50 (HSK HR03)	18:27	30 18:01 (HSK ME01)	33	19:47 (HSK ME07)	21:08	16 20:38 (HSK ME09)	21:43
15	08:25	15:05 (HSK HR05)	07:41		06:41	17:30 (HSK ME01)	06:31		05:35	19:15 (HSK ME08b)	05:07	
	16:44	23 15:28 (HSK HR05)	17:39	29	16:50 (HSK HR03)	18:28	32 18:02 (HSK ME01)	31	19:46 (HSK ME07)	21:09	18 20:39 (HSK ME09)	21:44
16	08:24	15:06 (HSK HR05)	07:39		06:39	17:30 (HSK ME01)	06:29		05:33	19:17 (HSK ME08b)	05:07	
	16:46	22 15:28 (HSK HR05)	17:40	29	16:50 (HSK HR03)	18:30	32 18:02 (HSK ME01)	28	19:45 (HSK ME07)	21:11	20 20:41 (HSK ME09)	21:44
17	08:23	15:07 (HSK HR05)	07:37		06:37	17:29 (HSK ME01)	06:27		05:32	19:19 (HSK ME08b)	05:07	
	16:47	21 15:28 (HSK HR05)	17:42	27	16:49 (HSK HR03)	18:32	31 18:00 (HSK ME01)	24	19:44 (HSK ME07)	21:12	20 20:42 (HSK ME09)	21:45
18	08:22	15:08 (HSK HR05)	07:35		06:35	17:29 (HSK ME01)	06:25		05:30	19:30 (HSK ME07)	05:07	
	16:49	19 15:27 (HSK HR05)	17:44	27	16:49 (HSK HR03)	18:33	31 18:00 (HSK ME01)	23	19:43 (HSK ME07)	21:14	21 20:42 (HSK ME09)	21:45
19	08:21	15:10 (HSK HR05)	07:33		06:32	17:30 (HSK ME01)	06:23		05:29	19:33 (HSK ME07)	05:07	
	16:51	17 15:27 (HSK HR05)	17:46	25	16:48 (HSK HR03)	18:35	29 17:59 (HSK ME01)	7	19:40 (HSK ME07)	21:15	21 20:42 (HSK ME09)	21:45
20	08:20	15:12 (HSK HR05)	07:31		06:30	17:30 (HSK ME01)	06:21		05:27	19:34 (HSK ME07)	05:07	
	16:52	14 15:26 (HSK HR05)	17:48	22	16:47 (HSK HR03)	18:37	26 17:56 (HSK ME01)	21	19:42 (HSK ME07)	21:17	21 20:42 (HSK ME09)	21:46
21	08:19	15:14 (HSK HR05)	07:29		06:28	17:30 (HSK ME01)	06:19		05:26	19:35 (HSK ME07)	05:07	
	16:54	10 15:24 (HSK HR05)	17:50	19	16:45 (HSK HR03)	18:38	24 17:54 (HSK ME01)	20	19:42 (HSK ME07)	21:18	20 20:42 (HSK ME09)	21:46
22	08:18		07:27		06:25	17:32 (HSK ME01)	06:17		05:25	19:36 (HSK ME07)	05:08	
	16:55		17:51	15	16:43 (HSK HR03)	18:40	18 17:50 (HSK ME01)	20	19:42 (HSK ME07)	21:19	20 20:42 (HSK ME09)	21:46
23	08:17		07:25		06:23	17:34 (HSK ME01)	06:15		05:24	19:37 (HSK ME07)	05:08	
	16:57		17:53	9	16:40 (HSK HR03)	18:42	15 17:49 (HSK ME01)	20	19:42 (HSK ME07)	21:21	19 20:42 (HSK ME09)	21:46
24	08:16		07:23		06:21	17:36 (HSK ME01)	06:12		05:22	20:03 (HSK ME08a)	05:08	
	16:59		17:55		18:43	9 17:45 (HSK ME01)	20:35	5	20:08 (HSK ME08a)	21:22	19 20:41 (HSK ME09)	21:46
25	08:15		07:21		06:19		17:30 (HSK ME01)	10	20:00 (HSK ME08a)	05:21	20:23 (HSK ME09)	05:08
	17:01		17:57		18:45		17:30 (HSK ME01)	10	20:10 (HSK ME08a)	21:23	18 20:41 (HSK ME09)	21:47
26	08:13		07:19		06:16		17:30 (HSK ME01)	10	19:59 (HSK ME08a)	05:20	20:24 (HSK ME09)	05:09
	17:02		17:59		18:47		17:30 (HSK ME01)	12	20:11 (HSK ME08a)	21:25	16 20:40 (HSK ME09)	21:47
27	08:12		07:17		06:14		17:30 (HSK ME01)	16	19:57 (HSK ME08a)	05:19	20:25 (HSK ME09)	05:09
	17:04		18:00		18:49		17:30 (HSK ME01)	16	20:13 (HSK ME08a)	21:26	16 20:41 (HSK ME09)	21:46
28	08:11		07:14		06:12		17:30 (HSK ME01)	16	19:56 (HSK ME08a)	05:18	20:26 (HSK ME09)	05:10
	17:06		18:02		18:50		17:30 (HSK ME01)	18	20:14 (HSK ME08a)	21:27	14 20:40 (HSK ME09)	21:46
29	08:09				07:09		17:30 (HSK ME01)	20	19:55 (HSK ME08a)	05:17	20:27 (HSK ME09)	05:10
	17:08				19:52		17:30 (HSK ME01)	20	20:15 (HSK ME08a)	21:28	12 20:39 (HSK ME09)	21:46
30	08:08				07:07		17:30 (HSK ME01)	20	19:55 (HSK ME08a)	05:16	20:28 (HSK ME09)	05:11
	17:09				19:54		17:30 (HSK ME01)	23	20:18 (HSK ME08a)	21:30	10 20:38 (HSK ME09)	21:46
31	08:06				07:05		17:30 (HSK ME01)		05:15	20:29 (HSK ME09)		
	17:11				19:55		17:30 (HSK ME01)		21:31	7 20:36 (HSK ME09)		
Sonnenscheinstunden		261		278		367		415		483		497
astr.max.mögl.Beschattung		505		491		382		545		595		2
Red. Sonnenscheinwahrsch.		0,19		0,32		0,28		0,36		0,43		0,34
Reduktion Betriebsdauer		0,96		0,96		0,96		0,96		0,96		0,96
Reduktion Windrichtung		0,66		0,70		0,70		0,69		0,66		0,66
Gesamte Reduktion		0,12		0,22		0,19		0,24		0,27		0,21
Met.wahrsch.Beschattung		60		106		73		131		162		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 (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Zeitpunkt (SS:MM)	Schattenende (WEA mit letztem Schatten)

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN43 - Meerhof, Drosselgasse 14

