

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:
17.10.2023 09:23/3.6.361



SHADOW - Hauptergebnis

Berechnung: SW23015 Alter-Bornskopf Zusatz- / 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) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:

Terraindaten: WAsP (1)

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

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

Verwendete Höhenlinien: Höhenlinien: CONTOURLINE_ONLINEDATA_0.wpo (C)
Rasterauflösung: 1,0 m

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

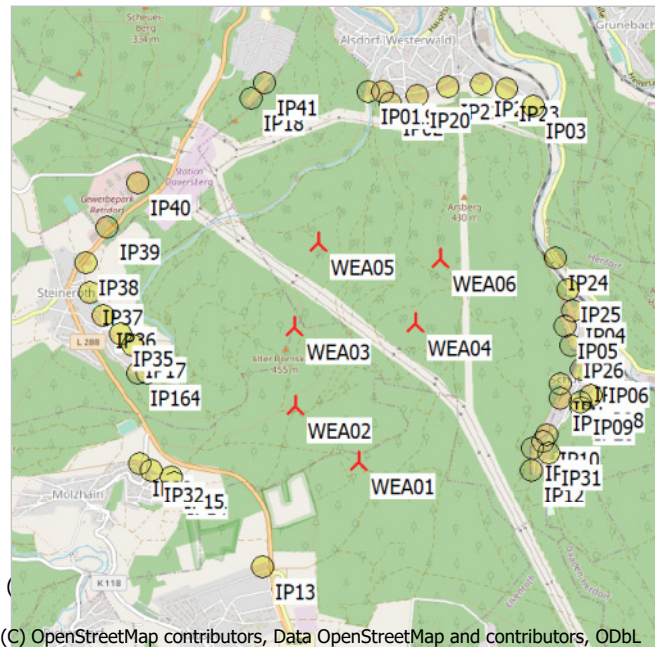
WEA

	Ost	Nord	Z	Beschreibung	WEA-Typ			Nennleistung	Rotor-durchmesser	Nabenhöhe	Schattendaten	
					Aktuell	Hersteller	Typ				Beschatt.-Bereich	U/min
			[m]					[kW]	[m]	[m]	[m]	[U/min]
WEA01	421.001	5.622.785	444,0	E-175 EP5; 162 m	Ja	ENERCON	E-175 EP5-6.000	6.000	175,0	162,0	1.750	0,0
WEA02	420.579	5.623.156	432,3	E-175 EP5; 162 m	Ja	ENERCON	E-175 EP5-6.000	6.000	175,0	162,0	1.750	0,0
WEA03	420.581	5.623.674	446,5	E-175 EP5; 162 m	Ja	ENERCON	E-175 EP5-6.000	6.000	175,0	162,0	1.750	0,0
WEA04	421.388	5.623.689	431,4	E-175 EP5; 162 m	Ja	ENERCON	E-175 EP5-6.000	6.000	175,0	162,0	1.750	0,0
WEA05	420.747	5.624.228	364,0	E-175 EP5; 162 m	Ja	ENERCON	E-175 EP5-6.000	6.000	175,0	162,0	1.750	0,0
WEA06	421.561	5.624.117	418,1	E-175 EP5; 162 m	Ja	ENERCON	E-175 EP5-6.000	6.000	175,0	162,0	1.750	0,0

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]
IP01	Lindenstraße 35, 57518 Alsdorf	421.098	5.625.220	210,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP02	Am Arsberg 62, 57518 Alsdorf	421.243	5.625.148	254,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP03	Schutzbacher Weg 81, 57518 Alsdorf	422.193	5.625.113	243,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP04	Auf dem Ebenhahn 1, 57520 Schutzbach	422.434	5.623.755	249,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP05	Auf dem Ebenhahn 25, 57520 Schutzbach	422.381	5.623.656	269,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP06	Im Stangenwald 3, 57520 Schutzbach	422.578	5.623.361	273,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP07	Zur Grünen Au 7, 57520 Schutzbach	422.342	5.623.273	265,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP08	Auf d. Bühnhardt 6, 57520 Schutzbach	422.545	5.623.196	296,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP09	Auf d. Bühnhardt 2, 57520 Schutzbach	422.476	5.623.151	293,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP10	In d. Eichwies 2, 57520 Schutzbach	422.248	5.622.938	280,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP11	In d. Eichwies 27, 57520 Schutzbach	422.151	5.622.851	302,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP12	In d. Eichwies 23, 57520 Schutzbach	422.141	5.622.707	309,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP13	Neue Str. 63, 57520 Kausen	420.344	5.622.089	414,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP14	Lärchenweg 13, 57520 Molzhain	419.773	5.622.665	404,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP15	Auf d. Höhe 25, 57520 Molzhain	419.757	5.622.698	410,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP16	Lindentallstraße 42, 57518 Steinerth	419.544	5.623.385	386,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP17	Peter-Hellinghausen-Straße 41, 57518 Steinerth	419.510	5.623.570	368,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP18	Franz-Josef-Magnus-Straße 26, 57518 Betzdorf	420.321	5.625.189	360,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP19	Lerchenweg 12, 57518 Alsdorf	421.191	5.625.217	226,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP20	Am Arsberg 46, 57518 Alsdorf	421.425	5.625.192	241,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0

(Fortsetzung nächste Seite)...



Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Hauptergebnis

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

...(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]
IP21	Am Arsberg 26, 57518 Alsdorf	421.622	5.625.249	244,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP22	Am Krahstück 31, 57518 Alsdorf	421.847	5.625.263	263,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP23	Rehzugstraße 5, 57518 Alsdorf	422.016	5.625.232	243,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP24	Am bhf Schutzbach 2, 57518 Alsdorf	422.322	5.624.108	230,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP25	Bahnhofsweg 1, 57520 Schutzbach	422.405	5.623.896	230,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP26	Auf dem Ebenhahn 17, 57520 Schutzbach	422.417	5.623.526	270,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP27	Schulstraße 22, 57520 Schutzbach	422.488	5.623.369	250,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP28	Auf d. Bühnhardt 23, 57520 Schutzbach	422.479	5.623.111	304,3	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP29	Zur Grünen Au 9, 57520 Schutzbach	422.337	5.623.179	261,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP30	In d. Eichwies 6, 57520 Schutzbach	422.219	5.622.900	284,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP31	In d. Eichwies 11, 57520 Schutzbach	422.257	5.622.821	285,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP32	Auf d. Höhe 13, 57520 Molzhain	419.621	5.622.767	371,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP33	Oberbergstraße 29, 57520 Molzhain	419.546	5.622.787	405,2	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP34	Lindentstraße, 57518 Steinerth	419.603	5.623.385	380,6	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP35	Peter-Hellinghausen-Straße 31, 57518 Steinerth	419.433	5.623.643	365,7	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP36	Peter-Hellinghausen-Straße 17, 57518 Steinerth	419.321	5.623.767	371,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP37	Weiherstraße 6, 57518 Steinerth	419.232	5.623.926	376,5	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP38	Betzdorfer Str. 1, 57518 Steinerth	419.212	5.624.118	373,1	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP39	Betzdorfer Str. 2, 57518 Steinerth	419.355	5.624.354	377,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP40	Gewerbepark-Betzdorf 2A, 57518 Betzdorf	419.561	5.624.644	381,8	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0
IP41	Franz-Josef-Magnus-Straße 12, 57518 Betzdorf	420.415	5.625.293	360,0	0,1	0,1	2,0	0,0	"Gewächshaus-Modus"	2,0

Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr
		[h/a]	[d/a]	[h/d]	[h/a]
IP01	Lindenstraße 35, 57518 Alsdorf	94:43	96	1:13	11:12
IP02	Am Arsberg 62, 57518 Alsdorf	111:00	90	1:31	12:53
IP03	Schutzbacher Weg 81, 57518 Alsdorf	47:11	104	0:34	6:01
IP04	Auf dem Ebenhahn 1, 57520 Schutzbach	24:39	52	0:37	6:11
IP05	Auf dem Ebenhahn 25, 57520 Schutzbach	31:24	62	0:39	8:04
IP06	Im Stangenwald 3, 57520 Schutzbach	50:00	124	0:33	11:15
IP07	Zur Grünen Au 7, 57520 Schutzbach	3:19	18	0:14	0:40
IP08	Auf d. Bühnhardt 6, 57520 Schutzbach	38:07	91	0:33	8:18
IP09	Auf d. Bühnhardt 2, 57520 Schutzbach	18:52	62	0:26	3:55
IP10	In d. Eichwies 2, 57520 Schutzbach	0:00	0	0:00	0:00
IP11	In d. Eichwies 27, 57520 Schutzbach	0:00	0	0:00	0:00
IP12	In d. Eichwies 23, 57520 Schutzbach	0:00	0	0:00	0:00
IP13	Neue Str. 63, 57520 Kausen	0:00	0	0:00	0:00
IP14	Lärchenweg 13, 57520 Molzhain	20:00	48	0:33	5:01
IP15	Auf d. Höhe 25, 57520 Molzhain	36:01	87	0:33	8:21
IP16	Lindentalstraße 42, 57518 Steineroth	86:07	185	0:39	19:13
IP17	Peter-Hellinghausen-Straße 41, 57518 Steineroth	89:30	200	0:37	19:52
IP18	Franz-Josef-Magnus-Straße 26, 57518 Betzdorf	30:20	82	0:30	3:49
IP19	Lerchenweg 12, 57518 Alsdorf	100:04	88	1:21	11:33
IP20	Am Arsberg 46, 57518 Alsdorf	84:20	96	1:11	10:09
IP21	Am Arsberg 26, 57518 Alsdorf	62:31	97	0:57	7:34
IP22	Am Krahstück 31, 57518 Alsdorf	51:28	101	0:38	6:04
IP23	Rehzugstraße 5, 57518 Alsdorf	53:14	114	0:35	6:44
IP24	Am bhf Schutzbach 2, 57518 Alsdorf	95:00	162	0:49	22:35
IP25	Bahnhofsweg 1, 57520 Schutzbach	59:55	111	0:43	13:36
IP26	Auf dem Ebenhahn 17, 57520 Schutzbach	39:15	83	0:38	9:54
IP27	Schulstraße 22, 57520 Schutzbach	41:56	79	0:36	9:32
IP28	Auf d. Bühnhardt 23, 57520 Schutzbach	13:54	50	0:26	2:53
IP29	Zur Grünen Au 9, 57520 Schutzbach	0:00	0	0:00	0:00
IP30	In d. Eichwies 6, 57520 Schutzbach	0:00	0	0:00	0:00
IP31	In d. Eichwies 11, 57520 Schutzbach	17:22	44	0:31	4:19
IP32	Auf d. Höhe 13, 57520 Molzhain	63:01	118	0:41	14:43
IP33	Oberbergstraße 29, 57520 Molzhain	65:10	133	0:39	15:27
IP34	Lindentalstraße, 57518 Steineroth	93:54	181	0:41	20:48
IP35	Peter-Hellinghausen-Straße 31, 57518 Steineroth	72:55	181	0:35	16:38

(Fortsetzung nächste Seite)...

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierte Anwender:

windtest grevenbroich gmbh

Frimmersdorfer Straße 73a

DE-41517 Grevenbroich

+49 2181 2278 0

Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Hauptergebnis

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

...(Fortsetzung von vorheriger Seite)

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer	
		Stunden/Jahr	Schattentage/Jahr	Max.Schattendauer/Tag	Stunden/Jahr	
		[h/a]	[d/a]	[h/d]	[h/a]	
IP36	Peter-Hellinghausen-Straße 17, 57518 Steineroth	47:50	128	0:31	10:45	
IP37	Weierstraße 6, 57518 Steineroth	38:33	111	0:29	8:13	
IP38	Betzdorfer Str. 1, 57518 Steineroth	35:53	106	0:27	7:12	
IP39	Betzdorfer Str. 2, 57518 Steineroth	44:57	131	0:29	7:44	
IP40	Gewerbepark-Betzdorf 2A, 57518 Betzdorf	37:08	95	0:32	6:00	
IP41	Franz-Josef-Magnus-Straße 12, 57518 Betzdorf	19:55	61	0:26	2:37	

Gesamtdauer Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal	Erwartet
		[h/a]	[h/a]
WEA01	E-175 EP5; 162 m	96:38	21:11
WEA02	E-175 EP5; 162 m	168:35	34:23
WEA03	E-175 EP5; 162 m	213:41	42:18
WEA04	E-175 EP5; 162 m	247:17	51:31
WEA05	E-175 EP5; 162 m	320:52	53:32
WEA06	E-175 EP5; 162 m	400:12	61:13

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP01 - Lindenstraße 35, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März		April	Mai	Juni
1	08:31	11:30 (WEA04)	08:06	10:51 (WEA06)	07:15	07:07	06:05	05:22	
	16:33	56	14:04 (WEA05)	17:19	51	14:09 (WEA05)	18:09	20:49	21:32
2	08:31	10:55 (WEA06)	08:05	10:52 (WEA06)	07:13	07:05	06:03	05:21	
	16:35	58	14:04 (WEA05)	17:21	44	14:07 (WEA05)	18:10	20:50	21:33
3	08:31	10:53 (WEA06)	08:03	10:52 (WEA06)	07:11	07:03	06:01	05:20	
	16:36	63	14:05 (WEA05)	17:23	36	14:03 (WEA05)	18:12	20:52	21:34
4	08:31	10:51 (WEA06)	08:02	10:54 (WEA06)	07:09	07:01	05:59	05:20	
	16:37	65	14:05 (WEA05)	17:25	23	11:17 (WEA06)	18:14	20:53	21:35
5	08:31	10:50 (WEA06)	08:00	10:56 (WEA06)	07:07	06:58	05:58	05:19	
	16:38	69	14:06 (WEA05)	17:26	19	11:15 (WEA06)	18:16	20:55	21:36
6	08:30	10:50 (WEA06)	07:59	10:58 (WEA06)	07:05	06:56	05:56	05:18	
	16:39	70	14:07 (WEA05)	17:28	15	11:13 (WEA06)	18:17	20:57	21:37
7	08:30	10:49 (WEA06)	07:57	11:03 (WEA06)	07:02	06:54	05:54	05:18	
	16:40	72	14:08 (WEA05)	17:30	6	11:09 (WEA06)	18:19	20:58	21:38
8	08:30	10:49 (WEA06)	07:55		07:00	06:52	05:52	05:17	
	16:42	73	14:09 (WEA05)	17:32		18:21	20:12	21:00	21:39
9	08:29	10:48 (WEA06)	07:54		06:58	06:50	05:51	05:17	
	16:43	73	14:09 (WEA05)	17:34		18:22	20:13	21:01	21:40
10	08:29	10:48 (WEA06)	07:52		06:56	06:47	05:49	05:17	
	16:44	70	14:09 (WEA05)	17:35		18:24	20:15	21:03	21:40
11	08:28	10:48 (WEA06)	07:50		06:54	06:45	05:48	05:16	
	16:46	70	14:11 (WEA05)	17:37		18:26	20:16	21:04	21:41
12	08:28	10:47 (WEA06)	07:48		06:52	06:43	05:46	05:16	
	16:47	64	14:11 (WEA05)	17:39		18:27	20:18	21:06	21:42
13	08:27	10:47 (WEA06)	07:47		06:49	06:41	05:44	05:16	
	16:48	64	14:11 (WEA05)	17:41		18:29	20:20	21:07	21:42
14	08:26	10:47 (WEA06)	07:45		06:47	06:39	05:43	05:15	
	16:50	66	14:12 (WEA05)	17:42		18:31	20:21	21:09	21:43
15	08:26	10:46 (WEA06)	07:43		06:45	06:37	05:41	05:15	
	16:51	68	14:12 (WEA05)	17:44		18:32	20:23	21:10	21:44
16	08:25	10:46 (WEA06)	07:41		06:43	06:35	05:40	05:15	
	16:53	69	14:12 (WEA05)	17:46		18:34	20:24	21:12	21:44
17	08:24	10:46 (WEA06)	07:39		06:41	06:33	05:39	05:15	
	16:54	70	14:13 (WEA05)	17:48		18:36	20:26	21:13	21:44
18	08:23	10:46 (WEA06)	07:37		06:38	06:30	05:37	05:15	
	16:56	70	14:13 (WEA05)	17:50		18:37	20:28	21:14	21:45
19	08:22	10:46 (WEA06)	07:35		06:36	06:28	05:36	05:15	
	16:57	70	14:13 (WEA05)	17:51		18:39	20:29	21:16	21:45
20	08:21	10:46 (WEA06)	07:33		06:34	06:26	05:35	05:15	
	16:59	72	14:14 (WEA05)	17:53		18:41	20:31	21:17	21:46
21	08:20	10:46 (WEA06)	07:32		06:32	06:24	05:33	05:15	
	17:01	71	14:14 (WEA05)	17:55		18:42	20:33	21:19	21:46
22	08:19	10:47 (WEA06)	07:30		06:29	06:22	05:32	05:16	
	17:02	70	14:14 (WEA05)	17:57		18:44	20:34	21:20	21:46
23	08:18	10:47 (WEA06)	07:28		06:27	06:20	05:31	05:16	
	17:04	72	14:15 (WEA05)	17:58		18:46	20:36	21:21	21:46
24	08:17	10:47 (WEA06)	07:26		06:25	06:18	05:30	05:16	
	17:06	70	14:14 (WEA05)	18:00		18:47	20:37	21:23	21:46
25	08:16	10:47 (WEA06)	07:23		06:23	06:16	05:29	05:16	
	17:07	70	14:14 (WEA05)	18:02		18:49	20:39	21:24	21:46
26	08:14	10:48 (WEA06)	07:21		06:21	06:14	05:27	05:17	
	17:09	68	14:14 (WEA05)	18:04		18:50	20:41	21:25	21:46
27	08:13	10:48 (WEA06)	07:19		06:18	06:12	05:26	05:17	
	17:11	66	14:13 (WEA05)	18:05		18:52	20:42	21:26	21:46
28	08:12	10:48 (WEA06)	07:17		06:16	06:10	05:25	05:18	
	17:12	65	14:13 (WEA05)	18:07		18:54	20:44	21:28	21:46
29	08:11	10:48 (WEA06)			07:14	06:09	05:24	05:18	
	17:14	63	14:12 (WEA05)		19:55	20:45	21:29	21:46	
30	08:09	10:49 (WEA06)			07:12	06:07	05:24	05:19	
	17:16	60	14:12 (WEA05)		19:57	20:47	21:30	21:46	
31	08:08	10:50 (WEA06)			07:09		05:23		
	17:18	55	14:10 (WEA05)		19:59		21:31		
Sonnenscheinstunden	264		280		367	414	480	493	
astr.max.mögl.Beschattung	2082		194						
Red.Sonnenscheinwahrsch.	0,21		0,30						
Reduktion Betriebsdauer	0,95		0,95						
Reduktion Windrichtung	0,60		0,61						
Gesamte Reduktion	0,12		0,18						
Met.wahrsch.Beschattung	246		34						

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP01 - Lindenstraße 35, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:06	08:08 16:27
2	05:20 21:45	05:55 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	05:21 21:45	05:57 21:13	06:44 20:12	07:31 19:05	07:22 17:02	08:11 16:26
4	05:21 21:45	05:58 21:11	06:46 20:10	07:33 19:02	07:24 17:00	10:32 (WEA06) 08:12 16:26
5	05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00	07:26 16:59	10:27 (WEA06) 08:13 16:25
6	05:23 21:44	06:01 21:08	06:49 20:05	07:36 18:58	07:28 16:57	10:25 (WEA06) 08:14 16:25
7	05:24 21:43	06:03 21:06	06:51 20:03	07:37 18:56	07:29 16:55	10:24 (WEA06) 08:16 16:24
8	05:25 21:43	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	10:23 (WEA06) 08:17 16:24
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	07:33 16:52	13:35 (WEA05) 16:24 16:24
10	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	10:22 (WEA06) 08:19 16:24
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	10:22 (WEA06) 08:20 16:24
12	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	13:42 (WEA05) 16:24 16:23
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:40 16:46	10:20 (WEA06) 08:22 16:23
14	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	13:44 (WEA05) 16:23 16:23
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	10:20 (WEA06) 08:23 16:24
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:45 16:42	13:45 (WEA05) 16:23 16:24
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	10:20 (WEA06) 08:26 16:24
18	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	10:21 (WEA06) 08:26 16:24
19	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:50 16:38	13:48 (WEA05) 16:24 16:24
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	10:21 (WEA06) 08:27 16:25
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	13:49 (WEA05) 16:24 16:25
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	10:22 (WEA06) 08:28 16:26
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	10:23 (WEA06) 08:29 16:26
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:58 16:33	13:50 (WEA05) 16:26 16:27
25	05:44 21:26	06:30 20:31	07:18 19:23	08:07 17:19	07:59 16:32	10:24 (WEA06) 08:30 16:27
26	05:46 21:24	06:32 20:29	07:20 19:20	08:09 17:17	08:01 16:31	13:51 (WEA05) 16:28 16:28
27	05:47 21:23	06:34 20:27	07:21 19:18	08:11 17:15	08:02 16:30	10:26 (WEA06) 08:31 16:29
28	05:48 21:22	06:35 20:25	07:23 19:16	08:12 17:13	08:04 16:29	13:52 (WEA05) 16:30 16:30
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 17:11	08:05 16:29	10:28 (WEA06) 08:31 16:31
30	05:51 21:19	06:38 20:20	07:26 19:11	08:16 17:09	08:06 16:28	13:52 (WEA05) 16:31 16:31
31	05:53 21:17	06:40 20:18		07:17 17:07		08:31 16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung					1547	1860
Red.Sonnenscheinwahrsch.					0,25	0,17
Reduktion Betriebsdauer					0,95	0,95
Reduktion Windrichtung					0,60	0,59
Gesamte Reduktion					0,14	0,09
Met.wahrsch.Beschattung					218	175