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Juli		August		September		Oktober		November		Dezember	
1	05:11		05:47	20:10 (HSK ME08a)	06:36	19:13 (HSK ME08b)	07:24	18:11 (HSK B694 TLF)	07:17	15:51 (HSK HR03)	08:07	14:44 (HSK HR05)
2	21:46		21:15	20:45 (HSK ME09)	20:13	19:47 (HSK ME07)	19:05	18:38 (HSK ME01)	17:00	16:19 (HSK HR03)	16:20	15:11 (HSK HR05)
3	05:12		05:49	20:08 (HSK ME08a)	06:38	19:12 (HSK ME08b)	07:26	18:12 (HSK B694 TLF)	07:19	15:51 (HSK HR03)	08:09	14:44 (HSK HR05)
4	21:45		21:13	20:43 (HSK ME09)	20:11	19:44 (HSK ME07)	19:03	18:36 (HSK ME01)	16:58	16:18 (HSK HR03)	16:19	15:11 (HSK HR05)
5	05:13		05:50	20:08 (HSK ME08a)	06:39	19:12 (HSK ME08b)	07:27	18:13 (HSK B694 TLF)	07:21	15:52 (HSK HR03)	08:10	14:45 (HSK HR05)
6	21:45		21:11	20:42 (HSK ME09)	20:09	19:42 (HSK ME07)	19:00	18:33 (HSK ME01)	16:56	16:17 (HSK HR03)	16:19	15:12 (HSK HR05)
7	05:14		05:52	20:06 (HSK ME08a)	06:41	19:11 (HSK ME08b)	07:29	18:15 (HSK B694 TLF)	07:22	15:53 (HSK HR03)	08:11	14:44 (HSK HR05)
8	21:45		21:10	20:40 (HSK ME09)	20:07	19:40 (HSK ME07)	18:58	18:31 (HSK ME01)	16:54	16:16 (HSK HR03)	16:18	15:12 (HSK HR05)
9	05:14		05:53	20:05 (HSK ME08a)	06:42	19:11 (HSK ME08b)	07:31	18:18 (HSK B694 TLF)	07:24	15:54 (HSK HR03)	08:13	14:45 (HSK HR05)
10	21:44		21:08	20:26 (HSK ME08a)	20:05	19:38 (HSK ME07)	18:56	18:25 (HSK B694 TLF)	16:53	16:15 (HSK HR03)	16:18	15:13 (HSK HR05)
11	05:15		05:55	20:05 (HSK ME08a)	06:44	19:12 (HSK ME08b)	07:32		07:26	15:55 (HSK HR03)	08:14	14:45 (HSK HR05)
12	21:44		21:06	20:27 (HSK ME08a)	20:02	19:35 (HSK ME08b)	18:54		16:51	16:14 (HSK HR03)	16:17	15:13 (HSK HR05)
13	05:16		05:56	20:04 (HSK ME08a)	06:45	19:12 (HSK ME08b)	07:33		07:28	15:57 (HSK HR03)	08:15	14:45 (HSK HR05)
14	21:43		21:04	20:27 (HSK ME08a)	20:00	19:33 (HSK ME08b)	18:51		16:49	16:13 (HSK HR03)	16:17	15:13 (HSK HR05)
15	05:17		05:58	20:04 (HSK ME08a)	06:47	19:13 (HSK ME08b)	07:36		07:29	16:00 (HSK HR03)	08:16	14:46 (HSK HR05)
16	21:43		21:03	20:27 (HSK ME08a)	19:58	19:31 (HSK ME08b)	18:49		16:48	16:10 (HSK HR03)	16:17	15:15 (HSK HR05)
17	05:18		06:00	20:03 (HSK ME08a)	06:49	19:14 (HSK ME08b)	07:37		16:49		08:18	14:47 (HSK HR05)
18	21:42		21:01	20:27 (HSK ME08a)	19:55	19:29 (HSK ME08b)	18:47		16:31		16:16	15:15 (HSK HR05)
19	05:19		06:01	20:03 (HSK ME08a)	06:50	19:16 (HSK ME08b)	07:39		16:33		08:19	14:47 (HSK HR05)
20	21:41		20:59	20:27 (HSK ME08a)	19:53	19:27 (HSK ME08b)	18:45		16:44		16:16	15:15 (HSK HR05)
21	05:20		06:03	20:03 (HSK ME08a)	06:52	19:20 (HSK ME08b)	07:41		16:45		08:20	14:47 (HSK HR05)
22	21:40		20:57	20:27 (HSK ME08a)	19:51	19:23 (HSK ME08b)	18:42		16:43		16:16	15:15 (HSK HR05)
23	05:21	20:38 (HSK ME09)	06:04	20:03 (HSK ME08a)	06:54		07:42		07:36		08:21	14:48 (HSK HR05)
24	21:40	6 20:44 (HSK ME09)	20:55	24:20:27 (HSK ME08a)	19:49		18:40		16:41		16:16	15:16 (HSK HR05)
25	05:22	20:37 (HSK ME09)	06:06	20:03 (HSK ME08a)	06:55		07:44		07:38		08:22	14:48 (HSK HR05)
26	21:39	9 20:46 (HSK ME09)	20:53	22:20:25 (HSK ME08a)	19:46		18:38		16:40		16:16	15:16 (HSK HR05)
27	05:23	20:36 (HSK ME09)	06:07	20:04 (HSK ME08a)	06:57		07:46		07:40		08:23	14:49 (HSK HR05)
28	21:38	11 20:47 (HSK ME09)	20:51	20:24 (HSK ME08a)	19:44		18:36		16:38		16:16	15:17 (HSK HR05)
29	05:24	20:35 (HSK ME09)	06:09	20:04 (HSK ME08a)	06:58		07:47		07:42		08:24	14:49 (HSK HR05)
30	21:37	13 20:48 (HSK ME09)	20:49	17:20:21 (HSK ME08a)	19:42		18:34		16:37		16:16	15:17 (HSK HR05)
31	05:25	20:34 (HSK ME09)	06:11	20:05 (HSK ME08a)	07:00		07:49		07:43		08:24	14:50 (HSK HR05)
32	21:36	15 20:49 (HSK ME09)	20:47	15:20:20 (HSK ME08a)	19:39		18:32		16:36		16:16	15:18 (HSK HR05)
33	05:27	20:33 (HSK ME09)	06:12	20:05 (HSK ME08a)	07:02		07:51		07:45		08:25	14:50 (HSK HR05)
34	21:35	16 20:49 (HSK ME09)	20:45	12:20:17 (HSK ME08a)	19:37		18:29		16:34		16:16	15:18 (HSK HR05)
35	05:28	20:33 (HSK ME09)	06:14	20:07 (HSK ME08a)	07:03		07:53		07:47		08:26	14:50 (HSK HR05)
36	21:34	17 20:43 (HSK ME09)	20:43	9 20:16 (HSK ME08a)	19:35		18:27		16:33		16:17	15:18 (HSK HR05)
37	05:29	20:33 (HSK ME09)	06:15	20:09 (HSK ME08a)	07:05	18:24 (HSK B694 TLF)	07:54	17:00 (HSK HR03)	07:48		08:27	14:51 (HSK HR05)
38	21:33	18 20:51 (HSK ME09)	20:41	4 20:13 (HSK ME08a)	19:32	7 18:31 (HSK B694 TLF)	18:25	12 17:12 (HSK HR03)	16:32		16:17	15:19 (HSK HR05)
39	05:30	20:33 (HSK ME09)	06:17		07:06	18:20 (HSK B694 TLF)	07:56	16:58 (HSK HR03)	07:50		08:27	14:52 (HSK HR05)
40	21:32	19 20:52 (HSK ME09)	20:39		19:30	13 18:33 (HSK B694 TLF)	18:23	16 17:14 (HSK HR03)	16:30		16:17	15:20 (HSK HR05)
41	05:32	20:32 (HSK ME09)	06:19		07:08	18:18 (HSK B694 TLF)	07:58	16:56 (HSK HR03)	07:52	14:49 (HSK HR05)	08:28	14:52 (HSK HR05)
42	21:30	20 20:52 (HSK ME09)	20:37		19:28	17 18:35 (HSK B694 TLF)	18:21	20 17:16 (HSK HR03)	16:29	10 14:59 (HSK HR05)	16:18	15:20 (HSK HR05)
43	05:33	20:32 (HSK ME09)	06:20		07:16	18 16:55 (HSK B694 TLF)	07:53	21 16:55 (HSK HR03)	07:53	14:48 (HSK HR05)	16:18	15:21 (HSK HR05)
44	21:29	20 20:52 (HSK ME09)	20:35		19:26	22 18:37 (HSK ME01)	18:19	23 17:18 (HSK HR03)	16:28	14 15:02 (HSK HR05)	16:18	15:21 (HSK HR05)
45	05:34	20:32 (HSK ME09)	06:22		07:11	24 18:14 (HSK B694 TLF)	08:01	25 16:54 (HSK HR03)	07:55	14 14:47 (HSK HR05)	08:29	14:53 (HSK HR05)
46	21:28	21 20:53 (HSK ME09)	20:33		19:23	26 18:40 (HSK ME01)	18:17	27 17:19 (HSK HR03)	16:27	17 15:04 (HSK HR05)	16:19	15:21 (HSK HR05)
47	05:36	20:32 (HSK ME09)	06:23		07:13	28 18:14 (HSK B694 TLF)	08:03	29 16:52 (HSK HR03)	07:57	17 14:46 (HSK HR05)	08:29	14:53 (HSK HR05)
48	21:26	21 20:53 (HSK ME09)	20:31	8 19:44 (HSK ME07)	19:21	28 18:42 (HSK ME01)	18:15	26 17:18 (HSK HR03)	16:26	19 15:05 (HSK HR05)	16:19	15:21 (HSK HR05)
49	05:37	20:32 (HSK ME09)	06:25		07:14	29 18:12 (HSK B694 TLF)	07:05	30 15:51 (HSK HR03)	07:58	14 14:45 (HSK HR05)	08:30	14:54 (HSK HR05)
50	21:25	20 20:52 (HSK ME09)	20:29	13 19:46 (HSK ME07)	19:19	30 18:42 (HSK ME01)	17:13	28 16:19 (HSK HR03)	16:25	21 15:06 (HSK HR05)	16:20	15:22 (HSK HR05)
51	05:39	20:31 (HSK ME09)	06:26		07:16	31 18:12 (HSK B694 TLF)	07:06	32 15:51 (HSK HR03)	08:00	14 14:45 (HSK HR05)	08:30	14:54 (HSK HR05)
52	21:24	21 20:52 (HSK ME09)	20:27	26 19:47 (HSK ME07)	19:16	31 18:43 (HSK ME01)	17:11	28 16:19 (HSK HR03)	16:24	22 15:07 (HSK HR05)	16:20	15:22 (HSK HR05)
53	05:40	20:32 (HSK ME09)	06:28		07:18	32 18:12 (HSK B694 TLF)	07:08	33 15:51 (HSK HR03)	08:01	14 14:45 (HSK HR05)	08:30	14:55 (HSK HR05)
54	21:22	20 20:52 (HSK ME09)	20:24	29 19:47 (HSK ME07)	19:14	31 18:43 (HSK ME01)	17:09	29 16:20 (HSK HR03)	16:23	23 15:08 (HSK HR05)	16:21	15:23 (HSK HR05)
55	05:41	20:32 (HSK ME09)	06:30		07:19	32 18:11 (HSK B694 TLF)	07:10	30 15:50 (HSK HR03)	08:03	14 14:44 (HSK HR05)	08:31	14:55 (HSK HR05)
56	21:21	18 20:50 (HSK ME09)	20:22	31 19:48 (HSK ME07)	19:12	32 18:43 (HSK ME01)	17:07	30 16:20 (HSK HR03)	16:22	24 15:08 (HSK HR05)	16:22	15:23 (HSK HR05)
57	05:43	20:33 (HSK ME09)	06:31		07:21	33 18:11 (HSK B694 TLF)	07:12	31 15:50 (HSK HR03)	08:04	14 14:44 (HSK HR05)	08:31	14:55 (HSK HR05)
58	21:19	17 20:50 (HSK ME09)	20:20	33 19:48 (HSK ME07)	19:09	31 18:42 (HSK ME01)	17:05	30 16:20 (HSK HR03)	16:22	25 15:09 (HSK HR05)	16:23	15:23 (HSK HR05)
59	05:44	20:33 (HSK ME09)	06:33		07:23	32 18:11 (HSK B694 TLF)	07:14	31 15:51 (HSK HR03)	08:05	14 14:44 (HSK HR05)	08:31	14:55 (HSK HR05)
60	21:18	15 20:48 (HSK ME09)	20:18	34 19:48 (HSK ME07)	19:07	29 18:40 (HSK ME01)	17:03	29 16:20 (HSK HR03)	16:21	26 15:10 (HSK HR05)	16:24	15:24 (HSK HR05)
61	05:46	20:12 (HSK ME08a)	06:34		07:23	30 19:13 (HSK ME08b)	17:05	30 15:51 (HSK HR03)	08:05		08:31	14:56 (HSK HR05)
62	21:16	20 20:46 (HSK ME09)	20:16	34 19:47 (HSK ME07)			17:02	29 16:20 (HSK HR03)			16:25	15:25 (HSK HR05)
63	500		453		381		332		268		246	
Sonnenscheinstunden												
astr. max.mögl. Beschattung	337		580		540		419		370		867	
Red. Sonnenscheinwahrsch.	0,39		0,40		0,32		0,29		0,23		0,17	
Reduktion Betriebsdauer	0,96		0,96		0,96		0,96		0,96		0,96	
Reduktion Windrichtung	0,66		0,68		0,70		0,70		0,67		0,67	
Gesamte Reduktion	0,25		0,26		0,21		0,19		0,15		0,11	
Met. wahrsch. Beschattung	83		151		116		81		54		92	