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP02 - Am Arsberg 62, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März	April	Mai	Juni
1	08:31	11:01 (WEA06)	08:06	11:17 (WEA06)	07:15	07:07	06:05	05:22
	16:33	85	14:41 (WEA05)	17:19	46	14:49 (WEA05)	18:09	20:00
2	08:31	11:01 (WEA06)	08:05	11:20 (WEA06)	07:13	07:05	06:03	05:21
	16:35	84	14:42 (WEA05)	17:21	36	14:47 (WEA05)	18:10	20:02
3	08:31	11:02 (WEA06)	08:03	11:25 (WEA06)	07:11	07:03	06:01	05:20
	16:36	80	14:43 (WEA05)	17:23	21	14:45 (WEA05)	18:12	20:03
4	08:31	11:01 (WEA06)	08:02	11:31 (WEA05)	07:09	07:01	05:59	05:20
	16:37	78	14:43 (WEA05)	17:25	11	14:42 (WEA05)	18:14	20:05
5	08:31	11:02 (WEA06)	08:00			07:07	06:58	05:19
	16:38	78	14:44 (WEA05)	17:26		18:16	20:07	20:55
6	08:30	11:02 (WEA06)	07:59			07:05	06:56	05:18
	16:39	79	14:45 (WEA05)	17:28		18:17	20:08	20:56
7	08:30	11:02 (WEA06)	07:57			07:02	06:54	05:18
	16:40	78	14:45 (WEA05)	17:30		18:19	20:10	20:58
8	08:30	11:03 (WEA06)	07:55			07:00	06:52	05:17
	16:42	78	14:46 (WEA05)	17:32		18:21	20:12	21:00
9	08:29	11:02 (WEA06)	07:54			06:58	06:50	05:17
	16:43	81	14:47 (WEA05)	17:34		18:22	20:13	21:01
10	08:29	11:02 (WEA06)	07:52			06:56	06:47	05:17
	16:44	80	14:47 (WEA05)	17:35		18:24	20:15	21:03
11	08:28	11:03 (WEA06)	07:50			06:54	06:45	05:16
	16:46	79	14:48 (WEA05)	17:37		18:26	20:16	21:04
12	08:28	11:03 (WEA06)	07:48			06:52	06:43	05:16
	16:47	80	14:49 (WEA05)	17:39		18:27	20:18	21:06
13	08:27	11:03 (WEA06)	07:47			06:49	06:41	05:16
	16:48	80	14:49 (WEA05)	17:41		18:29	20:20	21:07
14	08:26	11:03 (WEA06)	07:45			06:47	06:39	05:15
	16:50	78	14:49 (WEA05)	17:42		18:31	20:21	21:09
15	08:26	11:03 (WEA06)	07:43			06:45	06:37	05:15
	16:51	78	14:50 (WEA05)	17:44		18:32	20:23	21:10
16	08:25	11:04 (WEA06)	07:41			06:43	06:35	05:15
	16:53	77	14:50 (WEA05)	17:46		18:34	20:24	21:12
17	08:24	11:04 (WEA06)	07:39			06:41	06:33	05:15
	16:54	77	14:50 (WEA05)	17:48		18:36	20:26	21:13
18	08:23	11:04 (WEA06)	07:37			06:38	06:30	05:15
	16:56	78	14:51 (WEA05)	17:50		18:37	20:28	21:14
19	08:22	11:05 (WEA06)	07:35			06:36	06:28	05:15
	16:57	77	14:51 (WEA05)	17:51		18:39	20:29	21:16
20	08:21	11:05 (WEA06)	07:33			06:34	06:26	05:15
	16:59	78	14:52 (WEA05)	17:53		18:41	20:31	21:17
21	08:20	11:06 (WEA06)	07:31			06:32	06:24	05:15
	17:01	76	14:52 (WEA05)	17:55		18:42	20:33	21:19
22	08:19	11:07 (WEA06)	07:30			06:29	06:22	05:16
	17:02	75	14:52 (WEA05)	17:57		18:44	20:34	21:20
23	08:18	11:08 (WEA06)	07:28			06:27	06:20	05:16
	17:04	75	14:53 (WEA05)	17:58		18:46	20:36	21:21
24	08:17	11:07 (WEA06)	07:26			06:25	06:18	05:16
	17:06	74	14:52 (WEA05)	18:00		18:47	20:37	21:23
25	08:16	11:08 (WEA06)	07:23			06:23	06:16	05:16
	17:07	72	14:52 (WEA05)	18:02		18:49	20:39	21:24
26	08:14	11:10 (WEA06)	07:21			06:21	06:14	05:17
	17:09	70	14:53 (WEA05)	18:04		18:50	20:41	21:25
27	08:13	11:10 (WEA06)	07:19			06:18	06:12	05:17
	17:11	67	14:52 (WEA05)	18:05		18:52	20:42	21:26
28	08:12	11:11 (WEA06)	07:17			06:16	06:10	05:18
	17:12	65	14:52 (WEA05)	18:07		18:54	20:44	21:28
29	08:11	11:12 (WEA06)				07:14	06:09	05:18
	17:14	61	14:51 (WEA05)			19:55	20:45	21:29
30	08:09	11:14 (WEA06)				07:12	06:07	05:19
	17:16	57	14:51 (WEA05)			19:57	20:47	21:30
31	08:08	11:15 (WEA06)				07:09		05:23
	17:18	51	14:49 (WEA05)			19:59		21:31
Sonnenscheinstunden	264		280		367	414	480	493
astr.max.mögl.Beschattung	2326		114					
Red.Sonnenscheinwahrsch.	0,21		0,30					
Reduktion Betriebsdauer	0,95		0,95					
Reduktion Windrichtung	0,61		0,61					
Gesamte Reduktion	0,12		0,18					
Met.wahrsch.Beschattung	277		20					

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP02 - Am Arsberg 62, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:05	08:08 16:27 79
2	05:20 21:45	05:55 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27 80
3	05:21 21:45	05:57 21:12	06:44 20:12	07:31 19:05	07:22 17:02	08:11 16:26 79
4	05:21 21:45	05:58 21:11	06:46 20:10	07:33 19:02	07:24 17:00	08:12 16:26 79
5	05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00	07:26 16:59	08:13 16:25 78
6	05:23 21:44	06:01 21:08	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25 78
7	05:24 21:43	06:03 21:06	06:51 20:03	07:37 18:56	07:29 16:55	08:16 16:24 78
8	05:25 21:43	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24 78
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	07:33 16:52	08:18 16:24 76
10	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	08:19 16:24 83
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24 85
12	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	08:21 16:23 86
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:40 16:46	08:22 16:23 88
14	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	08:23 16:23 88
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	08:24 16:24 87
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:45 16:42	08:25 16:24 90
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	08:25 16:24 89
18	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	08:26 16:24 89
19	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:50 16:38	08:27 16:24 90
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	08:28 16:25 90
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	08:28 16:25 90
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	08:29 16:26 90
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	08:29 16:26 90
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:58 16:33	08:30 16:27 91
25	05:44 21:26	06:30 20:31	07:18 19:23	08:07 18:18	07:59 16:32	08:30 16:27 89
26	05:46 21:24	06:32 20:29	07:20 19:20	08:09 18:17	08:01 16:31	08:30 16:28 89
27	05:47 21:23	06:34 20:27	07:21 19:18	08:10 18:15	08:02 16:30	08:31 16:29 90
28	05:48 21:22	06:35 20:25	07:23 19:16	08:12 18:13	08:04 16:29	08:31 16:30 90
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 18:11	08:05 16:29	08:31 16:30 89
30	05:51 21:19	06:38 20:20	07:26 19:11	08:16 18:09	08:06 16:28	08:31 16:31 88
31	05:53 21:17	06:40 20:18	07:28 19:07	08:18 18:07	08:08 17:07	08:31 16:32 88
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung					1566	2654
Red.Sonnenscheinwahrsch.					0,25	0,17
Reduktion Betriebsdauer					0,95	0,95
Reduktion Windrichtung					0,61	0,61
Gesamte Reduktion					0,14	0,10
Met.wahrsch.Beschattung					222	254

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP03 - Schutzbacher Weg 81, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März		April	Mai	Juni
1	08:31	14:20 (WEA04)	08:06	14:33 (WEA06)	07:15	07:07	06:05	05:22	
	16:33	25	14:45 (WEA04)	17:19	33	15:06 (WEA06)	18:09	20:00	21:32
2	08:31	14:20 (WEA04)	08:05	14:33 (WEA06)	07:13	07:05	06:03	05:21	
	16:34	26	14:46 (WEA04)	17:21	33	15:06 (WEA06)	18:10	20:02	21:33
3	08:31	14:21 (WEA04)	08:03	14:33 (WEA06)	07:11	07:03	06:01	05:20	
	16:36	26	14:47 (WEA04)	17:23	32	15:05 (WEA06)	18:12	20:03	21:34
4	08:31	14:21 (WEA04)	08:02	14:34 (WEA06)	07:09	07:00	05:59	05:20	
	16:37	26	14:47 (WEA04)	17:25	31	15:05 (WEA06)	18:14	20:05	21:35
5	08:31	14:21 (WEA04)	08:00	14:35 (WEA06)	07:07	06:58	05:58	05:19	
	16:38	26	14:47 (WEA04)	17:26	29	15:04 (WEA06)	18:16	20:07	21:36
6	08:30	14:22 (WEA04)	07:59	14:36 (WEA06)	07:05	06:56	05:56	05:18	
	16:39	26	14:48 (WEA04)	17:28	27	15:03 (WEA06)	18:17	20:08	21:37
7	08:30	14:22 (WEA04)	07:57	14:38 (WEA06)	07:02	06:54	05:54	05:18	
	16:40	26	14:48 (WEA04)	17:30	25	15:03 (WEA06)	18:19	20:10	21:38
8	08:30	14:23 (WEA04)	07:55	14:39 (WEA06)	07:00	06:52	05:52	05:17	
	16:41	26	14:49 (WEA04)	17:32	23	15:02 (WEA06)	18:21	20:11	21:39
9	08:29	14:23 (WEA04)	07:54	14:41 (WEA06)	06:58	06:50	05:51	05:17	
	16:43	26	14:49 (WEA04)	17:34	19	15:00 (WEA06)	18:22	20:13	21:40
10	08:29	14:23 (WEA04)	07:52	14:43 (WEA06)	06:56	06:47	05:49	05:16	
	16:44	26	14:49 (WEA04)	17:35	15	14:58 (WEA06)	18:24	20:15	21:40
11	08:28	14:25 (WEA04)	07:50	14:48 (WEA06)	06:54	06:45	05:48	05:16	
	16:45	25	14:50 (WEA04)	17:37	5	14:53 (WEA06)	18:26	20:16	21:41
12	08:28	14:25 (WEA04)	07:48	06:52	06:43	05:46	05:16		
	16:47	25	14:50 (WEA04)	17:39	18:27	20:18	21:06	21:42	
13	08:27	14:25 (WEA04)	07:47	06:49	06:41	05:44	05:16		
	16:48	26	14:51 (WEA06)	17:41	18:29	20:20	21:07	21:42	
14	08:26	14:26 (WEA04)	07:45	06:47	06:39	05:43	05:15		
	16:50	27	14:53 (WEA06)	17:42	18:31	20:21	21:09	21:43	
15	08:26	14:27 (WEA04)	07:43	06:45	06:37	05:41	05:15		
	16:51	27	14:54 (WEA06)	17:44	18:32	20:23	21:10	21:43	
16	08:25	14:27 (WEA04)	07:41	06:43	06:35	05:40	05:15		
	16:53	28	14:55 (WEA06)	17:46	18:34	20:24	21:12	21:44	
17	08:24	14:28 (WEA04)	07:39	06:41	06:32	05:39	05:15		
	16:54	28	14:56 (WEA06)	17:48	18:36	20:26	21:13	21:44	
18	08:23	14:29 (WEA04)	07:37	06:38	06:30	05:37	05:15		
	16:56	29	14:58 (WEA06)	17:50	18:37	20:28	21:14	21:45	
19	08:22	14:31 (WEA04)	07:35	06:36	06:28	05:36	05:15		
	16:57	28	14:59 (WEA06)	17:51	18:39	20:29	21:16	21:45	
20	08:21	14:31 (WEA04)	07:33	06:34	06:26	05:34	05:15		
	16:59	29	15:00 (WEA06)	17:53	18:41	20:31	21:17	21:45	
21	08:20	14:31 (WEA06)	07:31	06:32	06:24	05:33	05:15		
	17:01	30	15:01 (WEA06)	17:55	18:42	20:33	21:19	21:46	
22	08:19	14:31 (WEA06)	07:29	06:29	06:22	05:32	05:15		
	17:02	31	15:02 (WEA06)	17:57	18:44	20:34	21:20	21:46	
23	08:18	14:31 (WEA06)	07:27	06:27	06:20	05:31	05:16		
	17:04	32	15:03 (WEA06)	17:58	18:45	20:36	21:21	21:46	
24	08:17	14:31 (WEA06)	07:25	06:25	06:18	05:30	05:16		
	17:06	32	15:03 (WEA06)	18:00	18:47	20:37	21:23	21:46	
25	08:16	14:31 (WEA06)	07:23	06:23	06:16	05:28	05:16		
	17:07	33	15:04 (WEA06)	18:02	18:49	20:39	21:24	21:46	
26	08:14	14:31 (WEA06)	07:21	06:20	06:14	05:27	05:17		
	17:09	34	15:05 (WEA06)	18:03	18:50	20:41	21:25	21:46	
27	08:13	14:31 (WEA06)	07:19	06:18	06:12	05:26	05:17		
	17:11	34	15:05 (WEA06)	18:05	18:52	20:42	21:26	21:46	
28	08:12	14:31 (WEA06)	07:17	06:16	06:10	05:25	05:18		
	17:12	34	15:05 (WEA06)	18:07	18:54	20:44	21:28	21:46	
29	08:11	14:31 (WEA06)		07:14	06:09	05:24	05:18		
	17:14	34	15:05 (WEA06)		19:55	20:45	21:29	21:46	
30	08:09	14:32 (WEA06)		07:12	06:07	05:23	05:19		
	17:16	34	15:06 (WEA06)		19:57	20:47	21:30	21:46	
31	08:08	14:32 (WEA06)		07:09		05:23			
	17:18	34	15:06 (WEA06)		19:58		21:31		
Sonnenscheinstunden	264		280		367	414	480	493	
astr.max.mögl.Beschattung	893		272						
Red.Sonnenscheinwahrsch.	0,21		0,30						
Reduktion Betriebsdauer	0,95		0,95						
Reduktion Windrichtung	0,62		0,62						
Gesamte Reduktion	0,12		0,18						
Met.wahrsch.Beschattung	109		49						

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:



17.10.2023 09:23/3.6.361

SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP03 - Schutzbacher Weg 81, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19	05:54	06:41	07:28	07:19	14:12 (WEA06) 08:08
	21:46	21:16	20:16	19:09	17:05	14:28 (WEA06) 16:27
2	05:20	05:55	06:43	07:29	07:21	14:10 (WEA06) 08:09
	21:45	21:14	20:14	19:07	17:04	14:30 (WEA06) 16:27
3	05:21	05:57	06:44	07:31	07:22	14:08 (WEA06) 08:11
	21:45	21:12	20:12	19:05	17:02	14:32 (WEA06) 16:26
4	05:21	05:58	06:46	07:33	07:24	14:06 (WEA06) 08:12
	21:45	21:11	20:10	19:02	17:00	14:32 (WEA06) 16:26
5	05:22	06:00	06:47	07:34	07:26	14:05 (WEA06) 08:13
	21:44	21:09	20:07	19:00	16:59	14:33 (WEA06) 16:25
6	05:23	06:01	06:49	07:36	07:28	14:05 (WEA06) 08:14
	21:44	21:07	20:05	18:58	16:57	14:34 (WEA06) 16:25
7	05:24	06:03	06:50	07:37	07:29	14:04 (WEA06) 08:16
	21:43	21:06	20:03	18:56	16:55	14:35 (WEA06) 16:24
8	05:25	06:04	06:52	07:39	07:31	14:04 (WEA06) 08:17
	21:43	21:04	20:01	18:54	16:54	14:36 (WEA06) 16:24
9	05:26	06:06	06:54	07:41	07:33	14:04 (WEA06) 08:18
	21:42	21:02	19:59	18:51	16:52	14:36 (WEA06) 16:24
10	05:27	06:07	06:55	07:42	07:34	14:03 (WEA06) 08:19
	21:41	21:00	19:56	18:49	16:51	14:37 (WEA06) 16:24
11	05:28	06:09	06:57	07:44	07:36	14:02 (WEA06) 08:20
	21:41	20:59	19:54	18:47	16:49	14:36 (WEA06) 16:23
12	05:29	06:10	06:58	07:45	07:38	14:03 (WEA06) 08:21
	21:40	20:57	19:52	18:45	16:48	14:37 (WEA06) 16:23
13	05:30	06:12	07:00	07:47	07:40	14:03 (WEA06) 08:22
	21:39	20:55	19:50	18:43	16:46	14:37 (WEA06) 16:23
14	05:31	06:13	07:01	07:49	07:41	14:03 (WEA06) 08:23
	21:38	20:53	19:47	18:41	16:45	14:37 (WEA06) 16:23
15	05:32	06:15	07:03	07:50	07:43	14:04 (WEA06) 08:24
	21:37	20:51	19:45	18:39	16:43	14:38 (WEA06) 16:23
16	05:33	06:17	07:04	07:52	07:45	14:04 (WEA06) 08:25
	21:36	20:49	19:43	18:37	16:42	14:38 (WEA06) 16:24
17	05:34	06:18	07:06	07:54	07:46	14:04 (WEA06) 08:25
	21:35	20:47	19:41	18:34	16:41	14:37 (WEA06) 16:24
18	05:35	06:20	07:07	07:55	07:48	14:05 (WEA06) 08:26
	21:34	20:45	19:38	18:32	16:40	14:37 (WEA06) 16:24
19	05:36	06:21	07:09	07:57	07:49	14:05 (WEA06) 08:27
	21:33	20:43	19:36	18:30	16:38	14:37 (WEA06) 16:24
20	05:38	06:23	07:11	07:59	07:51	14:06 (WEA06) 08:28
	21:32	20:41	19:34	18:28	16:37	14:37 (WEA06) 16:25
21	05:39	06:24	07:12	08:00	07:53	14:06 (WEA06) 08:28
	21:31	20:39	19:32	18:26	16:36	14:36 (WEA06) 16:25
22	05:40	06:26	07:14	08:02	07:54	14:07 (WEA06) 08:29
	21:30	20:37	19:29	18:24	16:35	14:36 (WEA06) 16:26
23	05:42	06:27	07:15	08:04	07:56	14:08 (WEA06) 08:29
	21:28	20:35	19:27	18:22	16:34	14:36 (WEA06) 16:26
24	05:43	06:29	07:17	08:05	07:57	14:08 (WEA06) 08:30
	21:27	20:33	19:25	18:20	16:33	14:36 (WEA06) 16:27
25	05:44	06:30	07:18	08:07	07:59	14:06 (WEA06) 08:30
	21:26	20:31	19:23	18:18	16:32	14:35 (WEA06) 16:27
26	05:46	06:32	07:20	08:09	08:01	14:07 (WEA06) 08:30
	21:24	20:29	19:20	18:17	16:31	14:34 (WEA06) 16:28
27	05:47	06:33	07:21	08:10	08:02	14:06 (WEA06) 08:31
	21:23	20:27	19:18	18:15	16:30	14:33 (WEA06) 16:29
28	05:48	06:35	07:23	08:12	08:04	14:06 (WEA06) 08:31
	21:22	20:25	19:16	18:13	16:29	14:33 (WEA06) 16:30
29	05:50	06:37	07:25	08:14	08:05	14:07 (WEA06) 08:31
	21:20	20:23	19:14	18:11	16:29	14:32 (WEA06) 16:30
30	05:51	06:38	07:26	08:16	08:06	14:06 (WEA06) 08:31
	21:19	20:20	19:11	18:09	16:28	14:31 (WEA06) 16:31
31	05:53	06:40		08:17		08:31
	21:17	20:18		18:07		16:32
				8	14:16 (WEA06)	25
					14:24 (WEA06)	14:44 (WEA04)
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung				8	879	779
Red.Sonnenscheinwahrsch.				0,27	0,25	0,17
Reduktion Betriebsdauer				0,95	0,95	0,95
Reduktion Windrichtung				0,62	0,62	0,62
Gesamte Reduktion				0,16	0,14	0,10
Met.wahrsch.Beschattung				1	127	76