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung Schattenrezeptor: IPN44 - Meerhof, Drosselgasse 2
Annahmen für SchattenwurfberechnungSonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar			Februar			Marz			April			Mai			Juni		
1	08:31 16:26			08:05 17:13	44	15:44 (HSK HR05) 16:40 (HSK HR04)	07:12 18:04	28	16:58 (HSK HR03) 17:26 (HSK HR03)	07:03 19:57	23	19:05 (HSK 8694 TLF) 19:28 (HSK 8694 TLF)	05:59 20:47	17	19:46 (HSK ME08b) 20:03 (HSK ME08b)	05:14 21:32		
2	08:31 16:27			08:03 17:15	44	15:45 (HSK HR05) 16:41 (HSK HR04)	07:10 18:06	29	16:58 (HSK HR03) 17:27 (HSK HR03)	07:00 19:59	24	19:04 (HSK 8694 TLF) 19:28 (HSK 8694 TLF)	05:57 20:49	15	19:47 (HSK ME08b) 20:02 (HSK ME08b)	05:13 21:33		
3	08:31 16:28			08:02 17:17	46	15:45 (HSK HR05) 16:42 (HSK HR04)	07:08 18:07	29	16:58 (HSK HR03) 17:27 (HSK HR03)	06:58 20:00	24	19:03 (HSK 8694 TLF) 19:27 (HSK 8694 TLF)	05:55 20:50	12	19:48 (HSK ME08b) 20:00 (HSK ME08b)	05:13 21:34		
4	08:31 16:29			08:00 17:19	46	15:46 (HSK HR05) 16:43 (HSK HR04)	07:06 18:09	29	16:58 (HSK HR03) 17:27 (HSK HR03)	06:56 20:02	24	19:03 (HSK 8694 TLF) 19:27 (HSK 8694 TLF)	05:53 20:52	6	19:52 (HSK ME08b) 19:58 (HSK ME08b)	05:12 21:35		
5	08:30 16:30			07:59 17:20	45	15:47 (HSK HR05) 16:44 (HSK HR04)	07:04 18:11	29	16:58 (HSK HR03) 17:27 (HSK HR03)	06:54 20:04	24	19:03 (HSK 8694 TLF) 19:27 (HSK 8694 TLF)	05:51 20:53			05:11 21:36		
6	08:30 16:32			07:57 17:22	43	15:48 (HSK HR05) 16:44 (HSK HR04)	07:01 18:13	27	16:58 (HSK HR03) 17:25 (HSK HR03)	06:51 20:05	22	19:04 (HSK 8694 TLF) 19:26 (HSK 8694 TLF)	05:49 20:55			05:11 21:37		
7	08:30 16:33			07:55 17:24	42	15:49 (HSK HR05) 16:44 (HSK HR04)	06:59 18:14	27	16:58 (HSK HR03) 17:25 (HSK HR03)	06:49 20:07	22	19:04 (HSK 8694 TLF) 19:26 (HSK 8694 TLF)	05:48 20:57			05:10 21:38		
8	08:29 16:34			07:53 17:26	38	15:51 (HSK HR05) 16:44 (HSK HR04)	06:57 18:16	25	16:59 (HSK HR03) 17:24 (HSK HR03)	06:47 20:09	20	19:04 (HSK 8694 TLF) 19:24 (HSK 8694 TLF)	05:46 20:58			05:10 21:39		
9	08:29 16:36			07:52 17:28	30	15:55 (HSK HR05) 16:44 (HSK HR04)	06:55 18:18	23	17:00 (HSK HR03) 17:23 (HSK HR03)	06:45 20:10	17	19:05 (HSK 8694 TLF) 19:22 (HSK 8694 TLF)	05:44 21:00	3	20:27 (HSK ME08a) 20:30 (HSK ME08a)	05:09 21:40		
10	08:28 16:37			07:50 17:30	20	16:24 (HSK HR04) 16:44 (HSK HR04)	06:53 18:20	21	17:00 (HSK HR03) 17:21 (HSK HR03)	06:42 20:12	13	19:07 (HSK 8694 TLF) 19:20 (HSK 8694 TLF)	05:43 21:01	6	20:26 (HSK ME08a) 20:32 (HSK ME08a)	05:09 21:40		
11	08:28 16:38			07:48 17:31	18	16:25 (HSK HR04) 16:43 (HSK HR04)	06:50 18:21	17	17:02 (HSK HR03) 17:19 (HSK HR03)	06:40 20:14	7	19:10 (HSK 8694 TLF) 19:17 (HSK 8694 TLF)	05:41 21:03	9	20:24 (HSK ME08a) 20:33 (HSK ME08a)	05:08 21:41		
12	08:27 16:40			07:46 17:33	17	16:25 (HSK HR04) 16:42 (HSK HR04)	06:48 18:23	11	17:05 (HSK HR03) 17:16 (HSK HR03)	06:38 20:15			05:39 21:05	11	20:24 (HSK ME08a) 20:35 (HSK ME08a)	05:08 21:42		
13	08:26 16:41			07:45 17:35	14	16:27 (HSK HR04) 16:41 (HSK HR04)	06:46 18:25			06:36 20:17			05:38 21:06	13	20:23 (HSK ME08a) 20:36 (HSK ME08a)	05:08 21:42		
14	08:26 16:43	6	15:50 (HSK HR05) 15:56 (HSK HR05)	07:43 17:37	10	16:29 (HSK HR04) 16:39 (HSK HR04)	06:44 18:27			06:34 20:19			05:36 21:08	16	20:22 (HSK ME08a) 20:38 (HSK ME08a)	05:07 21:43		
15	08:25 16:44	11	15:48 (HSK HR05) 15:59 (HSK HR05)	07:41 17:39			06:41 18:28			06:31 20:20			05:35 21:09	17	20:22 (HSK ME08a) 20:39 (HSK ME08a)	05:07 21:44		
16	08:24 16:46	15	15:46 (HSK HR05) 16:01 (HSK HR05)	07:39 17:40			06:39 18:30			06:29 20:22			05:33 21:11	19	20:22 (HSK ME08a) 20:41 (HSK ME08a)	05:07 21:44		
17	08:23 16:47	18	15:45 (HSK HR05) 16:03 (HSK HR05)	07:37 17:42			06:37 18:32			06:27 20:24			05:32 21:12	20	20:22 (HSK ME08a) 20:42 (HSK ME08a)	05:07 21:45		
18	08:22 16:49	19	15:45 (HSK HR05) 16:04 (HSK HR05)	07:35 17:44			06:35 18:33			06:25 20:25	7	19:52 (HSK ME08b) 19:59 (HSK ME08b)	05:30 21:14	22	20:21 (HSK ME08a) 20:43 (HSK ME08a)	05:07 21:45		
19	08:21 16:51	21	15:44 (HSK HR05) 16:05 (HSK HR05)	07:33 17:46			06:32 18:35			06:23 20:27	11	19:49 (HSK ME08b) 20:00 (HSK ME08b)	05:29 21:15	22	20:21 (HSK ME08a) 20:43 (HSK ME08a)	05:07 21:45		
20	08:20 16:52	23	15:44 (HSK HR05) 16:07 (HSK HR05)	07:31 17:48			06:30 18:37			06:21 20:29	14	19:48 (HSK ME08b) 20:02 (HSK ME08b)	05:27 21:17	21	20:22 (HSK ME08a) 20:43 (HSK ME08a)	05:07 21:46		
21	08:19 16:54	24	15:44 (HSK HR05) 16:08 (HSK HR05)	07:29 17:50			06:28 18:38			06:19 20:30	16	19:47 (HSK ME08b) 20:03 (HSK ME08b)	05:26 21:18	21	20:22 (HSK ME08a) 20:43 (HSK ME08a)	05:07 21:46		
22	08:18 16:55	25	15:43 (HSK HR05) 16:08 (HSK HR05)	07:27 17:51	4	17:12 (HSK HR03) 17:16 (HSK HR03)	06:25 18:40			06:17 20:32	19	19:46 (HSK ME08b) 20:05 (HSK ME08b)	05:25 21:19	20	20:23 (HSK ME08a) 20:43 (HSK ME08a)	05:08 21:46		
23	08:17 16:57	26	15:43 (HSK HR05) 16:09 (HSK HR05)	07:25 17:53	14	17:06 (HSK HR03) 17:20 (HSK HR03)	06:23 18:42			06:15 20:34	22	19:45 (HSK ME08b) 20:07 (HSK ME08b)	05:24 21:21	20	20:23 (HSK ME08a) 20:43 (HSK ME08a)	05:08 21:46		
24	08:16 16:59	27	15:43 (HSK HR05) 16:10 (HSK HR05)	07:23 17:55	18	17:04 (HSK HR03) 17:22 (HSK HR03)	06:21 18:43	5	18:13 (HSK ME01) 18:18 (HSK ME01)	06:12 20:35	23	19:44 (HSK ME08b) 20:07 (HSK ME08b)	05:22 21:22	19	20:23 (HSK ME08a) 20:42 (HSK ME08a)	05:08 21:46		
25	08:15 17:01	28	15:42 (HSK HR05) 16:10 (HSK HR05)	07:21 17:57	21	17:03 (HSK HR03) 17:24 (HSK HR03)	06:19 18:45		18:11 (HSK ME01) 18:20 (HSK ME01)	06:10 20:37	23	19:44 (HSK ME08b) 20:07 (HSK ME08b)	05:21 21:23	18	20:23 (HSK ME08a) 20:41 (HSK ME08a)	05:08 21:46		
26	08:13 17:02	28	15:43 (HSK HR05) 16:11 (HSK HR05)	07:19 17:59	24	17:01 (HSK HR03) 17:25 (HSK HR03)	06:16 18:47	12	18:10 (HSK ME01) 18:22 (HSK ME01)	06:08 20:39	22	19:44 (HSK ME08b) 19:44 (HSK ME08b)	05:20 21:25	17	20:24 (HSK ME08a) 20:26 (HSK ME08a)	05:09 21:46		
27	08:12 17:04	29	15:43 (HSK HR05) 16:12 (HSK HR05)	07:17 18:00	26	17:00 (HSK HR03) 17:26 (HSK HR03)	06:14 18:49	15	18:08 (HSK ME01) 18:23 (HSK ME01)	06:06 20:40	22	19:44 (HSK ME08b) 20:06 (HSK ME08b)	05:19 21:26	15	20:26 (HSK ME08a) 20:41 (HSK ME08a)	05:09 21:46		
28	08:11 17:06	29	15:43 (HSK HR05) 16:12 (HSK HR05)	07:14 18:02	27	17:00 (HSK HR03) 17:27 (HSK HR03)	06:12 18:50	17	18:08 (HSK ME01) 18:25 (HSK ME01)	06:04 20:42	21	19:44 (HSK ME08b) 20:05 (HSK ME08b)	05:18 21:27	13	20:27 (HSK ME08a) 20:40 (HSK ME08a)	05:10 21:46		
29	08:09 17:08	30	15:42 (HSK HR05) 16:12 (HSK HR05)				07:09 19:52	19	19:07 (HSK ME01) 19:26 (HSK 8694 TLF)	06:03 20:44	21	19:44 (HSK ME08b) 20:05 (HSK ME08b)	05:17 21:28	12	20:27 (HSK ME08a) 20:39 (HSK ME08a)	05:10 21:46		
30	08:08 17:09	38	15:43 (HSK HR05) 16:36 (HSK HR04)				07:07 19:54	20	19:06 (HSK 8694 TLF) 19:26 (HSK 8694 TLF)	06:01 20:45	20	19:45 (HSK ME08b) 20:05 (HSK ME08b)	05:16 21:30	9	20:29 (HSK ME08a) 20:38 (HSK ME08a)	05:11 21:46		
31	08:06 17:11	41	15:43 (HSK HR05) 16:38 (HSK HR04)				07:05 19:55	22	19:05 (HSK 8694 TLF) 19:27 (HSK 8694 TLF)			05:15 21:31	7	20:30 (HSK ME08a) 20:37 (HSK ME08a)				
Sonnenscheinstunden		261		278	591		367	414		461	415		483	400		496		
astr.max.mögl.Beschattung		438			0,32		0,28	0,28		0,36			0,43					
Red.Sonnenscheinwahrsch.		0,96			0,96		0,96	0,96		0,96			0,96					
Reduktion Betriebsdauer		0,67			0,69		0,70	0,70		0,68			0,66					
Reduktion Windrichtung		0,12			0,21		0,19	0,19		0,24			0,27					
Gesamte Reduktion		53			126		79	110		120			108					
Met.wahrsch.Beschattung																		

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN44 - Meerhof, Drosselgasse 2