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

Schattenrezeptor: IP04 - Auf dem Ebenhahn 1, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April		Mai		Juni
1	08:31	08:06	07:15	07:07		06:05		18:18 (WEA04) 05:22
	16:33	17:19	18:09	20:00		20:49	16	18:34 (WEA04) 21:32
2	08:31	08:05	07:13	07:05		06:03		18:22 (WEA04) 05:21
	16:34	17:21	18:10	20:02		20:50	10	18:32 (WEA04) 21:33
3	08:31	08:03	07:11	07:03		06:01		05:20
	16:36	17:23	18:12	20:03		20:52		21:34
4	08:31	08:02	07:09	07:00		05:59		05:20
	16:37	17:25	18:14	20:05		20:53		21:35
5	08:31	08:00	07:07	06:58		05:58		05:19
	16:38	17:26	18:16	20:07		20:55		21:36
6	08:30	07:59	07:05	06:56		05:56		05:18
	16:39	17:28	18:17	20:08		20:56		21:37
7	08:30	07:57	07:02	06:54		18:26 (WEA04) 05:54		05:18
	16:40	17:30	18:19	20:10	8	18:34 (WEA04) 20:58		21:38
8	08:30	07:55	07:00	06:52		18:22 (WEA04) 05:52		05:17
	16:42	17:32	18:21	20:11	16	18:38 (WEA04) 20:59		21:39
9	08:29	07:54	06:58	06:50		18:19 (WEA04) 05:51		05:17
	16:43	17:34	18:22	20:13	22	18:41 (WEA04) 21:01		21:39
10	08:29	07:52	06:56	06:47		18:17 (WEA04) 05:49		05:17
	16:44	17:35	18:24	20:15	25	18:42 (WEA04) 21:03		21:40
11	08:28	07:50	06:54	06:45		18:15 (WEA04) 05:48		05:16
	16:46	17:37	18:26	20:16	28	18:43 (WEA04) 21:04		21:41
12	08:28	07:48	06:52	06:43		18:13 (WEA04) 05:46		05:16
	16:47	17:39	18:27	20:18	31	18:44 (WEA04) 21:06		21:42
13	08:27	07:47	06:49	06:41		18:12 (WEA04) 05:44		05:16
	16:48	17:41	18:29	20:20	32	18:44 (WEA04) 21:07		21:42
14	08:26	07:45	06:47	06:39		18:11 (WEA04) 05:43		05:15
	16:50	17:42	18:31	20:21	34	18:45 (WEA04) 21:09		21:43
15	08:25	07:43	06:45	06:37		18:11 (WEA04) 05:41		05:15
	16:51	17:44	18:32	20:23	34	18:45 (WEA04) 21:10		21:43
16	08:25	07:41	06:43	06:35		18:10 (WEA04) 05:40		05:15
	16:53	17:46	18:34	20:24	36	18:46 (WEA04) 21:11		21:44
17	08:24	07:39	06:41	06:32		18:10 (WEA04) 05:39		05:15
	16:54	17:48	18:36	20:26	36	18:46 (WEA04) 21:13		21:44
18	08:23	07:37	06:38	06:30		18:09 (WEA04) 05:37		05:15
	16:56	17:50	18:37	20:28	37	18:46 (WEA04) 21:14		21:45
19	08:22	07:35	06:36	06:28		18:09 (WEA04) 05:36		05:15
	16:57	17:51	18:39	20:29	37	18:46 (WEA04) 21:16		21:45
20	08:21	07:33	06:34	06:26		18:09 (WEA04) 05:35		05:15
	16:59	17:53	18:41	20:31	36	18:45 (WEA04) 21:17		21:45
21	08:20	07:31	06:32	06:24		18:09 (WEA04) 05:33		05:15
	17:01	17:55	18:42	20:32	36	18:45 (WEA04) 21:19		21:46
22	08:19	07:29	06:29	06:22		18:09 (WEA04) 05:32		05:16
	17:02	17:57	18:44	20:34	35	18:44 (WEA04) 21:20		21:46
23	08:18	07:27	06:27	06:20		18:10 (WEA04) 05:31		05:16
	17:04	17:58	18:45	20:36	34	18:44 (WEA04) 21:21		21:46
24	08:17	07:25	06:25	06:18		18:10 (WEA04) 05:30		05:16
	17:06	18:00	18:47	20:37	33	18:43 (WEA04) 21:22		21:46
25	08:16	07:23	06:23	06:16		18:10 (WEA04) 05:29		05:16
	17:07	18:02	18:49	20:39	32	18:42 (WEA04) 21:24		21:46
26	08:14	07:21	06:20	06:14		18:11 (WEA04) 05:27		05:17
	17:09	18:03	18:50	20:41	30	18:41 (WEA04) 21:25		21:46
27	08:13	07:19	06:18	06:12		18:13 (WEA04) 05:26		05:17
	17:11	18:05	18:52	20:42	28	18:41 (WEA04) 21:26		21:46
28	08:12	07:17	06:16	06:10		18:13 (WEA04) 05:25		05:18
	17:12	18:07	18:54	20:44	27	18:40 (WEA04) 21:27		21:46
29	08:10		07:14	06:09		18:15 (WEA04) 05:24		05:18
	17:14		19:55	20:45	23	18:38 (WEA04) 21:29		21:46
30	08:09		07:12	06:07		18:16 (WEA04) 05:24		05:19
	17:16		19:57	20:47	20	18:36 (WEA04) 21:30		21:46
31	08:08		07:09			05:23		
	17:18		19:58			21:31		
Sonnenscheinstunden	264	280	367	414		480		492
astr.max.mögl.Beschattung				710		26		
Red.Sonnenscheinwahrsch.				0,37		0,40		
Reduktion Betriebsdauer				0,95		0,95		
Reduktion Windrichtung				0,68		0,68		
Gesamte Reduktion				0,24		0,26		
Met.wahrsch.Beschattung				169		7		

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

Schattenrezeptor: IP04 - Auf dem Ebenhahn 1, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	18:15 (WEA04) 18:43 (WEA04)	07:28 19:09	07:19 17:05
2	05:20 21:45	05:55 21:14	06:43 20:14	18:15 (WEA04) 18:40 (WEA04)	07:29 19:07	07:21 17:04
3	05:21 21:45	05:57 21:12	06:44 20:12	18:17 (WEA04) 18:39 (WEA04)	07:31 19:05	07:22 17:02
4	05:21 21:45	05:58 21:11	06:46 20:10	18:19 (WEA04) 18:35 (WEA04)	07:32 19:02	07:24 17:00
5	05:22 21:44	06:00 21:09	06:47 20:07	18:22 (WEA04) 18:31 (WEA04)	07:34 19:00	07:26 16:59
6	05:23 21:44	06:01 21:07	06:49 20:05		07:36 18:58	07:28 16:57
7	05:24 21:43	06:03 21:06	06:50 20:03		07:37 18:56	07:29 16:55
8	05:25 21:42	06:04 21:04	06:52 20:01		07:39 18:54	07:31 16:54
9	05:26 21:42	06:06 21:02	06:54 19:58		07:41 18:51	07:33 16:52
10	05:27 21:41	06:07 21:00	06:55 19:56		07:42 18:49	07:34 16:51
11	05:28 21:40	06:09 20:59	18:29 (WEA04) 18:41 (WEA04)	06:57 19:54	07:44 18:47	07:36 16:49
12	05:29 21:40	06:10 20:57	18:26 (WEA04) 18:43 (WEA04)	06:58 19:52	07:45 18:45	07:38 16:48
13	05:30 21:39	06:12 20:55	18:24 (WEA04) 18:45 (WEA04)	07:00 19:50	07:47 18:43	07:39 16:46
14	05:31 21:38	06:13 20:53	18:22 (WEA04) 18:46 (WEA04)	07:01 19:47	07:49 18:41	07:41 16:45
15	05:32 21:37	06:15 20:51	18:21 (WEA04) 18:48 (WEA04)	07:03 19:45	07:50 18:39	07:43 16:43
16	05:33 21:36	06:17 20:49	18:19 (WEA04) 18:48 (WEA04)	07:04 19:43	07:52 18:37	07:44 16:42
17	05:34 21:35	06:18 20:47	18:18 (WEA04) 18:49 (WEA04)	07:06 19:41	07:54 18:34	07:46 16:41
18	05:35 21:34	06:20 20:45	18:17 (WEA04) 18:49 (WEA04)	07:07 19:38	07:55 18:32	07:48 16:40
19	05:36 21:33	06:21 20:43	18:15 (WEA04) 18:49 (WEA04)	07:09 19:36	07:57 18:30	07:49 16:38
20	05:38 21:32	06:23 20:41	18:15 (WEA04) 18:50 (WEA04)	07:11 19:34	07:59 18:28	07:51 16:37
21	05:39 21:31	06:24 20:39	18:14 (WEA04) 18:49 (WEA04)	07:12 19:32	08:00 18:26	07:53 16:36
22	05:40 21:30	06:26 20:37	18:14 (WEA04) 18:50 (WEA04)	07:14 19:29	08:02 18:24	07:54 16:35
23	05:42 21:28	06:27 20:35	18:13 (WEA04) 18:49 (WEA04)	07:15 19:27	08:04 18:22	07:56 16:34
24	05:43 21:27	06:29 20:33	18:13 (WEA04) 18:49 (WEA04)	07:17 19:25	08:05 18:20	07:57 16:33
25	05:44 21:26	06:30 20:31	18:12 (WEA04) 18:48 (WEA04)	07:18 19:22	08:07 18:18	07:59 16:32
26	05:46 21:24	06:32 20:29	18:13 (WEA04) 18:49 (WEA04)	07:20 19:20	08:09 18:17	08:00 16:31
27	05:47 21:23	06:33 20:27	18:12 (WEA04) 18:47 (WEA04)	07:21 19:18	08:10 18:15	08:02 16:30
28	05:48 21:22	06:35 20:25	18:13 (WEA04) 18:47 (WEA04)	07:23 19:16	08:12 18:13	08:03 16:29
29	05:50 21:20	06:37 20:23	18:12 (WEA04) 18:46 (WEA04)	07:25 19:14	08:14 18:11	08:05 16:28
30	05:51 21:19	06:38 20:20	18:13 (WEA04) 18:45 (WEA04)	07:26 19:11	08:16 18:09	08:06 16:27
31	05:53 21:17	06:40 20:18	18:13 (WEA04) 18:44 (WEA04)		17:09 17:07	16:28 16:31
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung		643	100			
Red.Sonnenscheinwahrsch.		0,41	0,37			
Reduktion Betriebsdauer		0,95	0,95			
Reduktion Windrichtung		0,68	0,68			
Gesamte Reduktion		0,27	0,24			
Met.wahrsch.Beschattung		172	24			

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP05 - Auf dem Ebenhahn 25, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April		Mai		Juni
1	08:31	08:06	07:15	07:07		06:05		18:22 (WEA04) 05:22
	16:33	17:19	18:09	20:00		20:49	39	19:01 (WEA04) 21:32
2	08:31	08:05	07:13	07:05		06:03		18:23 (WEA04) 05:21
	16:35	17:21	18:10	20:02		20:50	38	19:01 (WEA04) 21:33
3	08:31	08:03	07:11	07:03		06:01		18:23 (WEA04) 05:20
	16:36	17:23	18:12	20:03		20:52	38	19:01 (WEA04) 21:34
4	08:31	08:02	07:09	07:00		05:59		18:23 (WEA04) 05:20
	16:37	17:25	18:14	20:05		20:53	37	19:00 (WEA04) 21:35
5	08:31	08:00	07:07	06:58		05:58		18:24 (WEA04) 05:19
	16:38	17:26	18:16	20:07		20:55	36	19:00 (WEA04) 21:36
6	08:30	07:59	07:05	06:56		05:56		18:24 (WEA04) 05:18
	16:39	17:28	18:17	20:08		20:56	35	18:59 (WEA04) 21:37
7	08:30	07:57	07:02	06:54		05:54		18:25 (WEA04) 05:18
	16:40	17:30	18:19	20:10		20:58	33	18:58 (WEA04) 21:38
8	08:30	07:55	07:00	06:52		05:52		18:26 (WEA04) 05:17
	16:42	17:32	18:21	20:11		20:59	32	18:58 (WEA04) 21:39
9	08:29	07:54	06:58	06:50		05:51		18:26 (WEA04) 05:17
	16:43	17:34	18:22	20:13		21:01	31	18:57 (WEA04) 21:39
10	08:29	07:52	06:56	06:47		05:49		18:28 (WEA04) 05:17
	16:44	17:35	18:24	20:15		21:03	28	18:56 (WEA04) 21:40
11	08:28	07:50	06:54	06:45		05:48		18:29 (WEA04) 05:16
	16:46	17:37	18:26	20:16		21:04	26	18:55 (WEA04) 21:41
12	08:28	07:48	06:52	06:43		05:46		18:30 (WEA04) 05:16
	16:47	17:39	18:27	20:18		21:06	24	18:54 (WEA04) 21:42
13	08:27	07:47	06:49	06:41		05:44		18:31 (WEA04) 05:16
	16:48	17:41	18:29	20:20		21:07	21	18:52 (WEA04) 21:42
14	08:26	07:45	06:47	06:39		05:43		18:34 (WEA04) 05:15
	16:50	17:42	18:31	20:21		21:09	17	18:51 (WEA04) 21:43
15	08:25	07:43	06:45	06:37		05:41		18:36 (WEA04) 05:15
	16:51	17:44	18:32	20:23		21:10	13	18:49 (WEA04) 21:43
16	08:25	07:41	06:43	06:35		18:37 (WEA04) 05:40		18:41 (WEA04) 05:15
	16:53	17:46	18:34	20:24	15	18:52 (WEA04) 21:11	2	18:43 (WEA04) 21:44
17	08:24	07:39	06:41	06:32		18:34 (WEA04) 05:39		05:15
	16:54	17:48	18:36	20:26	20	18:54 (WEA04) 21:13		21:44
18	08:23	07:37	06:38	06:30		18:31 (WEA04) 05:37		05:15
	16:56	17:50	18:37	20:28	25	18:56 (WEA04) 21:14		21:45
19	08:22	07:35	06:36	06:28		18:30 (WEA04) 05:36		05:15
	16:57	17:51	18:39	20:29	28	18:58 (WEA04) 21:16		21:45
20	08:21	07:33	06:34	06:26		18:28 (WEA04) 05:35		05:15
	16:59	17:53	18:41	20:31	31	18:59 (WEA04) 21:17		21:45
21	08:20	07:31	06:32	06:24		18:27 (WEA04) 05:33		05:15
	17:01	17:55	18:42	20:32	32	18:59 (WEA04) 21:19		21:46
22	08:19	07:29	06:29	06:22		18:26 (WEA04) 05:32		05:16
	17:02	17:57	18:44	20:34	34	19:00 (WEA04) 21:20		21:46
23	08:18	07:27	06:27	06:20		18:25 (WEA04) 05:31		05:16
	17:04	17:58	18:45	20:36	35	19:00 (WEA04) 21:21		21:46
24	08:17	07:25	06:25	06:18		18:24 (WEA04) 05:30		05:16
	17:06	18:00	18:47	20:37	37	19:01 (WEA04) 21:22		21:46
25	08:16	07:23	06:23	06:16		18:23 (WEA04) 05:29		05:16
	17:07	18:02	18:49	20:39	38	19:01 (WEA04) 21:24		21:46
26	08:14	07:21	06:20	06:14		18:23 (WEA04) 05:27		05:17
	17:09	18:04	18:50	20:41	38	19:01 (WEA04) 21:25		21:46
27	08:13	07:19	06:18	06:12		18:23 (WEA04) 05:26		05:17
	17:11	18:05	18:52	20:42	39	19:02 (WEA04) 21:26		21:46
28	08:12	07:17	06:16	06:10		18:23 (WEA04) 05:25		05:18
	17:12	18:07	18:54	20:44	39	19:02 (WEA04) 21:27		21:46
29	08:10		07:14	06:09		18:23 (WEA04) 05:24		05:18
	17:14		19:55	20:45	39	19:02 (WEA04) 21:29		21:46
30	08:09		07:12	06:07		18:22 (WEA04) 05:24		05:19
	17:16		19:57	20:47	39	19:01 (WEA04) 21:30		21:46
31	08:08		07:09			05:23		
	17:18		19:58			21:31		
Sonnenscheinstunden	264	280	367	414		480		492
astr.max.mögl.Beschattung				489		450		
Red.Sonnenscheinwahrsch.				0,37		0,40		
Reduktion Betriebsdauer				0,95		0,95		
Reduktion Windrichtung				0,68		0,68		
Gesamte Reduktion				0,24		0,26		
Met.wahrsch.Beschattung				117		116		

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP05 - Auf dem Ebenhahn 25, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember	
1	05:19	05:54	18:40 (WEA04)	06:41	07:28	07:19	08:08				
	21:46	21:16	25 19:05 (WEA04)	20:16	19:09	17:05	16:27				
2	05:20	05:55	18:39 (WEA04)	06:43	07:29	07:21	08:09				
	21:45	21:14	27 19:06 (WEA04)	20:14	19:07	17:04	16:27				
3	05:21	05:57	18:38 (WEA04)	06:44	07:31	07:22	08:10				
	21:45	21:12	29 19:07 (WEA04)	20:12	19:05	17:02	16:26				
4	05:21	05:58	18:37 (WEA04)	06:46	07:32	07:24	08:12				
	21:45	21:11	30 19:07 (WEA04)	20:10	19:02	17:00	16:26				
5	05:22	06:00	18:35 (WEA04)	06:47	07:34	07:26	08:13				
	21:44	21:09	33 19:08 (WEA04)	20:07	19:00	16:59	16:25				
6	05:23	06:01	18:35 (WEA04)	06:49	07:36	07:28	08:14				
	21:44	21:07	34 19:09 (WEA04)	20:05	18:58	16:57	16:25				
7	05:24	06:03	18:34 (WEA04)	06:50	07:37	07:29	08:15				
	21:43	21:06	35 19:09 (WEA04)	20:03	18:56	16:55	16:24				
8	05:25	06:04	18:34 (WEA04)	06:52	07:39	07:31	08:17				
	21:42	21:04	36 19:10 (WEA04)	20:01	18:54	16:54	16:24				
9	05:26	06:06	18:33 (WEA04)	06:54	07:41	07:33	08:18				
	21:42	21:02	36 19:09 (WEA04)	19:58	18:51	16:52	16:24				
10	05:27	06:07	18:32 (WEA04)	06:55	07:42	07:34	08:19				
	21:41	21:00	37 19:09 (WEA04)	19:56	18:49	16:51	16:24				
11	05:28	06:09	18:32 (WEA04)	06:57	07:44	07:36	08:20				
	21:40	20:59	38 19:10 (WEA04)	19:54	18:47	16:49	16:24				
12	05:29	06:10	18:31 (WEA04)	06:58	07:45	07:38	08:21				
	21:40	20:57	38 19:09 (WEA04)	19:52	18:45	16:48	16:23				
13	05:30	06:12	18:31 (WEA04)	07:00	07:47	07:39	08:22				
	21:39	20:55	39 19:10 (WEA04)	19:50	18:43	16:46	16:23				
14	05:31	06:13	18:30 (WEA04)	07:01	07:49	07:41	08:23				
	21:38	20:53	39 19:09 (WEA04)	19:47	18:41	16:45	16:23				
15	05:32	06:15	18:31 (WEA04)	07:03	07:50	07:43	08:24				
	21:37	20:51	38 19:09 (WEA04)	19:45	18:39	16:43	16:24				
16	05:33	06:17	18:30 (WEA04)	07:04	07:52	07:44	08:25				
	21:36	20:49	39 19:09 (WEA04)	19:43	18:37	16:42	16:24				
17	05:34	06:18	18:31 (WEA04)	07:06	07:54	07:46	08:25				
	21:35	20:47	38 19:09 (WEA04)	19:41	18:34	16:41	16:24				
18	05:35	06:20	18:30 (WEA04)	07:07	07:55	07:48	08:26				
	21:34	20:45	38 19:08 (WEA04)	19:38	18:32	16:40	16:24				
19	05:36	06:21	18:30 (WEA04)	07:09	07:57	07:49	08:27				
	21:33	20:43	36 19:06 (WEA04)	19:36	18:30	16:38	16:24				
20	05:38	06:23	18:31 (WEA04)	07:11	07:59	07:51	08:27				
	21:32	20:41	35 19:06 (WEA04)	19:34	18:28	16:37	16:25				
21	05:39	06:24	18:31 (WEA04)	07:12	08:00	07:53	08:28				
	21:31	20:39	34 19:05 (WEA04)	19:32	18:26	16:36	16:25				
22	05:40	06:26	18:32 (WEA04)	07:14	08:02	07:54	08:29				
	21:30	20:37	32 19:04 (WEA04)	19:29	18:24	16:35	16:26				
23	05:42	06:27	18:32 (WEA04)	07:15	08:04	07:56	08:29				
	21:28	20:35	30 19:02 (WEA04)	19:27	18:22	16:34	16:26				
24	05:43	06:29	18:34 (WEA04)	07:17	08:05	07:57	08:30				
	21:27	20:33	27 19:01 (WEA04)	19:25	18:20	16:33	16:27				
25	05:44	06:30	18:34 (WEA04)	07:18	07:07	07:59	08:30				
	21:26	20:31	25 18:59 (WEA04)	19:22	17:18	16:32	16:27				
26	05:46	06:32	18:37 (WEA04)	07:20	07:09	08:00	08:30				
	21:24	20:29	20 18:57 (WEA04)	19:20	17:17	16:31	16:28				
27	05:47	06:33	18:39 (WEA04)	07:21	07:10	08:02	08:31				
	21:23	20:27	14 18:53 (WEA04)	19:18	17:15	16:30	16:29				
28	05:48	18:48 (WEA04)	06:35	07:23	07:12	08:03	08:31				
	21:22	8 18:56 (WEA04)	20:25	19:16	17:13	16:29	16:30				
29	05:50	18:46 (WEA04)	06:37	07:25	07:14	08:05	08:31				
	21:20	14 19:00 (WEA04)	20:23	19:14	17:11	16:29	16:30				
30	05:51	18:43 (WEA04)	06:38	07:26	07:16	08:06	08:31				
	21:19	19 19:02 (WEA04)	20:20	19:11	17:09	16:28	16:31				
31	05:53	18:41 (WEA04)	06:40		07:17		08:31				
	21:17	22 19:03 (WEA04)	20:18		17:07		16:32				
Sonnenscheinstunden		496	450	380	333	270	250				
astr.max.mögl.Beschattung		63	882								
Red.Sonnenscheinwahrsch.		0,39	0,41								
Reduktion Betriebsdauer		0,95	0,95								
Reduktion Windrichtung		0,68	0,68								
Gesamte Reduktion		0,25	0,27								
Met.wahrsch.Beschattung		16	236								

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP06 - Im Stangenwald 3, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:31	08:06	07:15	07:07	06:05	05:22	19:18 (WEA04)
	16:33	17:19	18:09	20:00	20:48	21:32	30 19:48 (WEA04)
2	08:31	08:05	07:13	07:05	06:03	05:21	19:19 (WEA04)
	16:35	17:21	18:10	20:02	20:50	21:33	29 19:48 (WEA04)
3	08:31	08:03	07:11	17:03 (WEA01)	07:03	06:01	05:20 19:19 (WEA04)
	16:36	17:23	18:12	17:12 (WEA01)	20:03	20:52	21:34 29 19:48 (WEA04)
4	08:31	08:02	07:09	17:00 (WEA01)	07:00	05:59	05:20 19:20 (WEA04)
	16:37	17:25	18:14	17:14 (WEA01)	20:05	20:53	21:35 27 19:47 (WEA04)
5	08:31	08:00	07:07	16:58 (WEA01)	06:58	05:58	05:19 19:21 (WEA04)
	16:38	17:26	18:16	17:16 (WEA01)	20:07	20:55	21:36 26 19:47 (WEA04)
6	08:30	07:59	07:05	16:57 (WEA01)	06:56	05:56	19:28 (WEA04) 05:18 19:21 (WEA04)
	16:39	17:28	18:17	17:17 (WEA01)	20:08	20:56	8 19:36 (WEA04) 21:37 26 19:47 (WEA04)
7	08:30	07:57	07:02	16:56 (WEA01)	06:54	05:54	19:24 (WEA04) 05:18 19:22 (WEA04)
	16:40	17:30	18:19	17:17 (WEA01)	20:10	20:58	14 19:38 (WEA04) 21:38 25 19:47 (WEA04)
8	08:30	07:55	07:00	16:55 (WEA01)	06:52	05:52	19:22 (WEA04) 05:17 19:23 (WEA04)
	16:42	17:32	18:21	17:18 (WEA01)	20:11	20:59	19 19:41 (WEA04) 21:39 24 19:47 (WEA04)
9	08:29	07:54	06:58	16:54 (WEA01)	06:50	05:51	19:20 (WEA04) 05:17 19:22 (WEA04)
	16:43	17:34	18:22	17:17 (WEA01)	20:13	21:01	22 19:42 (WEA04) 21:39 25 19:47 (WEA04)
10	08:29	07:52	06:56	16:54 (WEA01)	06:47	05:49	19:20 (WEA04) 05:17 19:23 (WEA04)
	16:44	17:35	18:24	17:17 (WEA01)	20:15	21:03	24 19:44 (WEA04) 21:40 24 19:47 (WEA04)
11	08:28	07:50	06:54	16:54 (WEA01)	06:45	05:48	19:18 (WEA04) 05:16 19:24 (WEA04)
	16:46	17:37	18:26	17:17 (WEA01)	20:16	21:04	26 19:44 (WEA04) 21:41 23 19:47 (WEA04)
12	08:28	07:48	06:52	16:55 (WEA01)	06:43	05:46	19:18 (WEA04) 05:16 19:25 (WEA04)
	16:47	17:39	18:27	17:17 (WEA01)	20:18	21:06	27 19:45 (WEA04) 21:42 22 19:47 (WEA04)
13	08:27	07:47	06:49	16:55 (WEA01)	06:41	05:44	19:17 (WEA04) 05:16 19:24 (WEA04)
	16:48	17:41	18:29	17:16 (WEA01)	20:20	21:07	28 19:45 (WEA04) 21:42 22 19:46 (WEA04)
14	08:26	07:45	06:47	16:55 (WEA01)	06:39	05:43	19:16 (WEA04) 05:15 19:25 (WEA04)
	16:50	17:42	18:31	17:14 (WEA01)	20:21	21:09	30 19:46 (WEA04) 21:43 21 19:46 (WEA04)
15	08:25	07:43	06:45	16:56 (WEA01)	06:37	05:41	19:16 (WEA04) 05:15 19:26 (WEA04)
	16:51	17:44	18:32	17:13 (WEA01)	20:23	21:10	31 19:47 (WEA04) 21:43 20 19:46 (WEA04)
16	08:25	07:41	06:43	16:58 (WEA01)	06:35	05:40	19:15 (WEA04) 05:15 19:26 (WEA04)
	16:53	17:46	18:34	17:11 (WEA01)	20:24	21:11	32 19:47 (WEA04) 21:44 20 19:46 (WEA04)
17	08:24	07:39	06:40	17:02 (WEA01)	06:32	05:39	19:15 (WEA04) 05:15 19:27 (WEA04)
	16:54	17:48	18:36	17:08 (WEA01)	20:26	21:13	32 19:47 (WEA04) 21:44 19 19:46 (WEA04)
18	08:23	07:37	06:38		06:30	05:37	19:15 (WEA04) 05:15 19:27 (WEA04)
	16:56	17:50	18:37		20:28	21:14	33 19:48 (WEA04) 21:45 19 19:46 (WEA04)
19	08:22	07:35	06:36		06:28	05:36	19:16 (WEA04) 05:15 19:27 (WEA04)
	16:57	17:51	18:39		20:29	21:16	32 19:48 (WEA04) 21:45 19 19:46 (WEA04)
20	08:21	07:33	06:34		06:26	05:35	19:15 (WEA04) 05:15 19:27 (WEA04)
	16:59	17:53	18:41		20:31	21:17	33 19:48 (WEA04) 21:45 19 19:46 (WEA04)
21	08:20	07:31	06:32		06:24	05:33	19:15 (WEA04) 05:15 19:28 (WEA04)
	17:01	17:55	18:42		20:32	21:18	33 19:48 (WEA04) 21:46 19 19:47 (WEA04)
22	08:19	07:29	06:29		06:22	05:32	19:15 (WEA04) 05:16 19:28 (WEA04)
	17:02	17:57	18:44		20:34	21:20	33 19:48 (WEA04) 21:46 19 19:47 (WEA04)
23	08:18	07:27	06:27		06:20	05:31	19:15 (WEA04) 05:16 19:28 (WEA04)
	17:04	17:58	18:45		20:36	21:21	33 19:48 (WEA04) 21:46 19 19:47 (WEA04)
24	08:17	07:25	06:25		06:18	05:30	19:16 (WEA04) 05:16 19:28 (WEA04)
	17:06	18:00	18:47		20:37	21:22	32 19:48 (WEA04) 21:46 19 19:47 (WEA04)
25	08:16	07:23	06:23		06:16	05:29	19:16 (WEA04) 05:16 19:29 (WEA04)
	17:07	18:02	18:49		20:39	21:24	32 19:48 (WEA04) 21:46 19 19:48 (WEA04)
26	08:14	07:21	06:20		06:14	05:27	19:16 (WEA04) 05:17 19:28 (WEA04)
	17:09	18:03	18:50		20:40	21:25	32 19:48 (WEA04) 21:46 20 19:48 (WEA04)
27	08:13	07:19	06:18		06:12	05:26	19:16 (WEA04) 05:17 19:29 (WEA04)
	17:11	18:05	18:52		20:42	21:26	32 19:48 (WEA04) 21:46 20 19:49 (WEA04)
28	08:12	07:17	06:16		06:10	05:25	19:16 (WEA04) 05:18 19:28 (WEA04)
	17:12	18:07	18:54		20:44	21:27	32 19:48 (WEA04) 21:46 21 19:49 (WEA04)
29	08:10		07:14		06:09	05:24	19:18 (WEA04) 05:18 19:29 (WEA04)
	17:14		19:55		20:45	21:29	31 19:49 (WEA04) 21:46 21 19:50 (WEA04)
30	08:09		07:12		06:07	05:24	19:18 (WEA04) 05:19 19:28 (WEA04)
	17:16		19:57		20:47	21:30	30 19:48 (WEA04) 21:46 22 19:50 (WEA04)
31	08:08		07:09			05:23	19:18 (WEA04)
	17:18		19:58			21:31	30 19:48 (WEA04)
Sonnenscheinstunden	264	280	367	414	480	492	668
astr.max.mögl.Beschattung			272		741		
Red.Sonnenscheinwahrsch.			0,29		0,40		0,32
Reduktion Betriebsdauer			0,95		0,95		0,95
Reduktion Windrichtung			0,67		0,66		0,66
Gesamte Reduktion			0,18		0,25		0,20
Met.wahrsch.Beschattung			49		185		135

Tabellen-Layout: Die Daten für jeden Tag 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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP06 - Im Stangenwald 3, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember	
1	05:19	19:28 (WEA04)	05:54	19:29 (WEA04)	06:41	07:28	17:34 (WEA01)	07:19	08:08		
	21:46	23	19:51 (WEA04)	21:16	19:55 (WEA04)	20:16	19:09	22	17:56 (WEA01)	17:05	16:27
2	05:20	19:28 (WEA04)	05:55	19:29 (WEA04)	06:43	07:29	17:33 (WEA01)	07:21	08:09		
	21:45	23	19:51 (WEA04)	21:14	19:54 (WEA04)	20:14	19:07	23	17:56 (WEA01)	17:04	16:27
3	05:21	19:28 (WEA04)	05:57	19:31 (WEA04)	06:44	07:31	17:32 (WEA01)	07:22	08:10		
	21:45	24	19:52 (WEA04)	21:12	19:54 (WEA04)	20:12	19:05	23	17:55 (WEA01)	17:02	16:26
4	05:21	19:28 (WEA04)	05:58	19:31 (WEA04)	06:46	07:32	17:32 (WEA01)	07:24	08:12		
	21:45	24	19:52 (WEA04)	21:11	19:52 (WEA04)	20:10	19:02	23	17:55 (WEA01)	17:00	16:26
5	05:22	19:28 (WEA04)	06:00	19:33 (WEA04)	06:47	07:34	17:32 (WEA01)	07:26	08:13		
	21:44	25	19:53 (WEA04)	21:09	19:50 (WEA04)	20:07	19:00	23	17:55 (WEA01)	16:59	16:25
6	05:23	19:27 (WEA04)	06:01	19:35 (WEA04)	06:49	07:36	17:32 (WEA01)	07:28	08:14		
	21:44	26	19:53 (WEA04)	21:07	19:48 (WEA04)	20:05	18:58	22	17:54 (WEA01)	16:57	16:25
7	05:24	19:27 (WEA04)	06:03	19:40 (WEA04)	06:50	07:37	17:32 (WEA01)	07:29	08:15		
	21:43	27	19:54 (WEA04)	21:06	19:43 (WEA04)	20:03	18:56	21	17:53 (WEA01)	16:55	16:24
8	05:25	19:27 (WEA04)	06:04		06:52	07:39	17:33 (WEA01)	07:31	08:17		
	21:42	27	19:54 (WEA04)	21:04		20:01	18:54	19	17:52 (WEA01)	16:54	16:24
9	05:26	19:27 (WEA04)	06:06		06:54	07:41	17:34 (WEA01)	07:33	08:18		
	21:42	28	19:55 (WEA04)	21:02		19:58	18:51	16	17:50 (WEA01)	16:52	16:24
10	05:27	19:27 (WEA04)	06:07		06:55	07:42	17:36 (WEA01)	07:34	08:19		
	21:41	28	19:55 (WEA04)	21:00		19:56	18:49	12	17:48 (WEA01)	16:51	16:24
11	05:28	19:27 (WEA04)	06:09		06:57	07:44	17:40 (WEA01)	07:36	08:20		
	21:40	29	19:56 (WEA04)	20:59		18:47	4	17:44 (WEA01)	16:49	16:24	
12	05:29	19:27 (WEA04)	06:10		06:58	07:45			07:38	08:21	
	21:40	29	19:56 (WEA04)	20:57		18:45			16:48	16:23	
13	05:30	19:26 (WEA04)	06:12		07:00	07:47			07:39	08:22	
	21:39	31	19:57 (WEA04)	20:55		18:43			16:46	16:23	
14	05:31	19:26 (WEA04)	06:13		07:01	07:49			07:41	08:23	
	21:38	31	19:57 (WEA04)	20:53		18:41			16:45	16:23	
15	05:32	19:26 (WEA04)	06:15		07:03	07:50			07:43	08:24	
	21:37	31	19:57 (WEA04)	20:51		18:39			16:43	16:24	
16	05:33	19:26 (WEA04)	06:17		07:04	07:52			07:44	08:25	
	21:36	32	19:58 (WEA04)	20:49		18:37			16:42	16:24	
17	05:34	19:26 (WEA04)	06:18		07:06	07:54			07:46	08:25	
	21:35	32	19:58 (WEA04)	20:47		18:34			16:41	16:24	
18	05:35	19:25 (WEA04)	06:20		07:07	07:55			07:48	08:26	
	21:34	33	19:58 (WEA04)	20:45		18:32			16:40	16:24	
19	05:36	19:25 (WEA04)	06:21		07:09	07:57			07:49	08:27	
	21:33	33	19:58 (WEA04)	20:43		18:30			16:38	16:24	
20	05:38	19:25 (WEA04)	06:23		07:10	07:59			07:51	08:27	
	21:32	33	19:58 (WEA04)	20:41		18:28			16:37	16:25	
21	05:39	19:26 (WEA04)	06:24		07:12	08:00			07:53	08:28	
	21:31	33	19:59 (WEA04)	20:39		18:26			16:36	16:25	
22	05:40	19:26 (WEA04)	06:26		07:14	08:02			07:54	08:29	
	21:30	33	19:59 (WEA04)	20:37		18:24			16:35	16:26	
23	05:42	19:25 (WEA04)	06:27		07:15	08:04			07:56	08:29	
	21:28	33	19:58 (WEA04)	20:35		18:22			16:34	16:26	
24	05:43	19:25 (WEA04)	06:29		07:17	08:05			07:57	08:29	
	21:27	33	19:58 (WEA04)	20:33		18:20			16:33	16:27	
25	05:44	19:26 (WEA04)	06:30		07:18	07:07			07:59	08:30	
	21:26	33	19:59 (WEA04)	20:31		17:18			16:32	16:27	
26	05:46	19:26 (WEA04)	06:32		07:20	07:09			08:00	08:30	
	21:24	32	19:58 (WEA04)	20:29		17:17			16:31	16:28	
27	05:47	19:26 (WEA04)	06:33		07:21	17:41 (WEA01)	07:10		08:02	08:31	
	21:23	32	19:58 (WEA04)	20:27		19:18	11	17:52 (WEA01)	17:15	16:30	16:29
28	05:48	19:26 (WEA04)	06:35		07:23	17:38 (WEA01)	07:12		08:03	08:31	
	21:22	31	19:57 (WEA04)	20:25		19:16	15	17:53 (WEA01)	17:13	16:29	16:30
29	05:50	19:27 (WEA04)	06:37		07:25	17:36 (WEA01)	07:14		08:05	08:31	
	21:20	30	19:57 (WEA04)	20:23		19:14	19	17:55 (WEA01)	17:11	16:29	16:30
30	05:51	19:27 (WEA04)	06:38		07:26	17:35 (WEA01)	07:16		08:06	08:31	
	21:19	29	19:56 (WEA04)	20:20		19:11	21	17:56 (WEA01)	17:09	16:28	16:31
31	05:53	19:27 (WEA04)	06:40			07:17				08:31	
	21:17	29	19:56 (WEA04)	20:18		17:07				16:32	
Sonnenscheinstunden		496		450		380		333		270	250
astr.max.mögl.Beschattung		917		128		66		208			
Red.Sonnenscheinwahrsch.		0,39		0,41		0,37		0,27			
Reduktion Betriebsdauer		0,95		0,95		0,95		0,95			
Reduktion Windrichtung		0,66		0,66		0,67		0,67			
Gesamte Reduktion		0,24		0,26		0,23		0,17			
Met.wahrsch.Beschattung		222		33		15		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 (WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	--	---

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361

SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP07 - Zur Grünen Au 7, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	[Januar	[Februar	[März	[April	[Mai	[Juni		[Juli	[August	[September	[Oktober	[November	[Dezember	
1	08:31 16:33	08:06 17:19	07:15 18:09	07:07 20:00	06:05 20:48	05:22 21:32		05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:05	08:08 16:27	
2	08:31 16:35	08:05 17:21	07:13 18:10	07:05 20:02	06:03 20:50	05:21 21:33		05:20 21:45	05:55 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27	
3	08:31 16:36	08:03 17:23	07:11 18:12	07:03 20:03	06:01 20:52	05:20 21:34		05:21 21:45	05:57 21:12	06:44 20:12	07:31 19:05	07:22 17:02	08:10 16:26	
4	08:31 16:37	08:02 17:25	07:09 18:14	07:00 20:05	05:59 20:53	05:20 21:35		05:21 21:45	05:58 21:11	06:46 20:10	07:32 19:02	07:24 17:00	08:12 16:26	
5	08:31 16:38	08:00 17:26	07:07 18:16	06:58 20:07	05:58 20:55	05:19 21:36		05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00	07:26 16:59	08:13 16:25	
6	08:30 16:39	07:59 17:28	07:05 18:17	06:56 20:08	05:56 20:56	05:18 21:37		05:23 21:44	06:01 21:07	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25	
7	08:30 16:40	07:57 17:30	07:02 18:19	06:54 20:10	05:54 20:58	05:18 21:38		05:24 21:43	06:03 21:06	06:50 20:03	07:37 18:56	07:29 16:55	08:15 16:24	
8	08:30 16:42	07:55 17:32	07:00 18:21	06:52 20:11	05:52 20:59	05:17 21:39		05:25 21:42	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24	
9	08:29 16:43	07:54 17:34	06:58 18:22	06:50 20:13	05:51 21:01	05:17 21:39		05:26 21:42	06:06 21:02	06:54 19:58	07:41 18:51	07:33 16:52	08:18 16:24	
10	08:29 16:44	07:52 17:35	06:56 18:24	06:47 20:15	05:49 21:03	05:17 21:40		05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	08:19 16:24	
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 20:16	05:48 21:04	05:16 21:41		05:28 21:40	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24	
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 20:18	05:46 21:06	05:16 21:42		05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	08:21 16:23	
13	08:27 16:48	07:47 17:41	06:49 18:29	06:41 20:20	05:44 21:07	05:16 21:42	5	19:49 (WEA04) 19:54 (WEA04)	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:39 16:46	08:22 16:23
14	08:26 16:50	07:45 17:42	06:47 18:31	06:39 20:21	05:43 21:09	05:15 21:43	8	19:48 (WEA04) 19:56 (WEA04)	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	08:23 16:23
15	08:25 16:51	07:43 17:44	06:45 18:32	06:37 20:23	05:41 21:10	05:15 21:43	10	19:47 (WEA04) 19:57 (WEA04)	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	08:24 16:24
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 20:24	05:40 21:11	05:15 21:44	11	19:47 (WEA04) 19:58 (WEA04)	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:44 16:42	08:25 16:24
17	08:24 16:54	07:39 17:48	06:41 18:36	06:32 20:26	05:39 21:13	05:15 21:44	13	19:46 (WEA04) 19:59 (WEA04)	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:34	07:46 16:41	08:25 16:24
18	08:23 16:56	07:37 17:50	06:38 18:37	06:30 20:28	05:37 21:14	05:15 21:45	13	19:46 (WEA04) 19:59 (WEA04)	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	08:26 16:24
19	08:22 16:57	07:35 17:51	06:36 18:39	06:28 20:29	05:36 21:16	05:15 21:45	14	19:46 (WEA04) 20:00 (WEA04)	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:49 16:38	08:27 16:24
20	08:21 16:59	07:33 17:53	06:34 18:41	06:26 20:31	05:35 21:17	05:15 21:45	14	19:46 (WEA04) 20:00 (WEA04)	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	08:27 16:25
21	08:20 17:01	07:31 17:55	06:32 18:42	06:24 20:32	05:33 21:18	05:15 21:46	14	19:47 (WEA04) 20:01 (WEA04)	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	08:28 16:25
22	08:19 17:02	07:29 17:57	06:29 18:44	06:22 20:34	05:32 21:20	05:16 21:46	14	19:47 (WEA04) 20:01 (WEA04)	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	08:29 16:26
23	08:18 17:04	07:27 17:58	06:27 18:45	06:20 20:36	05:31 21:21	05:16 21:46	14	19:47 (WEA04) 20:01 (WEA04)	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	08:29 16:26
24	08:17 17:06	07:25 18:00	06:25 18:47	06:18 20:37	05:30 21:22	05:16 21:46	14	19:47 (WEA04) 20:01 (WEA04)	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:57 16:33	08:30 16:27
25	08:16 17:07	07:23 18:02	06:23 18:49	06:16 20:39	05:29 21:24	05:16 21:46	13	19:48 (WEA04) 20:01 (WEA04)	05:44 21:26	06:30 20:31	07:18 19:22	07:07 17:18	07:59 16:32	08:30 16:27
26	08:14 17:09	07:21 18:04	06:20 18:50	06:14 20:41	05:27 21:25	05:17 21:46	11	19:49 (WEA04) 20:00 (WEA04)	05:46 21:24	06:32 20:29	07:20 19:20	07:09 17:17	08:00 16:31	08:30 16:28
27	08:13 17:11	07:19 18:05	06:18 18:52	06:12 20:42	05:26 21:26	05:17 21:46	11	19:50 (WEA04) 20:01 (WEA04)	05:47 21:23	06:33 20:27	07:21 19:18	07:10 17:15	08:02 16:30	08:31 16:29
28	08:12 17:12	07:17 18:07	06:16 18:54	06:10 20:44	05:25 21:27	05:18 21:46	10	19:50 (WEA04) 20:00 (WEA04)	05:48 21:22	06:35 20:25	07:23 19:16	07:12 17:13	08:03 16:29	08:31 16:30
29	08:10 17:14		07:14 19:55	06:09 20:45	05:24 21:29	05:18 21:46	7	19:52 (WEA04) 19:59 (WEA04)	05:50 21:20	06:37 20:23	07:25 19:14	07:14 17:11	08:05 16:29	08:31 16:30
30	08:09 17:16		07:12 19:57	06:07 20:47	05:24 21:30	05:19 21:46	3	19:54 (WEA04) 19:57 (WEA04)	05:51 21:19	06:38 20:20	07:26 19:11	07:16 17:09	08:06 16:28	08:31 16:31
31	08:08 17:18		07:09 19:58		05:23 21:31			05:53 21:17	06:40 20:18		07:17 17:07		08:31 16:32	
Sonnenscheinstunden	264	280	367	414	480	492		496	450	380	333	270	250	
astr.max.mögl.Beschattung							199							
Red.Sonnenscheinwahrsch.							0,32							
Reduktion Betriebsdauer							0,95							
Reduktion Windrichtung							0,67							
Gesamte Reduktion							0,21							
Met.wahrsch.Beschattung							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	