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11	05:47	20:34 (HSK ME08a)	06:36	19:09 (HSK 8694 TLF)	07:24	17:46 (HSK HR03)	07:17	15:54 (HSK HR04)	08:07	
2	05:12	21:15	11 20:45 (HSK ME08a)	20:13	7 19:16 (HSK 8694 TLF)	19:05	7 17:53 (HSK HR03)	17:00	20 16:14 (HSK HR04)	16:20	
3	05:13	05:49	21:13	8 20:43 (HSK ME08a)	20:11	13 19:03 (HSK 8694 TLF)	19:03	15 17:57 (HSK HR03)	16:58	32 16:13 (HSK HR04)	16:19
4	05:14	05:50	21:11	5 20:37 (HSK ME08a)	20:09	17 19:20 (HSK 8694 TLF)	19:00	19 17:58 (HSK HR03)	16:56	38 16:13 (HSK HR04)	16:19
5	05:14	05:52	21:10	2 20:40 (HSK ME08a)	20:07	20 19:21 (HSK 8694 TLF)	18:58	22 18:00 (HSK HR03)	16:54	40 16:13 (HSK HR04)	16:18
6	05:15	05:53	21:08	20:05	22 19:22 (HSK 8694 TLF)	18:56	25 18:01 (HSK HR03)	16:53	43 16:13 (HSK HR04)	16:18	
7	05:16	05:55	21:06	20:02	22 19:00 (HSK 8694 TLF)	18:54	27 17:34 (HSK HR03)	16:51	44 16:13 (HSK HR04)	16:17	
8	05:17	05:56	21:04	20:00	24 18:58 (HSK 8694 TLF)	18:51	27 17:34 (HSK HR03)	16:49	46 16:13 (HSK HR04)	16:17	
9	05:18	05:58	21:03	19:58	24 18:58 (HSK 8694 TLF)	18:49	29 17:33 (HSK HR03)	16:48	46 16:13 (HSK HR04)	16:17	
10	05:19	06:00	21:01	19:59 (HSK ME08b)	19:55	24 18:57 (HSK 8694 TLF)	18:47	29 17:33 (HSK HR03)	16:46	45 16:12 (HSK HR04)	16:16
11	05:20	06:01	20:59	13 19:57 (HSK ME08b)	19:53	24 18:57 (HSK 8694 TLF)	18:45	29 17:32 (HSK HR03)	16:44	44 16:11 (HSK HR04)	16:16
12	05:21	06:03	20:57	16 19:55 (HSK ME08b)	19:51	23 18:57 (HSK 8694 TLF)	18:42	29 17:32 (HSK HR03)	16:43	41 16:10 (HSK HR04)	16:16
13	05:22	06:06	20:53	19 19:54 (HSK ME08b)	19:46	21 18:58 (HSK 8694 TLF)	18:38	27 17:33 (HSK HR03)	16:40	30 15:44 (HSK HR05)	16:16
14	05:23	06:07	20:51	21 19:52 (HSK ME08b)	19:44	19 19:17 (HSK 8694 TLF)	18:36	27 17:32 (HSK HR03)	16:38	29 15:44 (HSK HR05)	16:16
15	05:24	06:09	20:49	22 19:51 (HSK ME08b)	19:42	18 19:15 (HSK ME01)	18:34	25 17:33 (HSK HR03)	16:37	29 15:44 (HSK HR05)	16:16
16	05:25	06:11	20:47	23 19:51 (HSK ME08b)	19:39	16 18:57 (HSK ME01)	18:32	23 17:34 (HSK HR03)	16:36	28 15:44 (HSK HR05)	16:16
17	05:27	06:12	20:45	23 19:50 (HSK ME08b)	19:37	13 19:11 (HSK ME01)	18:29	20 17:35 (HSK HR03)	16:34	28 15:44 (HSK HR05)	16:16
18	05:28	06:14	20:43	22 19:51 (HSK ME08b)	19:35	10 18:58 (HSK ME01)	18:27	17 17:36 (HSK HR03)	16:33	27 15:44 (HSK HR05)	16:17
19	05:29	06:15	20:41	22 19:50 (HSK ME08b)	19:32	6 19:08 (HSK ME01)	18:25	11 17:39 (HSK HR03)	16:32	26 15:44 (HSK HR05)	16:17
20	05:30	06:17	20:39	21 19:51 (HSK ME08b)	19:30	1 19:02 (HSK ME01)	18:23		16:30	25 15:43 (HSK HR05)	16:17
21	05:32	06:19	20:37	19 19:50 (HSK ME08b)	19:28		18:21		16:29	24 15:43 (HSK HR05)	16:18
22	05:33	06:20	20:35	17 19:51 (HSK ME08b)	19:26		18:19		16:28	23 15:43 (HSK HR05)	16:18
23	05:34	06:22	20:33	13 19:52 (HSK ME08b)	19:23		18:17		16:27	22 15:43 (HSK HR05)	16:19
24	05:36	06:23	20:31	11 19:53 (HSK ME08b)	19:21		18:15		16:26	19 15:41 (HSK HR05)	16:19
25	05:37	06:25	20:29	6 19:55 (HSK ME08b)	19:19		18:13		16:25	18 15:41 (HSK HR05)	16:20
26	05:39	06:26	20:27		19:16		18:11		16:24	15 15:40 (HSK HR05)	16:20
27	05:40	06:28	20:24		19:14		18:09		16:23	11 15:39 (HSK HR05)	16:21
28	05:41	06:30	20:22		19:12		18:07		16:22	6 15:36 (HSK HR05)	16:22
29	05:43	06:31	20:20		19:10		18:05		16:21		16:23
30	05:44	06:33	20:18		19:07		18:03		16:20		16:24
31	05:46	06:34	20:16				18:01		16:19		16:25
Sonnenscheinstunden		500	453	381	332	503	268	836	246		
astr. max. mögl. Beschattung		326	320	346		0,29		0,23			
Red. Sonnenscheinwahrsch.		0,39	0,40	0,32		0,96		0,96			
Reduktion Betriebsdauer		0,96	0,96	0,70		0,70		0,68			
Reduktion Windrichtung		0,66	0,67	0,22		0,19		0,15			
Gesamte Reduktion		0,25	0,26	0,22							
Met. wahrsch. Beschattung		80	82	75		98		122			

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung Schattenrezeptor: IPN45 - Meerhof, Zur Egge 3
Annahmen für Schattenwurfberechnung Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

	Januar	Februar	März	April	Mai	Jun
1	08:31 16:26 25	14:43 (HSK HR12) 15:08 (HSK HR12) 17:13	08:05 17:13 18:04	07:12 18:04 19:57	05:59 19:59 20:47	19:59 (HSK ME08b) 20:15 (HSK ME08b) 21:32
2	08:31 16:27 25	14:44 (HSK HR12) 15:09 (HSK HR12) 17:15	08:03 17:15 18:06	07:10 18:06 19:58	05:57 19:59 20:49	20:14 (HSK ME08b) 21:33 21:33
3	08:31 16:28 24	14:44 (HSK HR12) 15:08 (HSK HR12) 17:17	08:02 17:17 18:07	07:08 18:07 19:59	05:55 19:59 20:50	20:00 (HSK ME08b) 21:34 21:34
4	08:31 16:29 23	14:45 (HSK HR12) 15:08 (HSK HR12) 17:19	08:00 17:19 18:09	07:06 18:09 19:59	05:53 19:59 20:52	20:02 (HSK ME08b) 21:35 21:35
5	08:30 16:30 22	14:47 (HSK HR12) 15:09 (HSK HR12) 17:20	07:59 16:40 (HSK HR05) 18:11	07:04 18:11 19:59	05:51 19:59 20:53	20:11 (HSK ME08b) 21:36 21:36
6	08:30 16:32 21	14:47 (HSK HR12) 15:08 (HSK HR12) 17:22	07:57 16:36 (HSK HR05) 18:13	07:01 18:13 19:59	05:49 19:59 20:55	20:14 (HSK ME08b) 21:37 21:37
7	08:30 16:33 21	14:48 (HSK HR12) 15:07 (HSK HR12) 17:24	07:55 16:34 (HSK HR05) 18:14	06:59 17:40 (HSK HR03) 18:14	05:48 19:59 20:57	20:15 (HSK ME08b) 21:38 21:38
8	08:29 16:34 19	14:49 (HSK HR12) 15:08 (HSK HR12) 17:26	07:53 16:33 (HSK HR05) 18:16	06:57 17:37 (HSK HR03) 18:16	05:46 19:59 20:58	20:16 (HSK ME08b) 21:39 21:39
9	08:29 16:35 18	14:50 (HSK HR12) 15:08 (HSK HR12) 17:28	07:52 16:32 (HSK HR05) 18:18	06:55 17:35 (HSK HR03) 18:18	05:44 19:59 20:10	20:17 (HSK ME08b) 21:40 21:40
10	08:28 16:37 16	14:52 (HSK HR12) 15:08 (HSK HR12) 17:29	07:50 16:31 (HSK HR05) 18:20	06:53 17:33 (HSK HR03) 20:12	05:43 19:59 21:01	20:18 (HSK ME08a) 21:41 21:41
11	08:28 16:38 14	14:53 (HSK HR12) 15:07 (HSK HR12) 17:31	07:48 16:31 (HSK HR05) 18:21	06:50 17:32 (HSK HR03) 20:14	05:41 19:59 21:03	20:19 (HSK ME08a) 21:42 21:42
12	08:27 16:40 11	14:55 (HSK HR12) 15:06 (HSK HR12) 17:33	07:46 16:30 (HSK HR05) 18:23	06:48 17:31 (HSK HR03) 20:15	05:39 19:59 21:05	20:20 (HSK ME08a) 21:43 21:43
13	08:26 16:41 7	14:57 (HSK HR12) 15:04 (HSK HR12) 17:35	07:44 16:30 (HSK HR05) 18:25	06:46 17:30 (HSK HR03) 20:17	05:38 19:59 21:06	20:21 (HSK ME08a) 21:44 21:44
14	08:26 16:43 15	14:57 (HSK HR12) 15:04 (HSK HR12) 17:37	07:43 16:30 (HSK HR05) 18:27	06:44 17:30 (HSK HR03) 20:19	05:36 19:59 21:08	20:22 (HSK ME08a) 21:45 21:45
15	08:25 16:44 15	14:58 (HSK HR12) 15:05 (HSK HR12) 17:39	07:41 16:30 (HSK HR05) 18:28	06:41 17:30 (HSK HR03) 20:20	05:35 19:59 21:09	20:23 (HSK ME08a) 21:46 21:46
16	08:24 16:46 17	14:59 (HSK HR12) 15:06 (HSK HR12) 17:40	07:39 16:30 (HSK HR05) 18:30	06:39 17:30 (HSK HR03) 20:22	05:33 19:59 21:11	20:24 (HSK ME08a) 21:47 21:47
17	08:23 16:47 18	14:59 (HSK HR12) 15:07 (HSK HR12) 17:42	07:37 16:30 (HSK HR05) 18:32	06:37 17:29 (HSK HR03) 20:24	05:32 19:59 21:12	20:25 (HSK ME08a) 21:48 21:48
18	08:22 16:49 19	14:59 (HSK HR12) 15:08 (HSK HR12) 17:44	07:35 16:31 (HSK HR05) 18:33	06:35 17:30 (HSK HR03) 20:25	05:30 19:59 21:14	20:26 (HSK ME08a) 21:49 21:49
19	08:21 16:51 20	14:59 (HSK HR12) 15:09 (HSK HR12) 17:46	07:33 16:31 (HSK HR05) 18:35	06:33 17:31 (HSK HR03) 20:27	05:29 19:59 21:15	20:27 (HSK ME08a) 21:50 21:50
20	08:20 16:52 21	14:59 (HSK HR12) 15:10 (HSK HR12) 17:48	07:31 16:32 (HSK HR05) 18:37	06:31 17:31 (HSK HR03) 20:29	05:27 19:59 21:17	20:28 (HSK ME08a) 21:51 21:51
21	08:19 16:54 22	14:59 (HSK HR12) 15:11 (HSK HR12) 17:50	07:29 16:33 (HSK HR05) 18:38	06:29 17:33 (HSK HR03) 20:30	05:26 19:59 21:18	20:29 (HSK ME08a) 21:52 21:52
22	08:18 16:55 23	14:59 (HSK HR12) 15:12 (HSK HR12) 17:51	07:27 16:35 (HSK HR05) 18:40	06:27 17:37 (HSK HR03) 20:32	05:25 19:59 21:19	20:30 (HSK ME08a) 21:53 21:53
23	08:17 16:57 24	14:59 (HSK HR12) 15:13 (HSK HR12) 17:53	07:25 16:37 (HSK HR05) 18:42	06:25 17:43 (HSK HR03) 20:34	05:24 19:59 21:21	20:31 (HSK ME08a) 21:54 21:54
24	08:16 16:59 25	14:59 (HSK HR12) 15:14 (HSK HR12) 17:55	07:23 16:47 (HSK HR05) 18:43	06:23 18:43 19:59	05:23 19:59 21:23	20:32 (HSK ME08a) 21:55 21:55
25	08:15 17:01 26	14:59 (HSK HR12) 15:15 (HSK HR12) 17:57	07:21 16:48 (HSK HR05) 18:45	06:21 18:45 20:00	05:22 19:59 21:25	20:33 (HSK ME08a) 21:56 21:56
26	08:13 17:02 27	14:59 (HSK HR12) 15:16 (HSK HR12) 17:59	07:19 16:49 (HSK HR05) 18:47	06:19 18:47 20:02	05:21 19:59 21:27	20:34 (HSK ME08a) 21:57 21:57
27	08:12 17:04 28	14:59 (HSK HR12) 15:17 (HSK HR12) 18:00	07:17 16:50 (HSK HR05) 18:49	06:17 18:49 20:04	05:20 19:59 21:29	20:35 (HSK ME08a) 21:58 21:58
28	08:11 17:06 29	14:59 (HSK HR12) 15:18 (HSK HR12) 18:02	07:14 16:51 (HSK HR05) 18:50	06:15 18:50 20:06	05:19 19:59 21:31	20:36 (HSK ME08a) 21:59 21:59
29	08:09 17:08 30	14:59 (HSK HR12) 15:19 (HSK HR12) 18:04	07:12 16:52 (HSK HR05) 18:52	06:13 18:52 20:08	05:18 19:59 21:33	20:37 (HSK ME08a) 22:00 22:00
30	08:08 17:09 31	14:59 (HSK HR12) 15:20 (HSK HR12) 18:06	07:10 16:53 (HSK HR05) 18:54	06:11 18:54 20:10	05:17 19:59 21:35	20:38 (HSK ME08a) 22:01 22:01
31	08:06 17:11 261	14:59 (HSK HR12) 15:21 (HSK HR12) 18:08	07:08 16:54 (HSK HR05) 18:56	06:09 18:56 20:12	05:16 19:59 21:37	20:39 (HSK ME08a) 22:02 22:02
Sonnenscheinstunden	246	384	306	294	221	496
astr.max.mögl.Beschattung	0,19	0,32	0,28	0,36	0,43	
Red.Sonnenscheinwahrsch.	0,96	0,96	0,96	0,96	0,96	
Reduktion Betriebsdauer	0,65	0,70	0,70	0,68	0,66	
Reduktion Windrichtung	0,12	0,22	0,19	0,24	0,27	
Gesamte Reduktion	29	83	58	70	60	
Met.wahrsch.Beschattung						