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP08 - Auf d. Bühnhardt 6, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März		April	Mai		Juni	
1	08:31 16:33	08:06 17:19	07:15 18:09		07:07 20:00	06:05 20:48		05:22 21:32	28 19:46 (WEA04)
2	08:31 16:35	08:05 17:21	07:13 18:10		07:05 20:02	06:03 20:50		05:21 21:33	28 19:47 (WEA04)
3	08:31 16:36	08:03 17:23	07:11 18:12		07:03 20:03	06:01 20:52		05:20 21:34	30 19:46 (WEA04)
4	08:31 16:37	08:02 17:25	07:09 18:14		07:00 20:05	05:59 20:53		05:20 21:35	30 19:46 (WEA04)
5	08:31 16:38	08:00 17:26	07:07 18:16		06:58 20:07	05:58 20:55		05:19 21:36	31 19:46 (WEA04)
6	08:30 16:39	07:58 17:28	07:05 18:17		06:56 20:08	05:56 20:56		05:18 21:37	30 19:46 (WEA04)
7	08:30 16:40	07:57 17:30	07:02 18:19		06:54 20:10	05:54 20:58		05:18 21:38	31 19:46 (WEA04)
8	08:30 16:42	07:55 17:32	07:00 18:21		06:52 20:11	05:52 20:59		05:17 21:39	31 19:47 (WEA04)
9	08:29 16:43	07:54 17:34	06:58 18:22		06:50 20:13	05:51 21:01		05:17 21:39	32 19:46 (WEA04)
10	08:29 16:44	07:52 17:35	06:56 18:24	9	17:18 (WEA01) 17:27 (WEA01)	06:47 20:15	05:49 21:03	05:17 21:40	32 19:46 (WEA04)
11	08:28 16:46	07:50 17:37	06:54 18:26	15	17:15 (WEA01) 17:30 (WEA01)	06:45 20:16	05:48 21:04	05:16 21:41	32 19:47 (WEA04)
12	08:28 16:47	07:48 17:39	06:52 18:27	18	17:13 (WEA01) 17:31 (WEA01)	06:43 20:18	05:46 21:06	05:16 21:42	32 19:47 (WEA04)
13	08:27 16:48	07:47 17:41	06:49 18:29	21	17:12 (WEA01) 17:33 (WEA01)	06:41 20:20	05:44 21:07	05:16 21:42	33 19:46 (WEA04)
14	08:26 16:50	07:45 17:42	06:47 18:31	22	17:10 (WEA01) 17:32 (WEA01)	06:39 20:21	05:43 21:09	05:15 21:43	32 19:47 (WEA04)
15	08:25 16:51	07:43 17:44	06:45 18:32	24	17:09 (WEA01) 17:33 (WEA01)	06:37 20:23	05:41 21:10	05:15 21:43	33 19:47 (WEA04)
16	08:25 16:53	07:41 17:46	06:43 18:34	24	17:09 (WEA01) 17:33 (WEA01)	06:35 20:24	05:40 21:11	05:15 21:44	33 19:47 (WEA04)
17	08:24 16:54	07:39 17:48	06:40 18:36	24	17:09 (WEA01) 17:33 (WEA01)	06:32 20:26	05:39 21:13	05:15 21:44	33 19:47 (WEA04)
18	08:23 16:56	07:37 17:50	06:38 18:37	24	17:08 (WEA01) 17:32 (WEA01)	06:30 20:28	05:37 21:14	05:15 21:45	33 19:47 (WEA04)
19	08:22 16:57	07:35 17:51	06:36 18:39	24	17:08 (WEA01) 17:32 (WEA01)	06:28 20:29	05:36 21:16	05:15 21:45	33 19:47 (WEA04)
20	08:21 16:59	07:33 17:53	06:34 18:41	23	17:09 (WEA01) 17:32 (WEA01)	06:26 20:31	05:35 21:17	05:15 21:45	32 19:48 (WEA04)
21	08:20 17:01	07:31 17:55	06:32 18:42	22	17:09 (WEA01) 17:31 (WEA01)	06:24 20:32	05:33 21:18	05:15 21:46	33 19:49 (WEA04)
22	08:19 17:02	07:29 17:57	06:29 18:44	19	17:10 (WEA01) 17:29 (WEA01)	06:22 20:34	05:32 21:20	05:16 21:46	33 19:49 (WEA04)
23	08:18 17:04	07:27 17:58	06:27 18:45	16	17:11 (WEA01) 17:27 (WEA01)	06:20 20:36	05:31 21:21	05:16 21:46	33 19:48 (WEA04)
24	08:17 17:06	07:25 18:00	06:25 18:47	12	17:13 (WEA01) 17:25 (WEA01)	06:18 20:37	05:30 21:22	05:16 21:46	33 19:48 (WEA04)
25	08:16 17:07	07:23 18:02	06:23 18:49			06:16 20:39	05:29 21:24	05:16 21:46	33 19:49 (WEA04)
26	08:14 17:09	07:21 18:03	06:20 18:50			06:14 20:40	05:27 21:25	05:17 21:46	33 19:49 (WEA04)
27	08:13 17:11	07:19 18:05	06:18 18:52			06:12 20:42	05:26 21:26	05:17 21:46	33 19:50 (WEA04)
28	08:12 17:12	07:17 18:07	06:16 18:54			06:10 20:44	05:25 21:27	05:18 21:46	32 19:50 (WEA04)
29	08:10 17:14		07:14 19:55			06:09 20:45	05:24 21:29	05:18 21:46	33 19:50 (WEA04)
30	08:09 17:16		07:12 19:57			06:07 20:47	05:24 21:30	05:19 21:46	33 19:50 (WEA04)
31	08:08 17:18		07:09 19:58			05:23 21:31	20:14 (WEA04) 20:14 (WEA04)		
Sonnenscheinstunden	264	280	367		414	480		492	
astr.max.mögl.Beschattung			297			189		958	
Red.Sonnenscheinwahrsch.			0,29			0,40		0,32	
Reduktion Betriebsdauer			0,95			0,95		0,95	
Reduktion Windrichtung			0,66			0,67		0,67	
Gesamte Reduktion			0,18			0,25		0,21	
Met.wahrsch.Beschattung			53			48		197	

Tabellen-Layout: Die Daten für jeden Tag 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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP08 - Auf d. Bühnhardt 6, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	05:19		19:51 (WEA04)	05:54	06:41		07:28		17:51 (WEA01)	07:19	08:08	
	21:46	32	20:23 (WEA04)	21:16	20:16		19:09	20	18:11 (WEA01)	17:05	16:27	
2	05:20		19:50 (WEA04)	05:55	06:43		07:29		17:53 (WEA01)	07:21	08:09	
	21:45	33	20:23 (WEA04)	21:14	20:14		19:07	16	18:09 (WEA01)	17:04	16:27	
3	05:21		19:51 (WEA04)	05:57	06:44		07:31		17:54 (WEA01)	07:22	08:10	
	21:45	32	20:23 (WEA04)	21:12	20:12		19:05	12	18:06 (WEA01)	17:02	16:26	
4	05:21		19:52 (WEA04)	05:58	06:46		07:32			07:24	08:12	
	21:44	31	20:23 (WEA04)	21:11	20:10		19:02			17:00	16:26	
5	05:22		19:52 (WEA04)	06:00	06:47		07:34			07:26	08:13	
	21:44	32	20:24 (WEA04)	21:09	20:07		19:00			16:59	16:25	
6	05:23		19:52 (WEA04)	06:01	06:49		07:36			07:28	08:14	
	21:44	31	20:23 (WEA04)	21:07	20:05		18:58			16:57	16:25	
7	05:24		19:52 (WEA04)	06:03	06:50		07:37			07:29	08:15	
	21:43	31	20:23 (WEA04)	21:06	20:03		18:56			16:55	16:24	
8	05:25		19:53 (WEA04)	06:04	06:52		07:39			07:31	08:17	
	21:42	30	20:23 (WEA04)	21:04	20:01		18:54			16:54	16:24	
9	05:26		19:53 (WEA04)	06:06	06:54		07:41			07:33	08:18	
	21:42	30	20:23 (WEA04)	21:02	19:58		18:51			16:52	16:24	
10	05:27		19:54 (WEA04)	06:07	06:55		07:42			07:34	08:19	
	21:41	29	20:23 (WEA04)	21:00	19:56		18:49			16:51	16:24	
11	05:28		19:55 (WEA04)	06:09	06:57		07:44			07:36	08:20	
	21:40	28	20:23 (WEA04)	20:59	19:54		18:47			16:49	16:24	
12	05:29		19:55 (WEA04)	06:10	06:58		07:45			07:38	08:21	
	21:40	28	20:23 (WEA04)	20:57	19:52		18:45			16:48	16:23	
13	05:30		19:56 (WEA04)	06:12	07:00		07:47			07:39	08:22	
	21:39	26	20:22 (WEA04)	20:55	19:50		18:43			16:46	16:23	
14	05:31		19:56 (WEA04)	06:13	07:01		07:49			07:41	08:23	
	21:38	26	20:22 (WEA04)	20:53	19:47		18:41			16:45	16:23	
15	05:32		19:57 (WEA04)	06:15	07:03		07:50			07:43	08:24	
	21:37	24	20:21 (WEA04)	20:51	19:45		18:39			16:43	16:24	
16	05:33		19:58 (WEA04)	06:17	07:04		07:52			07:44	08:25	
	21:36	23	20:21 (WEA04)	20:49	19:43		18:37			16:42	16:24	
17	05:34		19:59 (WEA04)	06:18	07:06		07:54			07:46	08:25	
	21:35	21	20:20 (WEA04)	20:47	19:41		18:34			16:41	16:24	
18	05:35		20:00 (WEA04)	06:20	07:07		07:55			07:48	08:26	
	21:34	19	20:19 (WEA04)	20:45	19:38		18:32			16:40	16:24	
19	05:37		20:01 (WEA04)	06:21	07:09	18:01 (WEA01)	07:57			07:49	08:27	
	21:33	16	20:17 (WEA04)	20:43	19:36	18:11 (WEA01)	18:30			16:38	16:24	
20	05:38		20:02 (WEA04)	06:23	07:11	17:58 (WEA01)	07:59			07:51	08:27	
	21:32	14	20:16 (WEA04)	20:41	19:34	18:13 (WEA01)	18:28			16:37	16:25	
21	05:39		20:06 (WEA04)	06:24	07:12	17:55 (WEA01)	08:00			07:53	08:28	
	21:31	8	20:14 (WEA04)	20:39	19:31	18:14 (WEA01)	18:26			16:36	16:25	
22	05:40			06:26	07:14	17:54 (WEA01)	08:02			07:54	08:29	
	21:30			20:37	19:29	18:15 (WEA01)	18:24			16:35	16:26	
23	05:42			06:27	07:15	17:54 (WEA01)	08:04			07:56	08:29	
	21:28			20:35	19:27	18:16 (WEA01)	18:22			16:34	16:26	
24	05:43			06:29	07:17	17:52 (WEA01)	08:05			07:57	08:29	
	21:27			20:33	19:25	18:16 (WEA01)	18:20			16:33	16:27	
25	05:44			06:30	07:18	17:52 (WEA01)	07:07			07:59	08:30	
	21:26			20:31	19:22	18:16 (WEA01)	17:18			16:32	16:27	
26	05:46			06:32	07:20	17:51 (WEA01)	07:09			08:00	08:30	
	21:24			20:29	19:20	18:15 (WEA01)	17:17			16:31	16:28	
27	05:47			06:33	07:21	17:51 (WEA01)	07:10			08:02	08:30	
	21:23			20:27	19:18	18:15 (WEA01)	17:15			16:30	16:29	
28	05:48			06:35	07:23	17:50 (WEA01)	07:12			08:03	08:31	
	21:22			20:25	19:16	18:14 (WEA01)	17:13			16:29	16:30	
29	05:50			06:37	07:25	17:51 (WEA01)	07:14			08:05	08:31	
	21:20			20:23	19:14	18:13 (WEA01)	17:11			16:29	16:30	
30	05:51			06:38	07:26	17:51 (WEA01)	07:16			08:06	08:31	
	21:19			20:20	19:11	18:13 (WEA01)	17:09			16:28	16:31	
31	05:53			06:40			07:17				08:31	
	21:17			20:18			17:07				16:32	
Sonnenscheinstunden		496		450	380		333		270	250		
astr.max.mögl.Beschattung		544			251		48					
Red.Sonnenscheinwahrsch.		0,39			0,37		0,27					
Reduktion Betriebsdauer		0,95			0,95		0,95					
Reduktion Windrichtung		0,67			0,66		0,66					
Gesamte Reduktion		0,25			0,23		0,17					
Met.wahrsch.Beschattung		134			58		8					

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP09 - Auf d. Bühnhardt 2, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März		April	Mai	Juni
1	08:31	08:06	07:15		07:07	06:05	05:22
	16:33	17:19	18:09		20:00	20:48	21:32
2	08:31	08:05	07:13		07:05	06:03	05:21
	16:35	17:21	18:10		20:02	20:50	21:33
3	08:31	08:03	07:11		07:03	06:01	05:20
	16:36	17:23	18:12		20:03	20:52	21:34
4	08:31	08:02	07:09		07:00	05:59	05:20
	16:37	17:25	18:14		20:05	20:53	21:35
5	08:31	08:00	07:07		06:58	05:58	05:19
	16:38	17:26	18:16		20:07	20:55	21:36
6	08:30	07:59	07:05		06:56	05:56	05:18
	16:39	17:28	18:17		20:08	20:56	21:37
7	08:30	07:57	07:02		06:54	05:54	05:18
	16:40	17:30	18:19		20:10	20:58	21:38
8	08:30	07:55	07:00		06:52	05:52	05:17
	16:42	17:32	18:21		20:11	20:59	21:39
9	08:29	07:54	06:58		06:50	05:51	05:17
	16:43	17:34	18:22		20:13	21:01	21:39
10	08:29	07:52	06:56		06:47	05:49	05:17
	16:44	17:35	18:24		20:15	21:03	21:40
11	08:28	07:50	06:54		06:45	05:48	05:16
	16:46	17:37	18:26		20:16	21:04	21:41
12	08:28	07:48	06:52	17:21 (WEA01)	06:43	05:46	05:16
	16:47	17:39	18:27	5	17:26 (WEA01)	20:18	21:06
13	08:27	07:47	06:49	17:17 (WEA01)	06:41	05:44	05:16
	16:48	17:41	18:29	13	17:30 (WEA01)	20:20	21:07
14	08:26	07:45	06:47	17:14 (WEA01)	06:39	05:43	05:15
	16:50	17:42	18:31	17	17:31 (WEA01)	20:21	21:09
15	08:25	07:43	06:45	17:12 (WEA01)	06:37	05:41	05:15
	16:51	17:44	18:32	21	17:33 (WEA01)	20:23	21:10
16	08:25	07:41	06:43	17:11 (WEA01)	06:35	05:40	05:15
	16:53	17:46	18:34	23	17:34 (WEA01)	20:24	21:11
17	08:24	07:39	06:40	17:11 (WEA01)	06:32	05:39	05:15
	16:54	17:48	18:36	24	17:35 (WEA01)	20:26	21:13
18	08:23	07:37	06:38	17:09 (WEA01)	06:30	05:37	05:15
	16:56	17:50	18:37	25	17:34 (WEA01)	20:28	21:14
19	08:22	07:35	06:36	17:09 (WEA01)	06:28	05:36	05:15
	16:57	17:51	18:39	25	17:34 (WEA01)	20:29	21:16
20	08:21	07:33	06:34	17:09 (WEA01)	06:26	05:35	05:15
	16:59	17:53	18:41	25	17:34 (WEA01)	20:31	21:17
21	08:20	07:31	06:32	17:09 (WEA01)	06:24	05:33	05:15
	17:01	17:55	18:42	25	17:34 (WEA01)	20:32	21:18
22	08:19	07:29	06:29	17:08 (WEA01)	06:22	05:32	05:16
	17:02	17:57	18:44	25	17:33 (WEA01)	20:34	21:20
23	08:18	07:27	06:27	17:09 (WEA01)	06:20	05:31	05:16
	17:04	17:58	18:45	23	17:32 (WEA01)	20:36	21:21
24	08:17	07:25	06:25	17:09 (WEA01)	06:18	05:30	05:16
	17:06	18:00	18:47	22	17:31 (WEA01)	20:37	21:22
25	08:16	07:23	06:23	17:10 (WEA01)	06:16	05:29	05:16
	17:07	18:02	18:49	20	17:30 (WEA01)	20:39	21:24
26	08:14	07:21	06:20	17:11 (WEA01)	06:14	05:27	05:17
	17:09	18:04	18:50	17	17:28 (WEA01)	20:40	21:25
27	08:13	07:19	06:18	17:13 (WEA01)	06:12	05:26	05:17
	17:11	18:05	18:52	13	17:26 (WEA01)	20:42	21:26
28	08:12	07:17	06:16	17:18 (WEA01)	06:10	05:25	05:18
	17:12	18:07	18:54	3	17:21 (WEA01)	20:44	21:27
29	08:10		07:14		06:09	05:24	05:18
	17:14		19:55		20:45	21:29	21:46
30	08:09		07:12		06:07	05:24	05:19
	17:16		19:57		20:47	21:30	21:46
31	08:08		07:09			05:23	
	17:18		19:58			21:31	
Sonnenscheinstunden	264	280	367		414	480	492
astr.max.mögl.Beschattung			326				413
Red.Sonnenscheinwahrsch.			0,29				0,32
Reduktion Betriebsdauer			0,95				0,95
Reduktion Windrichtung			0,67				0,67
Gesamte Reduktion			0,18				0,21
Met.wahrsch.Beschattung			59				85

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:
17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP09 - Auf d. Bühnhardt 2, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember	
1	05:19	20:08 (WEA04)	05:54	06:41		07:28	17:58 (WEA01)	07:19	08:08		
	21:46	20:24 (WEA04)	21:16	20:16		19:09	18:07 (WEA01)	17:05	16:27		
2	05:20	20:08 (WEA04)	05:55	06:43		07:29		07:21	08:09		
	21:45	20:23 (WEA04)	21:14	20:14		19:07		17:04	16:27		
3	05:21	20:10 (WEA04)	05:57	06:44		07:31		07:22	08:10		
	21:45	20:22 (WEA04)	21:12	20:12		19:05		17:02	16:26		
4	05:21	20:11 (WEA04)	05:58	06:46		07:32		07:24	08:12		
	21:44	20:22 (WEA04)	21:11	20:10		19:02		17:00	16:26		
5	05:22	20:13 (WEA04)	06:00	06:47		07:34		07:26	08:13		
	21:44	20:21 (WEA04)	21:09	20:07		19:00		16:59	16:25		
6	05:23		06:01	06:49		07:36		07:28	08:14		
	21:44		21:07	20:05		18:58		16:57	16:25		
7	05:24		06:03	06:50		07:37		07:29	08:15		
	21:43		21:06	20:03		18:56		16:55	16:24		
8	05:25		06:04	06:52		07:39		07:31	08:17		
	21:42		21:04	20:01		18:54		16:54	16:24		
9	05:26		06:06	06:54		07:41		07:33	08:18		
	21:42		21:02	19:58		18:51		16:52	16:24		
10	05:27		06:07	06:55		07:42		07:34	08:19		
	21:41		21:00	19:56		18:49		16:51	16:24		
11	05:28		06:09	06:57		07:44		07:36	08:20		
	21:40		20:59	19:54		18:47		16:49	16:24		
12	05:29		06:10	06:58		07:45		07:38	08:21		
	21:40		20:57	19:52		18:45		16:48	16:23		
13	05:30		06:12	07:00		07:47		07:39	08:22		
	21:39		20:55	19:50		18:43		16:46	16:23		
14	05:31		06:13	07:01		07:49		07:41	08:23		
	21:38		20:53	19:47		18:41		16:45	16:23		
15	05:32		06:15	07:03		07:50		07:43	08:24		
	21:37		20:51	19:45		18:39		16:43	16:24		
16	05:33		06:17	07:04		07:52		07:44	08:25		
	21:36		20:49	19:43	11	18:14 (WEA01)	18:37	16:42	16:24		
17	05:34		06:18	07:06		07:54		07:46	08:25		
	21:35		20:47	19:41	16	18:16 (WEA01)	18:34	16:41	16:24		
18	05:35		06:20	07:07		07:55		07:48	08:26		
	21:34		20:45	19:38	20	18:18 (WEA01)	18:32	16:40	16:24		
19	05:37		06:21	07:09		07:57		07:49	08:27		
	21:33		20:43	19:36	22	18:18 (WEA01)	18:30	16:38	16:24		
20	05:38		06:23	07:11		07:59		07:51	08:27		
	21:32		20:41	19:34	24	18:19 (WEA01)	18:28	16:37	16:25		
21	05:39		06:24	07:12		08:00		07:53	08:28		
	21:31		20:39	19:31	24	18:18 (WEA01)	18:26	16:36	16:25		
22	05:40		06:26	07:14		08:02		07:54	08:29		
	21:30		20:37	19:29	26	18:19 (WEA01)	18:24	16:35	16:26		
23	05:42		06:27	07:15		08:04		07:56	08:29		
	21:28		20:35	19:27	26	18:19 (WEA01)	18:22	16:34	16:26		
24	05:43		06:29	07:17		08:05		07:57	08:29		
	21:27		20:33	19:25	26	18:18 (WEA01)	18:20	16:33	16:27		
25	05:44		06:30	07:18		07:07		07:59	08:30		
	21:26		20:31	19:22	25	18:18 (WEA01)	17:18	16:32	16:27		
26	05:46		06:32	07:20		07:09		08:00	08:30		
	21:24		20:29	19:20	24	18:16 (WEA01)	17:17	16:31	16:28		
27	05:47		06:33	07:21		07:10		08:02	08:30		
	21:23		20:27	19:18	23	18:16 (WEA01)	17:15	16:30	16:29		
28	05:48		06:35	07:23		07:12		08:03	08:31		
	21:22		20:25	19:16	21	18:14 (WEA01)	17:13	16:29	16:30		
29	05:50		06:37	07:25		07:14		08:05	08:31		
	21:20		20:23	19:14	19	18:13 (WEA01)	17:11	16:29	16:30		
30	05:51		06:38	07:26		07:16		08:06	08:31		
	21:19		20:20	19:11	15	18:11 (WEA01)	17:09	16:28	16:31		
31	05:53		06:40			07:17			08:31		
	21:17		20:18			17:07			16:32		
Sonnenscheinstunden	496		450	380		333		270	250		
astr.max.mögl.Beschattung	62			322		9					
Red.Sonnenscheinwahrsch.	0,39			0,37		0,27					
Reduktion Betriebsdauer	0,95			0,95		0,95					
Reduktion Windrichtung	0,67			0,67		0,67					
Gesamte Reduktion	0,25			0,23		0,17					
Met.wahrsch.Beschattung	15			75		2					

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP10 - In d. Eichwies 2, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:31 16:34	08:06 17:19	07:15 18:09	07:07 20:00	06:05 20:48	05:22 21:32	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:05	08:08 16:27
2	08:31 16:35	08:05 17:21	07:13 18:10	07:05 20:02	06:03 20:50	05:21 21:33	05:20 21:45	05:56 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	08:31 16:36	08:03 17:23	07:11 18:12	07:03 20:03	06:01 20:52	05:20 21:34	05:21 21:45	05:57 21:12	06:44 20:12	07:31 19:05	07:22 17:02	08:10 16:26
4	08:31 16:37	08:02 17:25	07:09 18:14	07:00 20:05	05:59 20:53	05:20 21:35	05:21 21:45	05:58 21:11	06:46 20:10	07:32 19:02	07:24 17:00	08:12 16:26
5	08:31 16:38	08:00 17:26	07:07 18:16	07:07 20:07	06:58 20:55	05:19 21:36	05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00	07:26 16:59	08:13 16:25
6	08:30 16:39	07:59 17:28	07:05 18:17	06:56 20:08	05:56 20:56	05:18 21:37	05:23 21:44	06:01 21:07	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	08:30 16:40	07:57 17:30	07:02 18:19	06:54 20:10	05:54 20:58	05:18 21:38	05:24 21:43	06:03 21:06	06:50 20:03	07:37 18:56	07:29 16:55	08:15 16:24
8	08:30 16:42	07:55 17:32	07:00 18:21	06:52 20:11	05:52 20:59	05:17 21:39	05:25 21:42	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24
9	08:29 16:43	07:54 17:34	06:58 18:22	06:50 20:13	05:51 21:01	05:17 21:39	05:26 21:42	06:06 21:02	06:54 19:58	07:41 18:51	07:33 16:52	08:18 16:24
10	08:29 16:44	07:52 17:35	06:56 18:24	06:47 20:15	05:49 21:03	05:17 21:40	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	08:19 16:24
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 20:16	05:48 21:04	05:16 21:41	05:28 21:40	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 20:18	05:46 21:06	05:16 21:42	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	08:21 16:23
13	08:27 16:48	07:47 17:41	06:49 18:29	06:41 20:20	05:44 21:07	05:16 21:42	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:39 16:46	08:22 16:23
14	08:26 16:50	07:45 17:42	06:47 18:31	06:39 20:21	05:43 21:09	05:15 21:43	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	08:23 16:23
15	08:25 16:51	07:43 17:44	06:45 18:32	06:37 20:23	05:41 21:10	05:15 21:43	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	08:24 16:24
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 20:24	05:40 21:11	05:15 21:44	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:44 16:42	08:25 16:24
17	08:24 16:54	07:39 17:48	06:41 18:36	06:33 20:26	05:39 21:13	05:15 21:44	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	08:25 16:24
18	08:23 16:56	07:37 17:50	06:38 18:37	06:30 20:28	05:37 21:14	05:15 21:45	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	08:26 16:24
19	08:22 16:57	07:35 17:51	06:36 18:39	06:28 20:29	05:36 21:16	05:15 21:45	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:49 16:38	08:27 16:24
20	08:21 16:59	07:33 17:53	06:34 18:41	06:26 20:31	05:35 21:17	05:15 21:45	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	08:27 16:25
21	08:20 17:01	07:31 17:55	06:32 18:42	06:24 20:32	05:33 21:18	05:15 21:46	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	08:28 16:25
22	08:19 17:02	07:29 17:57	06:29 18:44	06:22 20:34	05:32 21:20	05:16 21:46	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	08:29 16:26
23	08:18 17:04	07:27 17:58	06:27 18:45	06:20 20:36	05:31 21:21	05:16 21:46	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	08:29 16:26
24	08:17 17:06	07:25 18:00	06:25 18:47	06:18 20:37	05:30 21:22	05:16 21:46	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:57 16:33	08:29 16:27
25	08:16 17:07	07:23 18:02	06:23 18:49	06:16 20:39	05:29 21:24	05:16 21:46	05:44 21:26	06:30 20:31	07:18 19:22	07:07 18:18	07:59 16:32	08:30 16:27
26	08:14 17:09	07:21 18:04	06:20 18:50	06:14 20:41	05:27 21:25	05:17 21:46	05:46 21:24	06:32 20:29	07:20 19:20	07:09 18:17	08:00 16:31	08:30 16:28
27	08:13 17:11	07:19 18:05	06:18 18:52	06:12 20:42	05:26 21:26	05:17 21:46	05:47 21:23	06:33 20:27	07:21 19:18	07:10 18:15	08:02 16:30	08:31 16:29
28	08:12 17:12	07:17 18:07	06:16 18:54	06:10 20:44	05:25 21:27	05:18 21:46	05:48 21:22	06:35 20:25	07:23 19:16	07:12 18:13	08:03 16:29	08:31 16:30
29	08:10 17:14	07:14 19:55	07:14 20:45	06:09 21:29	05:24 21:29	05:18 21:46	05:50 21:20	06:37 20:23	07:25 19:14	07:14 18:11	08:05 16:29	08:31 16:30
30	08:09 17:16	07:12 19:57	07:12 20:47	06:07 21:30	05:24 21:30	05:19 21:46	05:51 21:19	06:38 20:20	07:26 19:11	07:16 18:09	08:06 16:28	08:31 16:31
31	08:08 17:18	07:09 19:58	07:09 21:31	05:23 21:31	05:23 21:31	05:23 21:31	05:53 21:17	06:40 20:18	07:17 19:07	07:17 18:07	08:31 16:32	08:31 16:32
Sonnenscheinstunden	264	280	367	414	480	492	496	450	380	333	270	250
astr.max.mögl.Beschattung												
Red.Sonnenscheinwahrsch.												
Reduktion Betriebsdauer												
Reduktion Windrichtung												
Gesamte Reduktion												
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)
	Minuten mit Schatten		

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP11 - In d. Eichwies 27, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:31 16:34	08:06 17:19	07:15 18:09	07:07 20:00	06:05 20:48	05:22 21:32	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:05	08:08 16:27
2	08:31 16:35	08:05 17:21	07:13 18:10	07:05 20:02	06:03 20:50	05:21 21:33	05:20 21:45	05:56 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	08:31 16:36	08:03 17:23	07:11 18:12	07:03 20:03	06:01 20:52	05:20 21:34	05:21 21:45	05:57 21:12	06:44 20:12	07:31 19:05	07:22 17:02	08:10 16:26
4	08:31 16:37	08:02 17:25	07:09 18:14	07:00 20:05	05:59 20:53	05:20 21:35	05:21 21:45	05:58 21:11	06:46 20:10	07:33 19:02	07:24 17:00	08:12 16:26
5	08:31 16:38	08:00 17:26	07:07 18:16	06:58 20:07	05:58 20:55	05:19 21:36	05:22 21:44	05:52 21:09	06:47 20:07	07:34 19:00	07:26 16:59	08:13 16:25
6	08:30 16:39	07:59 17:28	07:05 18:17	06:56 20:08	05:56 20:56	05:18 21:37	05:23 21:44	06:01 21:07	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	08:30 16:40	07:57 17:30	07:02 18:19	06:54 20:10	05:54 20:58	05:18 21:38	05:24 21:43	06:03 21:06	06:50 20:03	07:37 18:56	07:29 16:55	08:15 16:24
8	08:30 16:42	07:55 17:32	07:00 18:21	06:52 20:11	05:52 20:59	05:17 21:39	05:25 21:42	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24
9	08:29 16:43	07:54 17:34	06:58 18:22	06:50 20:13	05:51 21:01	05:17 21:39	05:26 21:42	06:06 21:02	06:54 19:58	07:41 18:51	07:33 16:52	08:18 16:24
10	08:29 16:44	07:52 17:35	06:56 18:24	06:47 20:15	05:49 21:03	05:17 21:40	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	08:19 16:24
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 20:16	05:48 21:04	05:16 21:41	05:28 21:40	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 20:18	05:46 21:06	05:16 21:42	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	08:21 16:23
13	08:27 16:48	07:47 17:41	06:49 18:29	06:41 20:20	05:44 21:07	05:16 21:42	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:39 16:46	08:22 16:23
14	08:26 16:50	07:45 17:42	06:47 18:31	06:39 20:21	05:43 21:09	05:15 21:43	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	08:23 16:23
15	08:25 16:51	07:43 17:44	06:45 18:32	06:37 20:23	05:41 21:10	05:15 21:43	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	08:24 16:24
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 20:24	05:40 21:11	05:15 21:44	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:44 16:42	08:25 16:24
17	08:24 16:54	07:39 17:48	06:41 18:36	06:33 20:26	05:39 21:13	05:15 21:44	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	08:25 16:24
18	08:23 16:56	07:37 17:50	06:38 18:37	06:30 20:28	05:37 21:14	05:15 21:45	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	08:26 16:24
19	08:22 16:57	07:35 17:51	06:36 18:39	06:28 20:29	05:36 21:16	05:15 21:45	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:49 16:38	08:27 16:24
20	08:21 16:59	07:33 17:53	06:34 18:41	06:26 20:31	05:35 21:17	05:15 21:45	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	08:27 16:25
21	08:20 17:01	07:31 17:55	06:32 18:42	06:24 20:32	05:33 21:18	05:15 21:46	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	08:28 16:25
22	08:19 17:02	07:29 17:57	06:29 18:44	06:22 20:34	05:32 21:20	05:16 21:46	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	08:29 16:26
23	08:18 17:04	07:27 17:58	06:27 18:45	06:20 20:36	05:31 21:21	05:16 21:46	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	08:29 16:26
24	08:17 17:06	07:25 18:00	06:25 18:47	06:18 20:37	05:30 21:22	05:16 21:46	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:57 16:33	08:29 16:27
25	08:16 17:07	07:23 18:02	06:23 18:49	06:16 20:39	05:29 21:24	05:16 21:46	05:44 21:26	06:30 20:31	07:18 19:23	07:07 18:18	07:59 16:32	08:30 16:27
26	08:14 17:09	07:21 18:04	06:20 18:50	06:14 20:41	05:27 21:25	05:17 21:46	05:46 21:24	06:32 20:29	07:20 19:20	07:09 18:17	08:00 16:31	08:30 16:28
27	08:13 17:11	07:19 18:05	06:18 18:52	06:12 20:42	05:26 21:26	05:17 21:46	05:47 21:23	06:34 20:27	07:21 19:18	07:10 18:15	08:02 16:30	08:31 16:29
28	08:12 17:12	07:17 18:07	06:16 18:54	06:10 20:44	05:25 21:27	05:18 21:46	05:48 21:22	06:35 20:25	07:23 19:16	07:12 18:13	08:03 16:29	08:31 16:30
29	08:10 17:14	07:14 19:55	07:14 20:45	06:09 21:29	05:24 21:29	05:18 21:46	05:50 21:20	06:37 20:23	07:25 19:14	07:14 18:11	08:05 16:29	08:31 16:30
30	08:09 17:16	07:12 19:57	07:12 20:47	06:07 21:30	05:24 21:30	05:19 21:46	05:51 21:19	06:38 20:20	07:26 19:11	07:16 18:09	08:06 16:28	08:31 16:31
31	08:08 17:18	07:09 19:58	07:09 21:31	05:23 21:31	05:23 21:31	05:23 21:31	05:53 21:17	06:40 20:18	07:17 19:07	07:17 18:07	08:31 16:32	08:31 16:32
Sonnenscheinstunden	264	280	367	414	480	492	496	450	380	333	270	250
astr.max.mögl.Beschattung												
Red.Sonnenscheinwahrsch.												
Reduktion Betriebsdauer												
Reduktion Windrichtung												
Gesamte Reduktion												
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)
	Minuten mit Schatten		

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP12 - In d. Eichwies 23, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

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

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierte Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP13 - Neue Str. 63, 57520 Kausen

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP14 - Lärchenweg 13, 57520 Molzhain

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April		Mai		Juni
1	08:31	08:06	07:15	07:07		06:05		07:25 (WEA01) 05:22
	16:34	17:20	18:09	20:00		20:49	6	07:31 (WEA01) 21:32
2	08:31	08:05	07:13	07:05		06:03		05:21
	16:35	17:21	18:11	20:02		20:50		21:33
3	08:31	08:03	07:11	07:03		06:01		05:21
	16:36	17:23	18:12	20:03		20:52		21:34
4	08:31	08:02	07:09	07:01		06:00		05:20
	16:37	17:25	18:14	20:05		20:53		21:35
5	08:31	08:00	07:07	06:58		05:58		05:19
	16:38	17:27	18:16	20:07		20:55		21:36
6	08:30	07:59	07:05	06:56		05:56		05:19
	16:39	17:28	18:17	20:08		20:57		21:37
7	08:30	07:57	07:03	06:54		05:54		05:18
	16:40	17:30	18:19	20:10		20:58		21:38
8	08:30	07:55	07:00	06:52		07:32 (WEA01) 05:53		05:18
	16:42	17:32	18:21	20:12	4	07:36 (WEA01) 21:00		21:39
9	08:29	07:54	06:58	06:50		07:27 (WEA01) 05:51		05:17
	16:43	17:34	18:22	20:13	14	07:41 (WEA01) 21:01		21:40
10	08:29	07:52	06:56	06:48		07:24 (WEA01) 05:49		05:17
	16:44	17:36	18:24	20:15	19	07:43 (WEA01) 21:03		21:40
11	08:28	07:50	06:54	06:45		07:22 (WEA01) 05:48		05:16
	16:46	17:37	18:26	20:16	23	07:45 (WEA01) 21:04		21:41
12	08:28	07:48	06:52	06:43		07:19 (WEA01) 05:46		05:16
	16:47	17:39	18:27	20:18	26	07:45 (WEA01) 21:06		21:42
13	08:27	07:47	06:49	06:41		07:18 (WEA01) 05:45		05:16
	16:49	17:41	18:29	20:20	28	07:46 (WEA01) 21:07		21:42
14	08:26	07:45	06:47	06:39		07:17 (WEA01) 05:43		05:16
	16:50	17:43	18:31	20:21	29	07:46 (WEA01) 21:09		21:43
15	08:26	07:43	06:45	06:37		07:16 (WEA01) 05:42		05:15
	16:51	17:44	18:32	20:23	31	07:47 (WEA01) 21:10		21:43
16	08:25	07:41	06:43	06:35		07:16 (WEA01) 05:40		05:15
	16:53	17:46	18:34	20:25	31	07:47 (WEA01) 21:12		21:44
17	08:24	07:39	06:41	06:33		07:15 (WEA01) 05:39		05:15
	16:54	17:48	18:36	20:26	32	07:47 (WEA01) 21:13		21:44
18	08:23	07:37	06:38	06:31		07:15 (WEA01) 05:37		05:15
	16:56	17:50	18:37	20:28	32	07:47 (WEA01) 21:14		21:45
19	08:22	07:35	06:36	06:29		07:14 (WEA01) 05:36		05:15
	16:58	17:51	18:39	20:29	33	07:47 (WEA01) 21:16		21:45
20	08:21	07:33	06:34	06:26		07:14 (WEA01) 05:35		05:15
	16:59	17:53	18:41	20:31	33	07:47 (WEA01) 21:17		21:46
21	08:20	07:32	06:32	06:24		07:14 (WEA01) 05:33		05:16
	17:01	17:55	18:42	20:33	32	07:46 (WEA01) 21:19		21:46
22	08:19	07:30	06:30	06:22		07:14 (WEA01) 05:32		05:16
	17:02	17:57	18:44	20:34	31	07:45 (WEA01) 21:20		21:46
23	08:18	07:28	06:27	06:20		07:14 (WEA01) 05:31		05:16
	17:04	17:58	18:46	20:36	31	07:45 (WEA01) 21:21		21:46
24	08:17	07:26	06:25	06:18		07:14 (WEA01) 05:30		05:16
	17:06	18:00	18:47	20:37	30	07:44 (WEA01) 21:23		21:46
25	08:16	07:24	06:23	06:16		07:15 (WEA01) 05:29		05:17
	17:07	18:02	18:49	20:39	28	07:43 (WEA01) 21:24		21:46
26	08:14	07:21	06:21	06:14		07:16 (WEA01) 05:28		05:17
	17:09	18:04	18:50	20:41	27	07:43 (WEA01) 21:25		21:46
27	08:13	07:19	06:18	06:13		07:17 (WEA01) 05:27		05:17
	17:11	18:05	18:52	20:42	24	07:41 (WEA01) 21:26		21:46
28	08:12	07:17	06:16	06:11		07:18 (WEA01) 05:26		05:18
	17:13	18:07	18:54	20:44	21	07:39 (WEA01) 21:28		21:46
29	08:11		07:14	06:09		07:19 (WEA01) 05:25		05:18
	17:14		19:55	20:45	18	07:37 (WEA01) 21:29		21:46
30	08:09		07:12	06:07		07:21 (WEA01) 05:24		05:19
	17:16		19:57	20:47	14	07:35 (WEA01) 21:30		21:46
31	08:08		07:09			05:23		
	17:18		19:59			21:31		
Sonnenscheinstunden	264	280	367	414		480		492
astr.max.mögl.Beschattung				591		6		
Red.Sonnenscheinwahrsch.				0,37		0,40		
Reduktion Betriebsdauer				0,95		0,95		
Reduktion Windrichtung				0,68		0,68		
Gesamte Reduktion				0,24		0,26		
Met.wahrsch.Beschattung				141		2		

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP14 - Lärchenweg 13, 57520 Molzhain

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:20 21:46	05:54 21:16	06:41 20:16	07:21 (WEA01) 19:09	07:19 17:06	08:08 16:27
2	05:20 21:45	05:56 21:14	06:43 20:14	07:22 (WEA01) 19:07	07:21 17:04	08:09 16:27
3	05:21 21:45	05:57 21:12	06:44 20:12	07:25 (WEA01) 19:05	07:23 17:02	08:11 16:26
4	05:22 21:45	05:59 21:11	06:46 20:10	07:29 (WEA01) 19:03	07:24 17:00	08:12 16:26
5	05:22 21:44	06:00 21:09	06:48 20:07	07:34 19:00	07:26 16:59	08:13 16:25
6	05:23 21:44	06:02 21:08	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	05:24 21:43	06:03 21:06	06:51 20:03	07:37 18:56	07:29 16:55	08:16 16:25
8	05:25 21:43	06:05 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	07:33 16:52	08:18 16:24
10	05:27 21:41	06:08 21:00	06:55 19:56	07:42 18:49	07:34 16:51	08:19 16:24
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24
12	05:29 21:40	06:11 20:57	07:32 (WEA01) 19:52	07:46 18:45	07:38 16:48	08:21 16:24
13	05:30 21:39	06:12 20:55	07:29 (WEA01) 19:50	07:47 18:43	07:40 16:46	08:22 16:24
14	05:31 21:38	06:14 20:53	07:26 (WEA01) 19:47	07:49 18:41	07:41 16:45	08:23 16:24
15	05:32 21:37	06:15 20:51	07:25 (WEA01) 19:45	07:50 18:39	07:43 16:44	08:24 16:24
16	05:33 21:36	06:17 20:49	07:23 (WEA01) 19:43	07:52 18:37	07:45 16:42	08:25 16:24
17	05:34 21:35	06:18 20:47	07:23 (WEA01) 19:41	07:54 18:35	07:46 16:41	08:25 16:24
18	05:35 21:34	06:20 20:45	07:21 (WEA01) 19:38	07:55 18:33	07:48 16:40	08:26 16:24
19	05:37 21:33	06:21 20:43	07:21 (WEA01) 19:36	07:57 18:31	07:50 16:39	08:27 16:25
20	05:38 21:32	06:23 20:41	07:20 (WEA01) 19:34	07:59 18:29	07:51 16:37	08:28 16:25
21	05:39 21:31	06:24 20:39	07:20 (WEA01) 19:32	08:00 18:26	07:53 16:36	08:28 16:25
22	05:40 21:30	06:26 20:37	07:19 (WEA01) 19:29	08:02 18:25	07:54 16:35	08:29 16:26
23	05:42 21:28	06:27 20:35	07:18 (WEA01) 19:27	08:04 18:23	07:56 16:34	08:29 16:26
24	05:43 21:27	06:29 20:33	07:18 (WEA01) 19:25	08:05 18:21	07:58 16:33	08:30 16:27
25	05:44 21:26	06:31 20:31	07:17 (WEA01) 19:23	08:07 17:19	07:59 16:32	08:30 16:28
26	05:46 21:24	06:32 20:29	07:18 (WEA01) 19:20	07:09 17:17	08:01 16:31	08:30 16:28
27	05:47 21:23	06:34 20:27	07:18 (WEA01) 19:18	07:11 17:15	08:02 16:30	08:31 16:29
28	05:49 21:22	06:35 20:25	07:18 (WEA01) 19:16	07:12 17:13	08:04 16:30	08:31 16:30
29	05:50 21:20	06:37 20:23	07:18 (WEA01) 19:14	07:14 17:11	08:05 16:29	08:31 16:31
30	05:51 21:19	06:38 20:21	07:19 (WEA01) 19:11	07:16 17:09	08:06 16:28	08:31 16:31
31	05:53 21:17	06:40 20:18	07:19 (WEA01) 19:08	07:17 17:07		08:31 16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung		543	60			
Red.Sonnenscheinwahrsch.		0,41	0,37			
Reduktion Betriebsdauer		0,95	0,95			
Reduktion Windrichtung		0,68	0,68			
Gesamte Reduktion		0,27	0,24			
Met.wahrsch.Beschattung		145	14			

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP15 - Auf d. Höhe 25, 57520 Molzhain