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN45 - Meerhof, Zur Egge 3
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11 21:46	05:47 21:15	20:40 (HSK ME08a)	06:36	19:24 (HSK 8694 TLF)	07:24	18:10 (HSK HR03)	07:17	16:01 (HSK HR05)	08:07	14:35 (HSK HR12)
2	05:12 21:45	05:49 21:13	20:40 (HSK ME08a)	06:38	19:23 (HSK 8694 TLF)	07:26	18:10 (HSK HR03)	07:19	16:01 (HSK HR05)	08:09	14:34 (HSK HR12)
3	05:13 21:45	05:50 21:11	20:43 (HSK ME08a)	06:39	19:23 (HSK 8694 TLF)	07:27	18:10 (HSK HR03)	07:21	16:02 (HSK HR05)	08:10	14:34 (HSK HR12)
4	05:14 21:45	05:52 21:10		06:41	19:22 (HSK 8694 TLF)	07:28	18:11 (HSK HR03)	07:22	16:04 (HSK HR05)	08:11	14:33 (HSK HR12)
5	05:14 21:44	05:53 21:08		06:42	19:23 (HSK 8694 TLF)	07:31	18:13 (HSK HR03)	07:24	16:06 (HSK HR05)	08:13	14:34 (HSK HR12)
6	05:15 21:44	05:55 21:06		06:44	19:24 (HSK 8694 TLF)	07:32	18:14 (HSK HR03)	07:26	16:18 (HSK HR05)	08:14	14:33 (HSK HR12)
7	05:16 21:43	05:56 21:04		06:46	19:26 (HSK 8694 TLF)	07:34	18:25 (HSK HR03)	07:28		08:15	14:33 (HSK HR12)
8	05:17 21:42	05:58 21:03	20:13 (HSK ME08b)	06:47	19:26 (HSK 8694 TLF)	07:36	18:25 (HSK HR03)	07:29		08:16	14:34 (HSK HR12)
9	05:18 21:42	06:00 21:01	20:18 (HSK ME08b)	06:49	19:31 (HSK 8694 TLF)	07:37	18:29 (HSK HR03)	07:31		08:18	14:33 (HSK HR12)
10	05:19 21:41	06:01 20:59	20:20 (HSK ME08b)	06:50		07:39	18:33 (HSK HR03)	07:33		08:19	14:33 (HSK HR12)
11	05:20 21:40	06:03 20:57	20:22 (HSK ME08b)	06:52		07:41	18:33 (HSK HR03)	07:35		08:20	14:33 (HSK HR12)
12	05:21 21:40	06:04 20:55	20:22 (HSK ME08b)	06:54		07:42	18:33 (HSK HR03)	07:36		08:21	14:34 (HSK HR12)
13	05:22 21:39	06:06 20:53	20:24 (HSK ME08b)	06:55		07:44	18:33 (HSK HR03)	07:38		08:22	14:34 (HSK HR12)
14	05:23 21:38	06:07 20:51	20:26 (HSK ME08b)	06:57		07:46	18:33 (HSK HR03)	07:40		08:23	14:34 (HSK HR12)
15	05:24 21:37	06:09 20:49	20:27 (HSK ME08b)	06:58		07:47	18:33 (HSK HR03)	07:41		08:24	14:35 (HSK HR12)
16	05:25 21:36	06:11 20:47	20:21 (HSK ME08b)	07:00		07:49	18:34 (HSK HR03)	07:43		08:24	14:35 (HSK HR12)
17	05:27 21:35	06:12 20:45	20:20 (HSK ME08b)	07:02		07:51	18:34 (HSK HR03)	07:45		08:25	14:35 (HSK HR12)
18	05:28 21:34	06:14 20:43	20:17 (HSK ME08b)	07:03		07:53	18:34 (HSK HR03)	07:47		08:26	14:36 (HSK HR12)
19	05:29 21:33	06:15 20:52	20:16 (HSK ME08b)	07:05		07:54	17:13 (HSK HR05)	07:48		08:27	14:36 (HSK HR12)
20	05:30 21:31	06:17 20:53	20:13 (HSK ME08b)	07:06		07:56	17:05 (HSK HR05)	07:50		08:27	14:36 (HSK HR12)
21	05:32 21:30	06:18 20:53	20:07 (HSK ME08b)	07:08		07:58	17:21 (HSK HR05)	07:52		08:28	14:37 (HSK HR12)
22	05:33 21:29	06:20 20:54	20:09 (HSK ME08b)	07:10	18:25 (HSK HR03)	07:58	17:03 (HSK HR05)	07:54		08:28	14:37 (HSK HR12)
23	05:34 21:28	06:22 20:55		07:11	18:26 (HSK HR03)	08:01	17:23 (HSK HR05)	07:56		08:29	14:38 (HSK HR12)
24	05:36 21:26	06:23 20:56		07:13	18:27 (HSK HR03)	08:03	17:25 (HSK HR05)	07:57		08:29	14:38 (HSK HR12)
25	05:37 21:25	06:25 20:54		07:14	18:31 (HSK HR03)	08:05	17:25 (HSK HR05)	07:58		08:30	14:39 (HSK HR12)
26	05:39 21:24	06:26 20:53		07:16	18:34 (HSK HR03)	08:06	17:25 (HSK HR05)	07:58		08:30	14:40 (HSK HR12)
27	05:40 21:22	06:28 20:52	19:31 (HSK 8694 TLF)	07:18	18:35 (HSK HR03)	08:08	17:25 (HSK HR05)	08:00		08:30	14:40 (HSK HR12)
28	05:41 21:21	06:30 20:50	19:38 (HSK 8694 TLF)	07:19	18:35 (HSK HR03)	08:09	17:25 (HSK HR05)	08:01		08:31	14:41 (HSK HR12)
29	05:43 21:19	06:31 20:50	19:29 (HSK 8694 TLF)	07:21	18:35 (HSK HR03)	08:10	17:25 (HSK HR05)	08:02		08:31	14:41 (HSK HR12)
30	05:44 21:18	06:33 20:49	19:41 (HSK 8694 TLF)	07:23	18:35 (HSK HR03)	08:12	17:25 (HSK HR05)	08:04	14:38 (HSK HR12)	08:31	14:41 (HSK HR12)
31	05:46 21:16	06:34 20:46	19:42 (HSK 8694 TLF)	07:24	18:35 (HSK HR03)	08:13	17:25 (HSK HR05)	08:06	14:45 (HSK HR12)	08:31	14:42 (HSK HR12)
Sonnenscheinstunden		453		381		332		268		246	
astr. max.mögl. Beschattung		163	241	305		413		109		749	
Red. Sonnenscheinwahrsch.		0,39	0,40	0,32		0,29		0,23		0,17	
Reduktion Betriebsdauer		0,96	0,96	0,96		0,96		0,96		0,96	
Reduktion Windrichtung		0,66	0,67	0,70		0,70		0,69		0,65	
Gesamte Reduktion		0,24	0,26	0,21		0,19		0,15		0,11	
Met. wahrsch. Beschattung		40	63	65		80		16		79	

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN46 - Oesdorf, Zum Kesselberg 20
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Januar	Februar	März	April	Mai	Juni
1	08:31 16:26	08:05 17:13	15:33 (HSK HR13) 17:13	07:12 18:04	16:32 (HSK HR12) 19:57	18:49 (HSK HR05) 20:59
2	08:31 16:27	08:03 17:15	15:34 (HSK HR13) 17:15	07:10 18:06	16:33 (HSK HR12) 19:59	18:50 (HSK HR05) 20:47
3	08:31 16:28	08:02 17:17	15:36 (HSK HR13) 17:17	07:08 18:07	16:36 (HSK HR12) 19:59	18:51 (HSK HR05) 20:55
4	08:31 16:29	08:00 17:19	15:39 (HSK HR13) 17:19	07:06 18:09	16:39 (HSK HR12) 20:02	19:04 (HSK HR05) 20:53
5	08:30 16:30	07:58 17:20	15:49 (HSK HR13) 17:20	07:04 18:11	16:49 (HSK HR12) 20:04	19:00 (HSK HR05) 20:51
6	08:30 16:32	07:57 17:22	15:48 (HSK HR13) 17:22	07:01 18:13	16:48 (HSK HR12) 20:05	19:09 (HSK HR05) 20:55
7	08:30 16:33	07:55 17:24	15:43 (HSK HR13) 17:24	06:59 18:14	16:49 (HSK HR12) 20:07	19:09 (HSK HR05) 20:57
8	08:29 16:34	07:53 17:26	15:44 (HSK HR13) 17:26	06:57 18:16	16:47 (HSK HR12) 20:09	19:07 (HSK HR05) 20:58
9	08:29 16:36	07:52 17:28	15:45 (HSK HR13) 17:28	06:55 18:18	16:45 (HSK HR12) 20:10	19:07 (HSK HR05) 21:00
10	08:28 16:37	07:50 17:29	15:47 (HSK HR13) 17:29	06:53 18:20	16:42 (HSK HR12) 20:12	19:05 (HSK HR05) 21:01
11	08:28 16:38	07:48 17:31	15:46 (HSK HR13) 17:31	06:50 18:21	16:40 (HSK HR12) 20:14	19:04 (HSK HR05) 21:03
12	08:27 16:40	07:46 17:33	15:46 (HSK HR13) 17:33	06:48 18:23	16:38 (HSK HR12) 20:15	19:03 (HSK HR05) 21:05
13	08:26 16:41	07:44 17:35	15:45 (HSK HR13) 17:35	06:46 18:25	16:36 (HSK HR12) 20:17	19:02 (HSK HR05) 21:06
14	08:26 16:43	07:43 17:37	15:44 (HSK HR13) 17:37	06:44 18:26	16:34 (HSK HR12) 20:19	19:01 (HSK HR05) 21:08
15	08:25 16:44	07:41 17:39	15:43 (HSK HR13) 17:39	06:41 18:28	16:33 (HSK HR12) 20:20	19:00 (HSK HR05) 21:09
16	08:24 16:46	07:39 17:40	15:42 (HSK HR13) 17:40	06:39 18:30	16:32 (HSK HR12) 20:22	18:59 (HSK HR05) 21:11
17	08:23 16:47	07:37 17:42	15:41 (HSK HR13) 17:42	06:37 18:32	16:31 (HSK HR12) 20:24	18:58 (HSK HR05) 21:12
18	08:22 16:49	07:35 17:44	15:40 (HSK HR13) 17:44	06:34 18:33	16:30 (HSK HR12) 20:25	18:57 (HSK HR05) 21:14
19	08:21 16:51	07:33 17:46	15:39 (HSK HR13) 17:46	06:32 18:35	16:29 (HSK HR12) 20:27	18:56 (HSK HR05) 21:15
20	08:20 16:52	07:31 17:48	15:38 (HSK HR13) 17:48	06:30 18:37	16:28 (HSK HR12) 20:29	18:55 (HSK HR05) 21:16
21	08:19 16:54	07:29 17:50	15:37 (HSK HR13) 17:50	06:28 18:38	16:27 (HSK HR12) 20:30	18:54 (HSK HR05) 21:18
22	08:18 16:55	07:27 17:51	15:36 (HSK HR13) 17:51	06:25 18:40	16:26 (HSK HR12) 20:32	18:53 (HSK HR05) 21:19
23	08:17 16:57	07:25 17:53	15:35 (HSK HR13) 17:53	06:23 18:42	16:25 (HSK HR12) 20:34	18:52 (HSK HR05) 21:21
24	08:16 16:59	07:23 17:55	15:34 (HSK HR13) 17:55	06:21 18:43	16:24 (HSK HR12) 20:35	18:51 (HSK HR05) 21:22
25	08:14 17:01	07:21 17:57	15:33 (HSK HR13) 17:57	06:19 18:45	16:23 (HSK HR12) 20:37	18:50 (HSK HR05) 21:23
26	08:13 17:02	07:19 17:59	15:32 (HSK HR13) 17:59	06:16 18:47	16:22 (HSK HR12) 20:39	18:49 (HSK HR05) 21:25
27	08:12 17:04	07:17 18:00	15:31 (HSK HR13) 18:00	06:14 18:49	16:21 (HSK HR12) 20:40	18:48 (HSK HR05) 21:26
28	08:11 17:06	07:14 18:02	15:30 (HSK HR13) 18:02	06:12 18:50	16:20 (HSK HR12) 20:42	18:47 (HSK HR05) 21:27
29	08:09 17:08	07:12 18:04	15:29 (HSK HR13) 18:04	06:10 19:02	16:19 (HSK HR12) 20:44	18:46 (HSK HR05) 21:28
30	08:08 17:09	07:11 18:05	15:28 (HSK HR13) 18:05	06:09 19:04	16:18 (HSK HR12) 20:45	18:45 (HSK HR05) 21:29
31	08:06 17:11	07:09 18:06	15:27 (HSK HR13) 18:06	06:07 19:06	16:17 (HSK HR12) 20:46	18:44 (HSK HR05) 21:30
Sonnenscheinstunden	261	278	367	415	483	496
astr. max. mögl. Beschattung	677	731	357	310	140	0,43
Red. Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36	0,43	0,43
Reduktion Betriebsdauer	0,96	0,96	0,96	0,96	0,96	0,96
Reduktion Windrichtung	0,66	0,70	0,71	0,69	0,66	0,66
Gesamte Reduktion	0,12	0,22	0,19	0,24	0,27	0,27
Met. wahrsch. Beschattung	80	159	69	74	38	

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

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

Projekt:
Marsberg-Meerhof

Beschreibung:
Für die Abschätzung der meteorologisch wahrscheinlichen Beschattungsdauer wurde die Windverteilung der DWD-Station Bad Lippspringe und die Sonnenscheinstatistik der Station Bad Lippspringe zugrunde gelegt

Lizenzierter Anwender:
PAVANA GmbH
Otto-Hahn-Strasse 12-16
DE-25813 Husum
+49 4841 8944 281
Kirsten Ulner / ulner@pavana-wind.com
Berechnet:
17.02.2025 23:00/4.1.254

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN46 - Oesdorf, Zum Kesselberg 20
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,58	3,21	3,35	5,03	6,68	5,58	6,26	5,85	4,04	3,08	2,01	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

Juli		August		September		Oktober		November		Dezember	
1	05:11 21:46	05:47 21:15	20:34 (HSK 8694 TLF)	06:36	19:43 (HSK HR03)	07:24		07:17		08:07	15:08 (HSK HR13)
2	05:12 21:45	05:49 21:13	20:33 (HSK 8694 TLF)	06:38	19:47 (HSK HR03)	07:26		07:19		08:09	15:09 (HSK HR13)
3	05:13 21:45	05:50 21:11	20:34 (HSK 8694 TLF)	06:39		07:27		07:21		08:10	15:10 (HSK HR13)
4	05:14 21:45	05:52 21:10	20:34 (HSK 8694 TLF)	06:41		07:29		07:22		08:11	15:11 (HSK HR13)
5	05:14 21:44	05:53 21:08	20:34 (HSK 8694 TLF)	06:42		07:31		07:24		08:13	15:13 (HSK HR13)
6	05:15 21:44	05:55 21:06	20:36 (HSK 8694 TLF)	06:44		07:32		07:26		08:14	15:14 (HSK HR13)
7	05:16 21:43	05:56 21:04	20:37 (HSK 8694 TLF)	06:46		07:34		07:28	15:08 (HSK HR13)	08:15	15:15 (HSK HR13)
8	05:17 21:42	05:58 21:03		06:47	18:51 (HSK HR05)	07:36		07:29	15:06 (HSK HR13)	08:16	15:16 (HSK HR13)
9	05:18 21:42	06:00 21:01		06:49	18:54 (HSK HR05)	07:37		07:31	15:22 (HSK HR13)	08:17	15:17 (HSK HR13)
10	05:19 21:41	06:01 20:59		06:50	18:44 (HSK HR05)	07:39	17:11 (HSK HR12)	07:33	15:04 (HSK HR13)	08:19	15:19 (HSK HR13)
11	05:20 21:40	06:03 20:57		06:52	18:41 (HSK HR05)	07:41	17:25 (HSK HR12)	07:35	15:03 (HSK HR13)	08:20	15:20 (HSK HR13)
12	05:21 21:40	06:04 20:55		06:54	18:40 (HSK HR05)	07:42	17:46 (HSK HR06)	07:36	15:26 (HSK HR13)	08:21	15:26 (HSK HR13)
13	05:22 21:39	06:06 20:53		06:55	18:39 (HSK HR05)	07:44	17:04 (HSK HR12)	07:38	15:01 (HSK HR13)	08:22	15:22 (HSK HR13)
14	05:23 21:38	06:07 20:51		06:57	18:38 (HSK HR05)	07:46	17:03 (HSK HR12)	07:40	15:27 (HSK HR13)	08:23	15:27 (HSK HR13)
15	05:24 21:37	06:09 20:49		06:58	18:37 (HSK HR05)	07:47	17:50 (HSK HR06)	07:42	15:28 (HSK HR13)	08:24	15:28 (HSK HR13)
16	05:25 21:36	06:11 20:47		07:00	18:37 (HSK HR05)	07:49	17:02 (HSK HR12)	07:43	15:28 (HSK HR13)	08:24	15:28 (HSK HR13)
17	05:27 21:35	06:12 20:45	19:46 (HSK HR03)	07:02	18:37 (HSK HR05)	07:51	17:51 (HSK HR06)	07:45	15:29 (HSK HR13)	08:25	15:29 (HSK HR13)
18	05:28 21:34	06:14 20:43	19:53 (HSK HR03)	07:03	18:36 (HSK HR05)	07:53	17:51 (HSK HR06)	07:47	15:30 (HSK HR13)	08:26	15:30 (HSK HR13)
19	05:29 21:33	06:15 20:41	19:44 (HSK HR03)	07:05	18:35 (HSK HR05)	07:54	17:50 (HSK HR12)	07:48	15:31 (HSK HR13)	08:27	15:31 (HSK HR13)
20	05:30 21:31	06:17 20:39	19:57 (HSK HR03)	07:06	18:37 (HSK HR05)	07:56	17:50 (HSK HR12)	07:50	15:30 (HSK HR13)	08:27	15:30 (HSK HR13)
21	05:32 21:30	06:18 20:37	19:58 (HSK HR03)	07:08	18:38 (HSK HR05)	07:58	17:50 (HSK HR12)	07:52	15:31 (HSK HR13)	08:28	15:31 (HSK HR13)
22	05:33 21:29	06:20 20:35	19:59 (HSK HR03)	07:10	18:39 (HSK HR05)	07:59	17:51 (HSK HR12)	07:53	15:32 (HSK HR13)	08:28	15:32 (HSK HR13)
23	05:34 21:28	06:22 20:33	20:41 (HSK 8694 TLF)	07:11	18:40 (HSK HR05)	08:01	17:51 (HSK HR12)	07:55	15:33 (HSK HR13)	08:29	15:33 (HSK HR13)
24	05:36 21:26	06:23 20:31	20:43 (HSK 8694 TLF)	07:13	18:45 (HSK HR05)	08:03	17:47 (HSK HR12)	07:57	15:34 (HSK HR13)	08:29	15:34 (HSK HR13)
25	05:37 21:25	06:25 20:29	20:45 (HSK 8694 TLF)	07:14	18:49 (HSK HR05)	08:05	17:44 (HSK HR06)	07:58	15:35 (HSK HR13)	08:30	15:35 (HSK HR13)
26	05:39 21:24	06:26 20:27	20:46 (HSK 8694 TLF)	07:16		08:06	17:43 (HSK HR12)	08:00	15:36 (HSK HR13)	08:30	15:36 (HSK HR13)
27	05:40 21:22	06:28 20:24	20:47 (HSK 8694 TLF)	07:18		08:08	17:43 (HSK HR12)	08:01	15:37 (HSK HR13)	08:30	15:37 (HSK HR13)
28	05:41 21:21	06:30 20:22	20:49 (HSK 8694 TLF)	07:19		08:10	17:43 (HSK HR12)	08:03	15:38 (HSK HR13)	08:31	15:38 (HSK HR13)
29	05:43 21:19	06:31 20:20	20:50 (HSK 8694 TLF)	07:21		08:12	17:43 (HSK HR12)	08:04	15:39 (HSK HR13)	08:31	15:39 (HSK HR13)
30	05:44 21:18	06:33 20:18	20:51 (HSK 8694 TLF)	07:23		08:14	17:43 (HSK HR12)	08:06	15:40 (HSK HR13)	08:31	15:40 (HSK HR13)
31	05:46 21:16	06:34 20:16	20:53 (HSK 8694 TLF)	07:25		08:16	17:43 (HSK HR12)	08:08	15:41 (HSK HR13)	08:31	15:41 (HSK HR13)
Sonnenscheinstunden		500	453		381		332		268		246
astr. max. mögl. Beschattung		103	297		321		770		609		138
Red. Sonnenscheinwahrsch.		0,39	0,40		0,32		0,29		0,23		0,17
Reduktion Betriebsdauer		0,96	0,96		0,96		0,96		0,96		0,96
Reduktion Windrichtung		0,66	0,68		0,71		0,70		0,66		0,66
Gesamte Reduktion		0,25	0,26		0,22		0,19		0,14		0,11
Met. wahrsch. Beschattung		25	78		69		150		87		15