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April		Mai	Juni	
1	08:31	08:06	07:15	07:07		06:05	05:22	06:16 (WEA02)
	16:34	17:20	18:09	20:00		20:49	21:32	06:20 (WEA02)
2	08:31	08:05	07:13	07:05		06:03	05:21	06:12 (WEA02)
	16:35	17:21	18:11	20:02		20:50	21:33	06:23 (WEA02)
3	08:31	08:03	07:11	07:03		06:01	05:21	06:10 (WEA02)
	16:36	17:23	18:12	20:03		20:52	21:34	06:25 (WEA02)
4	08:31	08:02	07:09	07:01		06:00	05:20	06:10 (WEA02)
	16:37	17:25	18:14	20:05		20:53	21:35	06:27 (WEA02)
5	08:31	08:00	07:07	06:58	07:35 (WEA01)	05:58	05:19	06:08 (WEA02)
	16:38	17:27	18:16	20:07	7 07:42 (WEA01)	20:55	21:36	06:28 (WEA02)
6	08:30	07:59	07:05	06:56		07:30 (WEA01)	05:56	06:08 (WEA02)
	16:39	17:28	18:17	20:08	16 07:46 (WEA01)	20:57	21:37	06:30 (WEA02)
7	08:30	07:57	07:03	06:54		07:28 (WEA01)	05:54	06:07 (WEA02)
	16:40	17:30	18:19	20:10	20 07:48 (WEA01)	20:58	21:38	06:30 (WEA02)
8	08:30	07:55	07:00	06:52		07:26 (WEA01)	05:53	06:07 (WEA02)
	16:42	17:32	18:21	20:12	24 07:50 (WEA01)	21:00	21:39	06:31 (WEA02)
9	08:29	07:54	06:58	06:50		07:25 (WEA01)	05:51	06:05 (WEA02)
	16:43	17:34	18:22	20:13	26 07:51 (WEA01)	21:01	21:40	06:31 (WEA02)
10	08:29	07:52	06:56	06:48		07:24 (WEA01)	05:49	06:05 (WEA02)
	16:44	17:36	18:24	20:15	27 07:51 (WEA01)	21:03	21:40	06:32 (WEA02)
11	08:28	07:50	06:54	06:45		07:23 (WEA01)	05:48	06:05 (WEA02)
	16:46	17:37	18:26	20:16	29 07:52 (WEA01)	21:04	21:41	06:33 (WEA02)
12	08:28	07:48	06:52	06:43		07:21 (WEA01)	05:46	06:06 (WEA02)
	16:47	17:39	18:27	20:18	30 07:51 (WEA01)	21:06	21:42	06:34 (WEA02)
13	08:27	07:47	06:49	06:41		07:20 (WEA01)	05:45	06:06 (WEA02)
	16:49	17:41	18:29	20:20	32 07:52 (WEA01)	21:07	21:42	06:35 (WEA02)
14	08:26	07:45	06:47	06:39		07:20 (WEA01)	05:43	06:05 (WEA02)
	16:50	17:43	18:31	20:21	32 07:52 (WEA01)	21:09	21:43	06:34 (WEA02)
15	08:26	07:43	06:45	06:37		07:19 (WEA01)	05:42	06:05 (WEA02)
	16:51	17:44	18:32	20:23	33 07:52 (WEA01)	21:10	21:43	06:35 (WEA02)
16	08:25	07:41	06:43	06:35		07:19 (WEA01)	05:40	06:05 (WEA02)
	16:53	17:46	18:34	20:25	32 07:51 (WEA01)	21:12	21:44	06:35 (WEA02)
17	08:24	07:39	06:41	06:33		07:19 (WEA01)	05:39	06:05 (WEA02)
	16:54	17:48	18:36	20:26	32 07:51 (WEA01)	21:13	21:44	06:36 (WEA02)
18	08:23	07:37	06:38	06:31		07:19 (WEA01)	05:37	06:05 (WEA02)
	16:56	17:50	18:37	20:28	31 07:50 (WEA01)	21:14	21:45	06:36 (WEA02)
19	08:22	07:35	06:36	06:29		07:19 (WEA01)	05:36	06:05 (WEA02)
	16:58	17:51	18:39	20:29	31 07:50 (WEA01)	21:16	21:45	06:36 (WEA02)
20	08:21	07:33	06:34	06:26		07:20 (WEA01)	05:35	06:06 (WEA02)
	16:59	17:53	18:41	20:31	29 07:49 (WEA01)	21:17	21:46	06:37 (WEA02)
21	08:20	07:32	06:32	06:24		07:20 (WEA01)	05:33	06:06 (WEA02)
	17:01	17:55	18:42	20:33	28 07:48 (WEA01)	21:19	21:46	06:37 (WEA02)
22	08:19	07:30	06:30	06:22		07:21 (WEA01)	05:32	06:06 (WEA02)
	17:02	17:57	18:44	20:34	26 07:47 (WEA01)	21:20	21:46	06:37 (WEA02)
23	08:18	07:28	06:27	06:20		07:21 (WEA01)	05:31	06:06 (WEA02)
	17:04	17:58	18:46	20:36	24 07:45 (WEA01)	21:21	21:46	06:37 (WEA02)
24	08:17	07:26	06:25	06:18		07:22 (WEA01)	05:30	06:07 (WEA02)
	17:06	18:00	18:47	20:37	22 07:44 (WEA01)	21:23	21:46	06:38 (WEA02)
25	08:16	07:24	06:23	06:16		07:24 (WEA01)	05:29	06:07 (WEA02)
	17:07	18:02	18:49	20:39	18 07:42 (WEA01)	21:24	21:46	06:38 (WEA02)
26	08:14	07:21	06:21	06:14		07:27 (WEA01)	05:28	06:07 (WEA02)
	17:09	18:04	18:50	20:41	13 07:40 (WEA01)	21:25	21:46	06:38 (WEA02)
27	08:13	07:19	06:18	06:13		07:31 (WEA01)	05:27	06:08 (WEA02)
	17:11	18:05	18:52	20:42	4 07:35 (WEA01)	21:26	21:46	06:38 (WEA02)
28	08:12	07:17	06:16	06:11		05:26	05:18	06:08 (WEA02)
	17:13	18:07	18:54	20:44		21:28	21:46	06:38 (WEA02)
29	08:11		07:14	06:09		05:25	05:18	06:09 (WEA02)
	17:14		19:55	20:45		21:29	21:46	06:38 (WEA02)
30	08:09		07:12	06:07		05:24	05:19	06:09 (WEA02)
	17:16		19:57	20:47		21:30	21:46	06:37 (WEA02)
31	08:08		07:09			05:23		
	17:18		19:59			21:31		
Sonnenscheinstunden	264	280	367	414		480	492	
astr.max.mögl.Beschattung				566			790	
Red.Sonnenscheinwahrsch.				0,37			0,32	
Reduktion Betriebsdauer				0,95			0,95	
Reduktion Windrichtung				0,68			0,66	
Gesamte Reduktion				0,24			0,20	
Met.wahrsch.Beschattung				135			161	

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP15 - Auf d. Höhe 25, 57520 Molzhain

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli			August			September			Oktober			November			Dezember		
1	05:20		06:09 (WEA02)	05:54		06:41		07:22 (WEA01)	07:28		07:19		07:08		08:08		
	21:46	29	06:38 (WEA02)	21:16		20:16	29	07:51 (WEA01)	19:09		17:06		16:27		16:27		
2	05:20		06:10 (WEA02)	05:56		06:43		07:22 (WEA01)	07:29		07:21		08:09		08:09		
	21:45	28	06:38 (WEA02)	21:14		20:14	27	07:49 (WEA01)	19:07		17:04		16:27		16:27		
3	05:21		06:10 (WEA02)	05:57		06:44		07:23 (WEA01)	07:31		07:23		08:11		08:11		
	21:45	27	06:37 (WEA02)	21:13		20:12	26	07:49 (WEA01)	19:05		17:02		16:26		16:26		
4	05:22		06:12 (WEA02)	05:59		06:46		07:23 (WEA01)	07:33		07:24		08:12		08:12		
	21:45	25	06:37 (WEA02)	21:11		20:10	24	07:47 (WEA01)	19:03		17:00		16:26		16:26		
5	05:22		06:13 (WEA02)	06:00		06:48		07:25 (WEA01)	07:34		07:26		08:13		08:13		
	21:44	24	06:37 (WEA02)	21:09		20:07	20	07:45 (WEA01)	19:00		16:59		16:25		16:25		
6	05:23		06:14 (WEA02)	06:02		06:49		07:26 (WEA01)	07:36		07:28		08:14		08:14		
	21:44	22	06:36 (WEA02)	21:08		20:05	16	07:42 (WEA01)	18:58		16:57		16:25		16:25		
7	05:24		06:14 (WEA02)	06:03		06:51		07:30 (WEA01)	07:37		07:29		08:16		08:16		
	21:43	21	06:35 (WEA02)	21:06		20:03	8	07:38 (WEA01)	18:56		16:55		16:25		16:25		
8	05:25		06:15 (WEA02)	06:05		06:52			07:39		07:31		08:17		08:17		
	21:43	19	06:34 (WEA02)	21:04		20:01			18:54		16:54		16:24		16:24		
9	05:26		06:17 (WEA02)	06:06		06:54			07:41		07:33		08:18		08:18		
	21:42	16	06:33 (WEA02)	21:02		19:59			18:52		16:52		16:24		16:24		
10	05:27		06:19 (WEA02)	06:08		06:55			07:42		07:34		08:19		08:19		
	21:41	13	06:32 (WEA02)	21:00		19:56			18:49		16:51		16:24		16:24		
11	05:28		06:21 (WEA02)	06:09		06:57			07:44		07:36		08:20		08:20		
	21:41	8	06:29 (WEA02)	20:59		19:54			18:47		16:49		16:24		16:24		
12	05:29			06:11		06:58			07:46		07:38		08:21		08:21		
	21:40			20:57		19:52			18:45		16:48		16:24		16:24		
13	05:30			06:12		07:00			07:47		07:40		08:22		08:22		
	21:39			20:55		19:50			18:43		16:46		16:24		16:24		
14	05:31			06:14		07:01			07:49		07:41		08:23		08:23		
	21:38			20:53		19:47			18:41		16:45		16:24		16:24		
15	05:32			06:15		07:03			07:50		07:43		08:24		08:24		
	21:37			20:51		19:45			18:39		16:44		16:24		16:24		
16	05:33			06:17		07:04			07:52		07:45		08:25		08:25		
	21:36			20:49	7	07:43 (WEA01)			18:37		16:42		16:24		16:24		
17	05:34			06:18		07:33 (WEA01)			07:54		07:46		08:25		08:25		
	21:35			20:47	14	07:47 (WEA01)			18:35		16:41		16:24		16:24		
18	05:35			06:20		07:30 (WEA01)			07:55		07:48		08:26		08:26		
	21:34			20:45	19	07:49 (WEA01)			18:33		16:40		16:24		16:24		
19	05:37			06:21		07:29 (WEA01)			07:57		07:50		08:27		08:27		
	21:33			20:43	22	07:51 (WEA01)			18:31		16:39		16:25		16:25		
20	05:38			06:23		07:27 (WEA01)			07:59		07:51		08:28		08:28		
	21:32			20:41	24	07:51 (WEA01)			18:29		16:37		16:25		16:25		
21	05:39			06:24		07:26 (WEA01)			08:00		07:53		08:28		08:28		
	21:31			20:39	27	07:53 (WEA01)			18:26		16:36		16:25		16:25		
22	05:40			06:26		07:25 (WEA01)			08:02		07:54		08:29		08:29		
	21:30			20:37	28	07:53 (WEA01)			18:25		16:35		16:26		16:26		
23	05:42			06:27		07:23 (WEA01)			08:04		07:56		08:29		08:29		
	21:28			20:35	30	07:53 (WEA01)			18:23		16:34		16:26		16:26		
24	05:43			06:29		07:23 (WEA01)			08:05		07:58		08:30		08:30		
	21:27			20:33	31	07:54 (WEA01)			18:21		16:33		16:27		16:27		
25	05:44			06:31		07:22 (WEA01)			07:07		07:59		08:30		08:30		
	21:26			20:31	31	07:53 (WEA01)			17:19		16:32		16:28		16:28		
26	05:46			06:32		07:22 (WEA01)			07:09		08:01		08:30		08:30		
	21:24			20:29	32	07:54 (WEA01)			17:17		16:31		16:28		16:28		
27	05:47			06:34		07:21 (WEA01)			07:11		08:02		08:31		08:31		
	21:23			20:27	32	07:53 (WEA01)			17:15		16:30		16:29		16:29		
28	05:49			06:35		07:21 (WEA01)			07:12		08:04		08:31		08:31		
	21:22			20:25	32	07:53 (WEA01)			17:13		16:30		16:30		16:30		
29	05:50			06:37		07:21 (WEA01)			07:14		08:05		08:31		08:31		
	21:20			20:23	32	07:53 (WEA01)			17:11		16:29		16:31		16:31		
30	05:51			06:38		07:21 (WEA01)			07:16		08:06		08:31		08:31		
	21:19			20:21	32	07:53 (WEA01)			17:09		16:28		16:31		16:31		
31	05:53			06:40		07:21 (WEA01)			07:17				08:31		08:31		
	21:17			20:18	30	07:51 (WEA01)			17:07				16:32		16:32		
Sonnenscheinstunden	496			450		380			333		270		250				
astr.max.mögl.Beschattung		232		423		150											
Red.Sonnenscheinwahrsch.		0,39		0,41		0,37											
Reduktion Betriebsdauer		0,95		0,95		0,95											
Reduktion Windrichtung		0,66		0,68		0,68											
Gesamte Reduktion		0,24		0,27		0,24											
Met.wahrsch.Beschattung		57		113		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 (WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattenende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	--	---

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP16 - Lindentalstraße 42, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	June
1	08:31 16:34	08:06 17:20	07:15 18:09	07:55 (WEA01) 25 08:20 (WEA01)	07:07 26 08:48 (WEA02)	06:57 (WEA03) 14 07:11 (WEA03)
2	08:31 16:35	08:05 17:21	07:13 18:11	07:55 (WEA01) 25 08:20 (WEA01)	07:05 22 08:46 (WEA02)	06:54 (WEA03) 19 07:13 (WEA03)
3	08:31 16:36	08:03 17:23	07:11 18:12	07:55 (WEA01) 25 08:20 (WEA01)	07:03 18 08:44 (WEA02)	06:52 (WEA03) 23 07:15 (WEA03)
4	08:31 16:37	08:02 17:25	07:09 18:14	07:55 (WEA01) 25 08:20 (WEA01)	07:01 10 08:40 (WEA02)	06:50 (WEA03) 26 07:16 (WEA03)
5	08:31 16:38	08:00 17:27	07:07 18:16	07:55 (WEA01) 24 08:19 (WEA01)	06:58 20:07	06:49 (WEA03) 29 07:18 (WEA03)
6	08:30 16:39	07:59 17:28	07:05 18:17	07:55 (WEA01) 23 08:18 (WEA01)	06:56 20:08	06:48 (WEA03) 30 07:19 (WEA03)
7	08:30 16:40	07:57 17:30	07:03 18:19	07:56 (WEA01) 21 08:17 (WEA01)	06:54 20:10	06:47 (WEA03) 32 07:20 (WEA03)
8	08:30 16:42	07:55 17:32	07:00 18:21	07:58 (WEA01) 17 08:15 (WEA01)	06:52 20:12	06:46 (WEA03) 34 07:22 (WEA03)
9	08:29 16:43	07:54 17:34	06:58 18:22	08:00 (WEA01) 13 08:13 (WEA01)	06:50 20:13	06:45 (WEA03) 35 07:24 (WEA03)
10	08:29 16:44	07:52 17:36	06:56 18:24	08:02 (WEA01) 7 08:09 (WEA01)	06:48 20:15	06:45 (WEA03) 36 07:26 (WEA03)
11	08:28 16:46	07:50 17:37	06:54 18:26	08:09 (WEA01)	06:45 20:16	06:44 (WEA03) 36 07:28 (WEA03)
12	08:28 16:47	07:48 17:39	06:52 18:27		06:43 20:18	06:44 (WEA03) 37 07:29 (WEA03)
13	08:27 16:49	07:47 17:41	06:50 18:29	07:35 (WEA02) 15 07:50 (WEA02)	06:41 20:20	06:44 (WEA03) 38 07:30 (WEA03)
14	08:26 16:50	07:45 17:43	06:47 18:31	07:32 (WEA02) 20 07:52 (WEA02)	06:39 20:21	06:43 (WEA03) 38 07:31 (WEA03)
15	08:26 16:51	07:43 17:44	06:45 18:32	07:29 (WEA02) 24 07:53 (WEA02)	06:37 20:23	06:44 (WEA03) 38 07:32 (WEA03)
16	08:25 16:53	07:41 17:46	06:43 18:34	07:27 (WEA02) 28 07:55 (WEA02)	06:35 20:25	06:44 (WEA03) 38 07:33 (WEA03)
17	08:24 16:54	07:39 17:48	06:41 18:36	07:26 (WEA02) 30 07:56 (WEA02)	06:33 20:26	06:43 (WEA03) 39 07:34 (WEA03)
18	08:23 16:56	07:37 17:50	06:38 18:37	07:25 (WEA02) 32 07:57 (WEA02)	06:31 20:28	06:43 (WEA03) 39 07:35 (WEA03)
19	08:22 16:58	07:35 17:51	06:36 18:39	07:23 (WEA02) 34 07:57 (WEA02)	06:29 20:29	06:44 (WEA03) 38 07:36 (WEA03)
20	08:21 16:59	07:34 17:53	06:34 18:41	07:22 (WEA02) 35 07:57 (WEA02)	06:26 20:31	06:44 (WEA03) 38 07:37 (WEA03)
21	08:20 17:01	07:32 17:55	06:32 18:42	07:22 (WEA02) 36 07:58 (WEA02)	06:24 20:33	06:43 (WEA03) 38 07:38 (WEA03)
22	08:19 17:02	07:30 17:57	06:30 18:44	07:21 (WEA02) 37 07:58 (WEA02)	06:22 20:34	06:44 (WEA03) 37 07:39 (WEA03)
23	08:18 17:04	07:28 17:58	06:27 18:46	07:20 (WEA02) 37 07:57 (WEA02)	06:20 20:36	06:44 (WEA03) 37 07:40 (WEA03)
24	08:17 17:06	07:26 18:00	06:25 18:47	07:20 (WEA02) 37 07:57 (WEA02)	06:18 20:37	06:44 (WEA03) 37 07:41 (WEA03)
25	08:16 17:07	07:24 18:02	06:23 18:49	07:20 (WEA02) 37 07:57 (WEA02)	06:16 20:39	06:45 (WEA03) 35 07:42 (WEA03)
26	08:14 17:09	07:22 18:04	06:21 18:50	07:20 (WEA02) 36 07:56 (WEA02)	06:14 20:41	06:45 (WEA03) 35 07:43 (WEA03)
27	08:13 17:11	07:19 18:05	06:18 18:52	07:19 (WEA02) 36 07:55 (WEA02)	06:13 20:42	06:45 (WEA03) 35 07:44 (WEA03)
28	08:12 17:13	07:17 18:07	06:16 18:54	07:20 (WEA02) 34 07:54 (WEA02)	06:11 20:44	06:47 (WEA03) 33 07:45 (WEA03)
29	08:11 17:14		06:14 19:15	07:20 (WEA02) 33 08:53 (WEA02)	06:09 20:45	06:47 (WEA03) 33 07:46 (WEA03)
30	08:09 17:16		06:12 19:17	07:21 (WEA02) 31 08:52 (WEA02)	06:07 20:47	06:47 (WEA03) 32 07:47 (WEA03)
31	08:08 17:18		06:10 19:19	07:21 (WEA02) 29 08:50 (WEA02)	2 07:04 (WEA03)	06:48 (WEA03) 31 07:48 (WEA03)
Sonneneinstrahlung	264	280	367	414	480	492
astr.max.mögl.Beschattung		123	806	78	1040	751
Red.Sonneneinstrahlung		0,30	0,29	0,37	0,40	0,32
Reduktion Betriebsdauer		0,95	0,95	0,95	0,95	0,95
Reduktion Windrichtung		0,67	0,67	0,67	0,66	0,66
Gesamte Reduktion		0,19	0,18	0,23	0,25	0,20
Met.wahrsch.Beschattung		24	146	18	261	153