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN47 - Meerhof, Zur Egge 25
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
249 335 563 760 863 821 750 737 1.082 1.167 734 360 8.421

	Januar			Februar			März			April			Mai			Juni		
1	08:31		14:44 (HSK HR13)	08:05		15:42 (HSK HR12)	07:12		17:17 (HSK HR05)	07:03		19:04 (HSK HR03)	05:59		20:00 (HSK 8694 TLF)	05:14		
	16:26	18	15:02 (HSK HR13)	17:13	27	16:09 (HSK HR12)	18:04	19	17:36 (HSK HR05)	19:57	24	19:28 (HSK HR03)	20:47	8	20:08 (HSK 8694 TLF)	21:32		
2	08:31		14:45 (HSK HR13)	08:03		15:43 (HSK HR12)	07:10		17:16 (HSK HR05)	07:00		19:05 (HSK HR03)	05:57			05:13		
	16:27	17	15:02 (HSK HR13)	17:15	26	16:09 (HSK HR12)	18:06	21	17:37 (HSK HR05)	19:59	22	19:27 (HSK HR03)	20:49			05:13		
3	08:31		14:45 (HSK HR13)	08:02		15:43 (HSK HR12)	07:08		17:15 (HSK HR05)	06:58		19:04 (HSK HR03)	05:55			05:13		
	16:28	17	15:02 (HSK HR13)	17:17	25	16:08 (HSK HR12)	18:07	23	17:38 (HSK HR05)	20:00	22	19:26 (HSK HR03)	20:50			05:12		
4	08:31		14:46 (HSK HR13)	08:00		15:45 (HSK HR12)	07:06		17:14 (HSK HR05)	06:56		19:04 (HSK HR03)	05:53			05:12		
	16:29	16	15:02 (HSK HR13)	17:19	22	16:07 (HSK HR12)	18:09	25	17:39 (HSK HR05)	20:02	21	19:25 (HSK HR03)	20:52			21:35		
5	08:30		14:47 (HSK HR13)	07:58		15:47 (HSK HR12)	07:04		17:14 (HSK HR05)	06:54		19:05 (HSK HR03)	05:51			05:11		
	16:30	14	15:01 (HSK HR13)	17:20	19	16:06 (HSK HR12)	18:11	25	17:39 (HSK HR05)	20:04	19	19:24 (HSK HR03)	20:53			21:36		
6	08:30		14:49 (HSK HR13)	07:57		15:48 (HSK HR12)	07:01		17:13 (HSK HR05)	06:51		19:07 (HSK HR03)	05:49			05:11		
	16:32	12	15:01 (HSK HR13)	17:22	16	16:04 (HSK HR12)	18:13	25	17:38 (HSK HR05)	20:05	16	19:23 (HSK HR03)	20:55			21:37		
7	08:30		14:51 (HSK HR13)	07:55		15:51 (HSK HR12)	06:59		17:13 (HSK HR05)	06:49		19:08 (HSK HR03)	05:48			05:10		
	16:33	10	15:01 (HSK HR13)	17:24	10	16:01 (HSK HR12)	18:14	25	17:38 (HSK HR05)	20:07	13	19:21 (HSK HR03)	20:57			21:38		
8	08:29		14:53 (HSK HR13)	07:53			06:57		17:13 (HSK HR05)	06:47		19:11 (HSK HR03)	05:46			05:10		
	16:34	6	14:59 (HSK HR13)	17:26			18:16	25	17:38 (HSK HR05)	20:09	5	19:16 (HSK HR03)	20:58			21:39		
9	08:29		15:44 (HSK HR12)	07:52			06:55		17:13 (HSK HR05)	06:45			05:44			05:09		
	16:35	8	15:52 (HSK HR12)	17:28			18:18	25	17:38 (HSK HR05)	20:10			21:00			21:40		
10	08:28		15:43 (HSK HR12)	07:50			06:53		17:13 (HSK HR05)	06:42			05:43			05:09		
	16:37	12	15:55 (HSK HR12)	17:29			18:20	23	17:36 (HSK HR05)	20:12			21:01			21:40		
11	08:28		15:42 (HSK HR12)	07:48			06:50		17:14 (HSK HR05)	06:40			05:41			05:08		
	16:38	15	15:57 (HSK HR12)	17:31			18:21	22	17:36 (HSK HR05)	20:14			21:03			21:41		
12	08:27		15:41 (HSK HR12)	07:46			06:48		17:15 (HSK HR05)	06:38			05:39			05:08		
	16:40	17	15:58 (HSK HR12)	17:33			18:23	20	17:35 (HSK HR05)	20:15			21:05			21:42		
13	08:26		15:40 (HSK HR12)	07:44			06:46		17:16 (HSK HR05)	06:36			05:38			05:08		
	16:41	19	15:59 (HSK HR12)	17:35			18:25	16	17:32 (HSK HR05)	20:17			21:06			21:42		
14	08:26		15:40 (HSK HR12)	07:43			06:44		17:18 (HSK HR05)	06:34			05:36			05:07		
	16:43	20	16:00 (HSK HR12)	17:37			18:26	12	17:30 (HSK HR05)	20:19			21:08			21:43		
15	08:25		15:39 (HSK HR12)	07:41			06:41			06:31			05:35			05:07		
	16:44	22	16:01 (HSK HR12)	17:39			18:28			20:20			21:09			21:44		
16	08:24		15:39 (HSK HR12)	07:39			06:39			06:29			05:33			05:07		
	16:46	24	16:03 (HSK HR12)	17:40			18:30			20:22			21:11			21:44		
17	08:23		15:39 (HSK HR12)	07:37			06:37			06:27			05:32			05:07		
	16:47	25	16:04 (HSK HR12)	17:42			18:32			20:24			21:12			21:45		
18	08:22		15:39 (HSK HR12)	07:35			06:34			06:25			05:30			05:07		
	16:49	26	16:05 (HSK HR12)	17:44			18:33			20:25			21:14			21:45		
19	08:21		15:39 (HSK HR12)	07:33			06:32			06:23			05:29			05:07		
	16:51	27	16:06 (HSK HR12)	17:46			18:35			20:27			21:15			21:45		
20	08:20		15:39 (HSK HR12)	07:31			06:30			06:21		20:00 (HSK 8694 TLF)	05:27			05:07		
	16:52	27	16:06 (HSK HR12)	17:48			18:37			20:29	2	20:02 (HSK 8694 TLF)	21:17			21:46		
21	08:19		15:39 (HSK HR12)	07:29			06:28			06:19		19:59 (HSK 8694 TLF)	05:26			05:07		
	16:54	28	16:07 (HSK HR12)	17:50			18:38			20:30	4	20:03 (HSK 8694 TLF)	21:18			21:46		
22	08:18		15:38 (HSK HR12)	07:27			06:25			06:17		19:58 (HSK 8694 TLF)	05:25			05:08		
	16:55	29	16:07 (HSK HR12)	17:51			18:40			20:32	7	20:05 (HSK 8694 TLF)	21:19			21:46		
23	08:17		15:38 (HSK HR12)	07:25			06:23			06:15		19:57 (HSK 8694 TLF)	05:24			05:08		
	16:57	30	16:08 (HSK HR12)	17:53			18:42			20:34	10	20:07 (HSK 8694 TLF)	21:21			21:46		
24	08:16		15:39 (HSK HR12)	07:23			06:21			06:12		19:56 (HSK 8694 TLF)	05:22			05:08		
	16:59	30	16:09 (HSK HR12)	17:55			18:43			20:35	12	20:08 (HSK 8694 TLF)	21:22			21:46		
25	08:14		15:38 (HSK HR12)	07:21			06:19		18:13 (HSK HR03)	06:10		19:56 (HSK 8694 TLF)	05:21			05:08		
	17:01	31	16:09 (HSK HR12)	17:57			18:45	7	18:20 (HSK HR03)	20:37	14	20:10 (HSK 8694 TLF)	21:23			21:46		
26	08:13		15:39 (HSK HR12)	07:19			06:16		18:11 (HSK HR03)	06:08		19:56 (HSK 8694 TLF)	05:20			05:09		
	17:02	30	16:09 (HSK HR12)	17:59			18:47	11	18:22 (HSK HR03)	20:39	15	20:11 (HSK 8694 TLF)	21:25			21:46		
27	08:12		15:39 (HSK HR12)	07:17		17:23 (HSK HR05)	06:14		18:08 (HSK HR03)	06:06		19:56 (HSK 8694 TLF)	05:19			05:09		
	17:04	30	16:09 (HSK HR12)	18:00	9	17:32 (HSK HR05)	18:49	15	18:23 (HSK HR03)	20:40	17	20:13 (HSK 8694 TLF)	21:26			21:46		
28	08:11		15:40 (HSK HR12)	07:14		17:20 (HSK HR05)	06:12		18:07 (HSK HR03)	06:04		19:56 (HSK 8694 TLF)	05:18			05:10		
	17:06	30	16:10 (HSK HR12)	18:02	15	17:35 (HSK HR05)	18:50	18	18:25 (HSK HR03)	20:42	16	20:12 (HSK 8694 TLF)	21:27			21:46		
29	08:09		15:40 (HSK HR12)				07:09		19:06 (HSK HR03)	06:03		19:56 (HSK 8694 TLF)	05:17			05:10		
	17:08	29	16:09 (HSK HR12)				19:52	21	19:27 (HSK HR03)	20:44	15	20:11 (HSK 8694 TLF)	21:28			21:46		
30	08:08		15:41 (HSK HR12)				07:07		19:05 (HSK HR03)	06:01		19:58 (HSK 8694 TLF)	05:16			05:11		
	17:09	29	16:10 (HSK HR12)				19:54	22	19:27 (HSK HR03)	20:45	12	20:10 (HSK 8694 TLF)	21:30			21:46		
31	08:06		15:41 (HSK HR12)				07:05		19:04 (HSK HR03)				05:15					
	17:11	28	16:09 (HSK HR12)				19:55	24	19:28 (HSK HR03)				21:31					
Sonnenscheinstunden		261		278			367			415			483				496	
astr.max.mögl.Beschattung		676		169			424			266				8				
Red.Sonnenscheinwahrsch.		0,19		0,32			0,28			0,36				0,43				
Reduktion Betriebsdauer		0,96		0,96			0,96			0,96				0,96				
Reduktion Windrichtung		0,66		0,67			0,70			0,69				0,67				
Gesamte Reduktion		0,12		0,21			0,19			0,24				0,27				
Met.wahrsch.Beschattung		81		35			81			64				2				

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

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

SHADOW - Kalender

Berechnung: 2024PAV01486 Gesamtbelastung
Annahmen für Schattenwurfberechnung

Schattenrezeptor: IPN47 - Meerhof, Zur Egge 25
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,58 3,21 3,35 5,03 6,68 5,58 6,26 5,85 4,04 3,08 2,01 1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
249	335	563	760	863	821	750	737	1.082	1.167	734	360	8.421

	Juli		August		September		Oktober		November		Dezember			
1	05:11	05:47			06:36		07:24	17:54 (HSK HR05)	07:17		08:07	15:24 (HSK HR12)		
	21:46	21:15			20:13		19:05	18:13 (HSK HR05)	17:00		16:20	15:39 (HSK HR12)		
2	05:12	05:49			06:38		07:26	17:53 (HSK HR05)	07:19		08:09	15:25 (HSK HR12)		
	21:45	21:13			20:11		19:03	18:14 (HSK HR05)	16:58		16:19	15:37 (HSK HR12)		
3	05:13	05:50			06:39		07:27	17:51 (HSK HR05)	07:21		08:10	15:28 (HSK HR12)		
	21:45	21:11			20:09		19:00	18:14 (HSK HR05)	16:56		16:19	15:37 (HSK HR12)		
4	05:14	05:52			06:41	19:08 (HSK HR03)	07:29	17:50 (HSK HR05)	07:22		08:11	14:37 (HSK HR13)		
	21:45	21:10			20:07	19:13 (HSK HR03)	18:58	18:15 (HSK HR05)	16:54	12	15:32 (HSK HR12)	16:18		
5	05:14	05:53			06:42	19:05 (HSK HR03)	07:31	17:50 (HSK HR05)	07:24		08:13	14:36 (HSK HR13)		
	21:44	21:08			20:05	19:17 (HSK HR03)	18:56	18:15 (HSK HR05)	16:53	16	15:34 (HSK HR12)	16:18		
6	05:15	05:55			06:44	19:03 (HSK HR03)	07:32	17:49 (HSK HR05)	07:26		08:14	14:35 (HSK HR13)		
	21:44	21:06			20:02	19:19 (HSK HR03)	18:54	18:14 (HSK HR05)	16:51	20	15:36 (HSK HR12)	16:17		
7	05:16	05:56			06:46	19:01 (HSK HR03)	07:34	17:49 (HSK HR05)	07:28		08:15	14:34 (HSK HR13)		
	21:43	21:04			20:00	19:19 (HSK HR03)	18:51	18:14 (HSK HR05)	16:49	22	15:37 (HSK HR12)	16:17		
8	05:17	05:58			06:47	19:00 (HSK HR03)	07:36	17:49 (HSK HR05)	07:29		08:16	14:34 (HSK HR13)		
	21:42	21:03			19:58	20	19:20 (HSK HR03)	18:49	25	18:14 (HSK HR05)	16:48	24	15:38 (HSK HR12)	
9	05:18	06:00			06:49	18:58 (HSK HR03)	07:37	17:49 (HSK HR05)	07:31		08:17	14:34 (HSK HR13)		
	21:42	21:01			19:55	22	19:20 (HSK HR03)	18:47	25	18:14 (HSK HR05)	16:46	26	15:39 (HSK HR12)	
10	05:19	06:01			06:50	18:58 (HSK HR03)	07:39	17:49 (HSK HR05)	07:33		08:19	14:34 (HSK HR13)		
	21:41	20:59			19:53	22	19:20 (HSK HR03)	18:45	23	18:12 (HSK HR05)	16:44	27	15:40 (HSK HR12)	
11	05:20	06:03	20:10 (HSK 8694 TLF)		06:52	18:57 (HSK HR03)	07:41	17:49 (HSK HR05)	07:35		08:20	14:34 (HSK HR13)		
	21:40	20:57	5	20:15 (HSK 8694 TLF)	19:51	23	19:20 (HSK HR03)	18:42	23	18:12 (HSK HR05)	16:43	28	15:41 (HSK HR12)	
12	05:21	06:04	20:08 (HSK 8694 TLF)		06:54	18:57 (HSK HR03)	07:42	17:51 (HSK HR05)	07:36		08:21	14:34 (HSK HR13)		
	21:40	20:55	10	20:18 (HSK 8694 TLF)	19:49	23	19:20 (HSK HR03)	18:40	19	18:10 (HSK HR05)	16:41	30	15:42 (HSK HR12)	
13	05:22	06:06	20:05 (HSK 8694 TLF)		06:55	18:56 (HSK HR03)	07:44	17:51 (HSK HR05)	07:38		08:22	14:34 (HSK HR13)		
	21:39	20:53	13	20:18 (HSK 8694 TLF)	19:46	23	19:19 (HSK HR03)	18:38	17	18:08 (HSK HR05)	16:40	30	15:41 (HSK HR12)	
14	05:23	06:07	20:05 (HSK 8694 TLF)		06:57	18:57 (HSK HR03)	07:46	17:53 (HSK HR05)	07:40		08:23	14:34 (HSK HR13)		
	21:38	20:51	15	20:20 (HSK 8694 TLF)	19:44	20	19:17 (HSK HR03)	18:36	13	18:06 (HSK HR05)	16:38	31	15:42 (HSK HR12)	
15	05:24	06:09	20:03 (HSK 8694 TLF)		06:58	18:56 (HSK HR03)	07:47	17:57 (HSK HR05)	07:42		08:24	14:34 (HSK HR13)		
	21:37	20:49	17	20:20 (HSK 8694 TLF)	19:42	19	19:15 (HSK HR03)	18:34	5	18:02 (HSK HR05)	16:37	30	15:42 (HSK HR12)	
16	05:25	06:11	20:03 (HSK 8694 TLF)		07:00	18:57 (HSK HR03)	07:49		07:43		08:24	14:35 (HSK HR13)		
	21:36	20:47	17	20:20 (HSK 8694 TLF)	19:39	16	19:13 (HSK HR03)	18:32	16:36	30	15:42 (HSK HR12)	16:16	21	14:56 (HSK HR13)
17	05:27	06:12	20:02 (HSK 8694 TLF)		07:02	18:59 (HSK HR03)	07:51		07:45		08:25	14:34 (HSK HR13)		
	21:35	20:45	15	20:17 (HSK 8694 TLF)	19:37	12	19:11 (HSK HR03)	18:29	16:34	31	15:43 (HSK HR12)	16:16	22	14:56 (HSK HR13)
18	05:28	06:14	20:03 (HSK 8694 TLF)		07:03	19:00 (HSK HR03)	07:53		07:47		08:26	14:35 (HSK HR13)		
	21:34	20:43	13	20:16 (HSK 8694 TLF)	19:35	8	19:08 (HSK HR03)	18:27	16:33	30	15:43 (HSK HR12)	16:17	22	14:57 (HSK HR13)
19	05:29	06:15	20:02 (HSK 8694 TLF)		07:05		07:54		07:48		08:27	14:36 (HSK HR13)		
	21:33	20:41	11	20:13 (HSK 8694 TLF)	19:32		18:25		16:32	30	15:43 (HSK HR12)	16:17	21	14:57 (HSK HR13)
20	05:30	06:17	20:03 (HSK 8694 TLF)		07:06		07:56		07:50		08:27	14:36 (HSK HR13)		
	21:31	20:39	9	20:12 (HSK 8694 TLF)	19:30		18:23		16:30	29	15:42 (HSK HR12)	16:17	21	14:57 (HSK HR13)
21	05:32	06:18	20:02 (HSK 8694 TLF)		07:08		07:58		07:52		08:28	14:36 (HSK HR13)		
	21:30	20:37	7	20:09 (HSK 8694 TLF)	19:28		18:21		16:29	28	15:42 (HSK HR12)	16:18	22	14:58 (HSK HR13)
22	05:33	06:20	20:04 (HSK 8694 TLF)		07:10		07:59		07:53		08:28	14:36 (HSK HR13)		
	21:29	20:35	4	20:08 (HSK 8694 TLF)	19:26		18:19		16:28	27	15:42 (HSK HR12)	16:18	22	14:58 (HSK HR13)
23	05:34	06:22	20:04 (HSK 8694 TLF)		07:11		08:01		07:55		08:29	14:38 (HSK HR13)		
	21:28	20:33	1	20:05 (HSK 8694 TLF)	19:23		18:17		16:27	27	15:43 (HSK HR12)	16:19	21	14:59 (HSK HR13)
24	05:36	06:23			07:13		08:03		07:57		08:29	14:38 (HSK HR13)		
	21:26	20:31			19:21		18:15		16:26	26	15:42 (HSK HR12)	16:19	21	14:59 (HSK HR13)
25	05:37	06:25			07:14		07:05		07:58		08:30	14:39 (HSK HR13)		
	21:25	20:29			19:19		17:13		16:25	25	15:42 (HSK HR12)	16:20	21	15:00 (HSK HR13)
26	05:39	06:26			07:16		07:06		08:00		08:30	14:39 (HSK HR13)		
	21:24	20:27			19:16		17:11		16:24	24	15:42 (HSK HR12)	16:20	22	15:01 (HSK HR13)
27	05:40	06:28			07:18		07:08		08:01		08:30	14:40 (HSK HR13)		
	21:22	20:24			19:14		17:09		16:23	23	15:42 (HSK HR12)	16:21	21	15:01 (HSK HR13)
28	05:41	06:30			07:19		07:10		08:03		08:31	14:40 (HSK HR13)		
	21:21	20:22			19:12		17:07		16:22	21	15:41 (HSK HR12)	16:22	21	15:01 (HSK HR13)
29	05:43	06:31			07:21	18:00 (HSK HR05)	07:12		08:04		08:31	14:41 (HSK HR13)		
	21:19	20:20			19:09	9	18:09 (HSK HR05)	17:05	16:22	19	15:40 (HSK HR12)	16:23	20	15:01 (HSK HR13)
30	05:44	06:33			07:23	17:56 (HSK HR05)	07:13		08:06		08:31	14:42 (HSK HR13)		
	21:18	20:18			19:07	15	18:11 (HSK HR05)	17:03	16:21	17	15:39 (HSK HR12)	16:24	19	15:01 (HSK HR13)
31	05:46	06:34					07:15				08:31	14:42 (HSK HR13)		
	21:16	20:16					17:01				16:25	20	15:02 (HSK HR13)	
Sonnenscheinstunden	500	453				381		332		268		246		565
astr.max.mögl.Beschattung			137		283			313		683				0,17
Red.Sonnenscheinwahrsch.			0,40		0,32			0,29		0,23				0,17
Reduktion Betriebsdauer			0,96		0,96			0,96		0,96				0,96
Reduktion Windrichtung			0,67		0,70			0,70		0,67				0,65
Gesamte Reduktion			0,26		0,22			0,19		0,14				0,11
Met.wahrsch.Beschattung			35		61			61		98				60

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)