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP16 - Lindentalstraße 42, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember
1	05:20	05:49 (WEA05)	05:54	06:55 (WEA03)	06:41	07:28	08:16 (WEA02)	07:19	08:08	
	21:46	07:19 (WEA03)	21:16	07:32 (WEA03)	20:16	19:09	08:26 (WEA02)	17:06	16:27	
2	05:20	05:50 (WEA05)	05:56	06:55 (WEA03)	06:43	07:29		07:21	08:09	
	21:45	07:20 (WEA03)	21:14	07:31 (WEA03)	20:14	19:07		17:04	16:27	
3	05:21	05:50 (WEA05)	05:57	06:56 (WEA03)	06:44	07:31		07:23	08:11	
	21:45	07:21 (WEA03)	21:13	07:31 (WEA03)	20:12	19:05		17:02	16:26	
4	05:22	06:58 (WEA03)	05:59	06:56 (WEA03)	06:46	07:33	08:38 (WEA01)	07:24	08:12	
	21:45	07:21 (WEA03)	21:11	07:30 (WEA03)	20:10	19:03	08:49 (WEA01)	17:00	16:26	
5	05:22	06:58 (WEA03)	06:00	06:57 (WEA03)	06:48	07:34	08:35 (WEA01)	07:26	08:13	
	21:44	07:22 (WEA03)	21:09	07:30 (WEA03)	20:08	19:00	08:51 (WEA01)	16:59	16:25	
6	05:23	06:58 (WEA03)	06:02	06:57 (WEA03)	06:49	07:36	08:33 (WEA01)	07:28	08:14	
	21:44	07:23 (WEA03)	21:08	07:29 (WEA03)	20:05	18:58	08:52 (WEA01)	16:57	16:25	
7	05:24	06:57 (WEA03)	06:03	06:58 (WEA03)	06:51	07:37	08:32 (WEA01)	07:29	08:16	
	21:43	07:23 (WEA03)	21:06	07:27 (WEA03)	20:03	18:56	08:53 (WEA01)	16:55	16:25	
8	05:25	06:57 (WEA03)	06:05	06:59 (WEA03)	06:52	08:24 (WEA02)	07:39	08:31 (WEA01)	07:31	08:17
	21:43	07:24 (WEA03)	21:04	07:27 (WEA03)	20:01	08:33 (WEA02)	18:54	08:54 (WEA01)	16:54	16:24
9	05:26	06:57 (WEA03)	06:06	07:00 (WEA03)	06:54	08:20 (WEA02)	07:41	08:30 (WEA01)	07:33	08:18
	21:42	07:25 (WEA03)	21:02	07:25 (WEA03)	19:59	08:37 (WEA02)	18:52	08:54 (WEA01)	16:52	16:24
10	05:27	06:57 (WEA03)	06:08	07:02 (WEA03)	06:55	08:17 (WEA02)	07:42	08:29 (WEA01)	07:35	08:19
	21:41	07:26 (WEA03)	21:01	07:24 (WEA03)	19:56	08:39 (WEA02)	18:49	08:54 (WEA01)	16:51	16:24
11	05:28	06:56 (WEA03)	06:09	07:03 (WEA03)	06:57	08:16 (WEA02)	07:44	08:29 (WEA01)	07:36	08:20
	21:41	07:26 (WEA03)	20:59	07:21 (WEA03)	19:54	08:41 (WEA02)	18:47	08:55 (WEA01)	16:49	16:24
12	05:29	06:56 (WEA03)	06:11	07:06 (WEA03)	06:58	08:13 (WEA02)	07:46	08:28 (WEA01)	07:38	08:21
	21:40	07:27 (WEA03)	20:57	07:18 (WEA03)	19:52	08:42 (WEA02)	18:45	08:54 (WEA01)	16:48	16:24
13	05:30	06:56 (WEA03)	06:12		07:00	08:12 (WEA02)	07:47	08:29 (WEA01)	07:40	08:22
	21:39	07:28 (WEA03)	20:55		19:50	08:43 (WEA02)	18:43	08:53 (WEA01)	16:46	16:24
14	05:31	06:56 (WEA03)	06:14		07:01	08:11 (WEA02)	07:49	08:29 (WEA01)	07:41	08:23
	21:38	07:28 (WEA03)	20:53		19:47	08:43 (WEA02)	18:41	08:53 (WEA01)	16:45	16:24
15	05:32	06:55 (WEA03)	06:15		07:03	08:10 (WEA02)	07:50	08:30 (WEA01)	07:43	08:24
	21:37	07:29 (WEA03)	20:51		19:45	08:44 (WEA02)	18:39	08:53 (WEA01)	16:44	16:24
16	05:33	06:55 (WEA03)	06:17		07:04	08:09 (WEA02)	07:52	08:30 (WEA01)	07:45	08:25
	21:36	07:29 (WEA03)	20:49		19:43	08:44 (WEA02)	18:37	08:51 (WEA01)	16:42	16:24
17	05:34	06:55 (WEA03)	06:18		07:06	08:08 (WEA02)	07:54	08:31 (WEA01)	07:46	08:26
	21:35	07:29 (WEA03)	20:47		19:41	08:44 (WEA02)	18:35	08:50 (WEA01)	16:41	16:24
18	05:35	06:54 (WEA03)	06:20		07:08	08:07 (WEA02)	07:55	08:33 (WEA01)	07:48	08:26
	21:34	07:30 (WEA03)	20:45		19:38	08:44 (WEA02)	18:33	08:48 (WEA01)	16:40	16:24
19	05:37	06:54 (WEA03)	06:21		07:09	08:07 (WEA02)	07:57	08:35 (WEA01)	07:50	08:27
	21:33	07:30 (WEA03)	20:43		19:36	08:44 (WEA02)	18:31	08:46 (WEA01)	16:39	16:25
20	05:38	06:55 (WEA03)	06:23		07:11	08:06 (WEA02)	07:59		07:51	08:28
	21:32	07:31 (WEA03)	20:41		19:34	08:43 (WEA02)	18:29		16:37	16:25
21	05:39	06:54 (WEA03)	06:24		07:12	08:07 (WEA02)	08:00		07:53	08:28
	21:31	07:31 (WEA03)	20:39		19:32	08:43 (WEA02)	18:26		16:36	16:25
22	05:40	06:54 (WEA03)	06:26		07:14	08:06 (WEA02)	08:02		07:54	08:29
	21:30	07:31 (WEA03)	20:37		19:29	08:42 (WEA02)	18:25		16:35	16:26
23	05:42	06:54 (WEA03)	06:27		07:15	08:06 (WEA02)	08:04		07:56	08:29
	21:28	07:32 (WEA03)	20:35		19:27	08:42 (WEA02)	18:23		16:34	16:26
24	05:43	06:53 (WEA03)	06:29		07:17	08:06 (WEA02)	08:05		07:58	08:30
	21:27	07:31 (WEA03)	20:33		19:25	08:40 (WEA02)	18:21		16:33	16:27
25	05:44	06:54 (WEA03)	06:31		07:18	08:07 (WEA02)	07:07		07:59	08:30
	21:26	07:32 (WEA03)	20:31		19:23	08:40 (WEA02)	17:19		16:32	16:28
26	05:46	06:54 (WEA03)	06:32		07:20	08:07 (WEA02)	07:09		08:01	08:30
	21:25	07:32 (WEA03)	20:29		19:20	08:38 (WEA02)	17:17		16:31	16:28
27	05:47	06:54 (WEA03)	06:34		07:22	08:08 (WEA02)	07:11		08:02	08:31
	21:23	07:32 (WEA03)	20:27		19:18	08:37 (WEA02)	17:15		16:30	16:29
28	05:49	06:54 (WEA03)	06:35		07:23	08:10 (WEA02)	07:12		08:04	08:31
	21:22	07:33 (WEA03)	20:25		19:16	08:36 (WEA02)	17:13		16:30	16:30
29	05:50	06:54 (WEA03)	06:37		07:25	08:11 (WEA02)	07:14		08:05	08:31
	21:20	07:32 (WEA03)	20:23		19:14	08:33 (WEA02)	17:11		16:29	16:31
30	05:51	06:54 (WEA03)	06:38		07:26	08:13 (WEA02)	07:16		08:06	08:31
	21:19	07:32 (WEA03)	20:21		19:11	08:31 (WEA02)	17:09		16:28	16:31
31	05:53	06:55 (WEA03)	06:40				07:17			08:31
	21:17	07:32 (WEA03)	20:18				17:07			16:32
Sonnenscheinstunden	496		450		380		333		270	250
astr.max.mögl.Beschattung	1008		341		682		338			
Red.Sonnenscheinwahrsch.	0,39		0,41		0,37		0,27			
Reduktion Betriebsdauer	0,95		0,95		0,95		0,95			
Reduktion Windrichtung	0,66		0,66		0,67		0,67			
Gesamte Reduktion	0,24		0,26		0,23		0,17			
Met.wahrsch.Beschattung	246		89		159		58			

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP17 - Peter-Hellinghausen-Straße 41, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	June
1	08:31 16:34	08:06 17:20	07:15 18:09	08:03 (WEA02) 28 08:31 (WEA01) 20:00	06:05 20:49	07:20 (WEA03) 35 07:55 (WEA03) 21:32
2	08:31 16:35	08:05 17:21	07:13 18:11	08:01 (WEA02) 21 08:22 (WEA02) 20:02	06:03 20:50	07:20 (WEA03) 34 07:54 (WEA03) 21:33
3	08:31 16:36	08:03 17:23	07:11 18:12	07:59 (WEA02) 25 08:24 (WEA02) 20:03	06:01 20:52	07:20 (WEA03) 33 07:53 (WEA03) 21:34
4	08:31 16:37	08:02 17:25	07:09 18:14	07:58 (WEA02) 27 08:25 (WEA02) 20:05	06:00 20:53	07:20 (WEA03) 32 07:52 (WEA03) 21:35
5	08:31 16:38	08:00 17:27	07:07 18:16	07:56 (WEA02) 29 08:25 (WEA02) 20:07	05:58 20:55	07:21 (WEA03) 31 07:52 (WEA03) 21:36
6	08:30 16:39	07:59 17:28	07:05 18:17	07:55 (WEA02) 31 08:26 (WEA02) 20:08	05:56 20:57	07:22 (WEA03) 28 07:50 (WEA03) 21:37
7	08:30 16:40	07:57 17:30	07:03 18:19	07:54 (WEA02) 33 08:27 (WEA02) 20:10	05:54 20:58	07:23 (WEA03) 27 07:50 (WEA03) 21:38
8	08:30 16:42	07:55 17:32	07:00 18:21	07:54 (WEA02) 33 08:27 (WEA02) 20:12	05:53 21:00	07:24 (WEA03) 24 07:48 (WEA03) 21:39
9	08:29 16:43	07:54 17:34	06:58 18:22	07:53 (WEA02) 34 08:27 (WEA02) 20:13	05:51 21:01	07:25 (WEA03) 21 07:46 (WEA03) 21:40
10	08:29 16:44	07:52 17:36	06:56 18:24	07:52 (WEA02) 34 08:26 (WEA02) 20:15	05:49 21:03	07:27 (WEA03) 17 07:44 (WEA03) 21:40
11	08:28 16:46	07:50 17:37	06:54 18:26	07:52 (WEA02) 34 08:26 (WEA02) 20:16	05:48 21:04	07:29 (WEA03) 12 07:41 (WEA03) 21:41
12	08:28 16:47	07:48 17:39	06:52 18:27	07:52 (WEA02) 34 08:26 (WEA02) 20:18	05:46 21:06	07:35 (WEA03) 1 07:36 (WEA03) 21:42
13	08:27 16:49	07:47 17:41	06:50 18:29	07:52 (WEA02) 34 08:26 (WEA02) 20:20	05:45 21:07	07:36 (WEA03) 1 07:36 (WEA03) 21:42
14	08:26 16:50	07:45 17:43	06:47 18:31	07:53 (WEA02) 32 08:25 (WEA02) 20:21	05:43 21:09	07:35 (WEA03) 12 07:47 (WEA03) 21:09
15	08:26 16:51	07:43 17:44	06:45 18:32	07:52 (WEA02) 31 08:23 (WEA02) 20:23	05:42 21:10	07:31 (WEA03) 19 07:50 (WEA03) 21:10
16	08:25 16:53	07:41 17:46	06:43 18:34	07:53 (WEA02) 30 08:23 (WEA02) 20:25	05:40 21:12	07:29 (WEA03) 23 07:52 (WEA03) 21:12
17	08:24 16:54	07:39 17:48	06:41 18:36	07:54 (WEA02) 27 08:21 (WEA02) 20:26	05:39 21:13	07:27 (WEA03) 26 07:53 (WEA03) 21:13
18	08:23 16:56	07:37 17:50	06:38 18:37	07:55 (WEA02) 25 08:20 (WEA02) 20:28	05:37 21:15	07:25 (WEA03) 10 06:03 (WEA05) 21:15
19	08:22 16:58	07:35 17:51	06:36 18:39	07:56 (WEA02) 21 08:17 (WEA02) 20:29	05:36 21:16	06:02 (WEA05) 13 06:15 (WEA05) 21:16
20	08:21 16:59	07:34 17:53	06:34 18:41	07:58 (WEA02) 17 08:15 (WEA02) 20:31	05:35 21:17	06:01 (WEA05) 16 06:17 (WEA05) 21:17
21	08:20 17:01	07:32 17:55	06:32 18:42	08:02 (WEA02) 9 08:11 (WEA02) 20:33	05:33 21:19	05:59 (WEA05) 18 06:17 (WEA05) 21:19
22	08:19 17:02	07:30 17:57	06:30 18:44	08:03 (WEA02) 24 08:15 (WEA01) 20:34	05:32 21:20	05:58 (WEA05) 20 06:18 (WEA05) 21:20
23	08:18 17:04	07:28 17:58	06:27 18:46	08:04 (WEA02) 24 08:15 (WEA01) 20:36	05:31 21:21	05:57 (WEA05) 22 06:19 (WEA05) 21:21
24	08:17 17:06	07:26 18:00	06:25 18:47	08:05 (WEA02) 23 08:16 (WEA01) 20:37	05:30 21:23	05:56 (WEA05) 24 06:20 (WEA05) 21:23
25	08:16 17:07	07:24 18:02	06:23 18:49	08:06 (WEA02) 22 08:17 (WEA01) 20:39	05:29 21:24	05:55 (WEA05) 26 06:21 (WEA05) 21:24
26	08:15 17:09	07:22 18:04	06:21 18:51	08:07 (WEA02) 21 08:18 (WEA01) 20:41	05:28 21:25	05:54 (WEA05) 27 06:22 (WEA05) 21:25
27	08:13 17:11	07:19 18:05	06:18 18:52	08:08 (WEA02) 19 08:19 (WEA01) 20:42	05:27 21:26	05:53 (WEA05) 28 06:23 (WEA05) 21:26
28	08:12 17:13	07:17 18:07	06:16 18:54	08:09 (WEA02) 24 08:20 (WEA01) 20:44	05:26 21:28	05:52 (WEA05) 28 06:24 (WEA05) 21:28
29	08:11 17:14	07:15 18:09	06:14 19:00	08:10 (WEA02) 24 08:21 (WEA01) 20:45	05:25 21:29	05:51 (WEA05) 29 06:25 (WEA05) 21:29
30	08:09 17:16	07:13 18:11	06:12 19:02	08:11 (WEA02) 24 08:22 (WEA01) 20:46	05:24 21:30	05:50 (WEA05) 29 06:26 (WEA05) 21:30
31	08:08 17:18	07:11 18:13	06:10 19:04	08:12 (WEA02) 24 08:23 (WEA01) 20:47	05:23 21:31	05:49 (WEA05) 29 06:27 (WEA05) 21:31
Sonneneinstrahlung	264	280	367	414	480	492
astr.max.mögl.Beschattung		297	589	535	614	919
Red.Sonneneinstrahlung		0,30	0,29	0,37	0,40	0,32
Reduktion Betriebsdauer		0,95	0,95	0,95	0,95	0,95
Reduktion Windrichtung		0,67	0,67	0,68	0,67	0,66
Gesamte Reduktion		0,19	0,18	0,24	0,25	0,20
Met.wahrsch.Beschattung		58	107	127	156	188

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:

17.10.2023 09:23/3.6.361

SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP17 - Peter-Hellinghausen-Straße 41, 57518 Steinerath

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember
1	05:20	05:59 (WEA05)	05:54	07:42 (WEA03)	06:41	07:28	08:31 (WEA02)	07:19	08:08	
	21:46	06:30 (WEA05)	21:16	07:50 (WEA03)	20:16	19:09	09:05 (WEA02)	17:06	16:27	
2	05:20	06:00 (WEA05)	05:56	07:38 (WEA03)	06:43	07:29	08:31 (WEA02)	07:21	08:09	
	21:45	06:31 (WEA05)	21:14	07:53 (WEA03)	20:14	19:07	09:05 (WEA02)	17:04	16:27	
3	05:21	06:00 (WEA05)	05:57	07:37 (WEA03)	06:44	07:31	08:31 (WEA02)	07:23	08:11	
	21:45	06:30 (WEA05)	21:13	07:56 (WEA03)	20:12	19:05	09:05 (WEA02)	17:02	16:26	
4	05:22	06:00 (WEA05)	05:59	07:35 (WEA03)	06:46	07:33	08:30 (WEA02)	07:24	08:12	
	21:45	06:31 (WEA05)	21:11	07:57 (WEA03)	20:10	19:03	09:04 (WEA02)	17:00	16:26	
5	05:22	06:00 (WEA05)	06:00	07:34 (WEA03)	06:48	07:34	08:31 (WEA02)	07:26	08:13	
	21:44	06:31 (WEA05)	21:09	07:59 (WEA03)	20:08	19:00	09:04 (WEA02)	16:59	16:25	
6	05:23	06:01 (WEA05)	06:02	07:33 (WEA03)	06:49	07:36	08:30 (WEA02)	07:28	08:14	
	21:44	06:32 (WEA05)	21:08	08:00 (WEA03)	20:05	18:58	09:03 (WEA02)	16:57	16:25	
7	05:24	06:00 (WEA05)	06:03	07:31 (WEA03)	06:51	07:37	08:31 (WEA02)	07:29	08:16	
	21:43	06:31 (WEA05)	21:06	08:00 (WEA03)	20:03	18:56	09:02 (WEA02)	16:55	16:25	
8	05:25	06:01 (WEA05)	06:05	07:31 (WEA03)	06:52	07:39	08:31 (WEA02)	07:31	08:17	
	21:43	06:31 (WEA05)	21:04	08:01 (WEA03)	20:01	18:54	09:02 (WEA02)	16:54	16:24	
9	05:26	06:01 (WEA05)	06:06	07:29 (WEA03)	06:54	07:41	08:31 (WEA02)	07:33	08:18	
	21:42	06:32 (WEA05)	21:02	08:02 (WEA03)	19:59	18:52	09:00 (WEA02)	16:52	16:24	
10	05:27	06:01 (WEA05)	06:08	07:29 (WEA03)	06:55	07:42	08:33 (WEA02)	07:35	08:19	
	21:41	06:32 (WEA05)	21:01	08:03 (WEA03)	19:56	18:49	08:59 (WEA02)	16:51	16:24	
11	05:28	06:02 (WEA05)	06:09	07:28 (WEA03)	06:57	07:44	08:34 (WEA02)	07:36	08:20	
	21:41	06:32 (WEA05)	20:59	08:03 (WEA03)	19:54	18:47	09:02 (WEA02)	16:49	16:24	
12	05:29	06:02 (WEA05)	06:11	07:27 (WEA03)	06:58	07:46	08:35 (WEA02)	07:38	08:21	
	21:40	06:32 (WEA05)	20:57	08:03 (WEA03)	19:52	18:45	09:02 (WEA01)	16:48	16:24	
13	05:30	06:02 (WEA05)	06:12	07:27 (WEA03)	07:00	07:47	08:38 (WEA02)	07:40	08:22	
	21:39	06:32 (WEA05)	20:55	08:04 (WEA03)	19:50	18:43	09:05 (WEA01)	16:46	16:24	
14	05:31	06:03 (WEA05)	06:14	07:27 (WEA03)	07:01	07:49	08:50 (WEA02)	07:41	08:23	
	21:38	06:32 (WEA05)	20:53	08:03 (WEA03)	19:47	18:41	09:07 (WEA01)	16:45	16:24	
15	05:32	06:03 (WEA05)	06:15	07:27 (WEA03)	07:03	07:50	08:49 (WEA02)	07:43	08:24	
	21:37	06:31 (WEA05)	20:51	08:04 (WEA03)	19:45	18:39	09:09 (WEA01)	16:44	16:24	
16	05:33	06:03 (WEA05)	06:17	07:26 (WEA03)	07:04	07:52	08:47 (WEA02)	07:45	08:25	
	21:36	06:31 (WEA05)	20:49	08:03 (WEA03)	19:43	18:37	09:09 (WEA01)	16:42	16:24	
17	05:34	06:04 (WEA05)	06:18	07:27 (WEA03)	07:06	07:54	08:47 (WEA02)	07:46	08:26	
	21:35	06:31 (WEA05)	20:47	08:04 (WEA03)	19:41	18:35	09:09 (WEA01)	16:41	16:24	
18	05:35	06:04 (WEA05)	06:20	07:26 (WEA03)	07:08	07:55	08:46 (WEA02)	07:48	08:26	
	21:34	06:30 (WEA05)	20:45	08:03 (WEA03)	19:38	18:33	09:10 (WEA01)	16:40	16:24	
19	05:37	06:05 (WEA05)	06:21	07:27 (WEA03)	07:09	07:57	08:46 (WEA02)	07:50	08:27	
	21:33	06:30 (WEA05)	20:43	08:03 (WEA03)	19:36	18:31	09:10 (WEA01)	16:39	16:25	
20	05:38	06:07 (WEA05)	06:23	07:26 (WEA03)	07:11	07:59	08:45 (WEA02)	07:51	08:28	
	21:32	06:30 (WEA05)	20:41	08:02 (WEA03)	19:34	18:29	09:09 (WEA01)	16:37	16:25	
21	05:39	06:08 (WEA05)	06:24	07:27 (WEA03)	07:12	08:00	08:46 (WEA02)	07:53	08:28	
	21:31	06:29 (WEA05)	20:39	08:02 (WEA03)	19:32	18:26	09:09 (WEA01)	16:36	16:25	
22	05:40	06:09 (WEA05)	06:26	07:27 (WEA03)	07:14	08:02	08:46 (WEA02)	07:54	08:29	
	21:30	06:28 (WEA05)	20:37	08:01 (WEA03)	19:29	18:25	09:09 (WEA01)	16:35	16:26	
23	05:42	06:10 (WEA05)	06:27	07:27 (WEA03)	07:15	08:04	08:47 (WEA02)	07:56	08:29	
	21:28	06:27 (WEA05)	20:35	07:59 (WEA03)	19:27	18:23	09:08 (WEA01)	16:34	16:26	
24	05:43	06:11 (WEA05)	06:29	07:28 (WEA03)	07:17	08:05	08:46 (WEA02)	07:58	08:30	
	21:27	06:26 (WEA05)	20:33	07:59 (WEA03)	19:25	18:21	09:07 (WEA01)	16:33	16:27	
25	05:44	06:13 (WEA05)	06:31	07:28 (WEA03)	07:18	08:07	08:48 (WEA02)	07:59	08:30	
	21:26	06:25 (WEA05)	20:31	07:57 (WEA03)	19:23	18:19	09:02 (WEA02)	17:19	16:28	
26	05:46	06:14 (WEA05)	06:32	07:30 (WEA03)	07:20	08:36 (WEA02)	07:09	07:49 (WEA01)	08:01	08:30
	21:25	06:22 (WEA05)	20:29	07:56 (WEA03)	19:20	18:17	09:03 (WEA02)	17:17	16:31	16:28
27	05:47		06:34	07:31 (WEA03)	07:22	08:35 (WEA02)	07:11	07:51 (WEA01)	08:02	08:31
	21:23		20:27	07:53 (WEA03)	19:18	18:15	09:04 (WEA02)	17:15	11	16:30
28	05:49		06:35	07:33 (WEA03)	07:23	08:34 (WEA02)	07:12		08:04	08:31
	21:22		20:25	07:51 (WEA03)	19:16	18:13	09:05 (WEA02)	17:13	16:30	16:30
29	05:50		06:37	07:36 (WEA03)	07:25	08:33 (WEA02)	07:14		08:05	08:31
	21:20		20:23	07:47 (WEA03)	19:14	18:11	09:05 (WEA02)	17:11	16:29	16:31
30	05:51		06:38		07:26	08:32 (WEA02)	07:16		08:06	08:31
	21:19		20:21		19:11	18:09	09:05 (WEA02)	17:09	16:28	16:31
31	05:53		06:40			07:17				08:31
	21:17		20:18			17:07				16:32
Sonnenscheinstunden	496		450		380		333		270	250
astr.max.mögl.Beschattung		676	844		216		680			
Red.Sonnenscheinwahrsch.	0,39		0,41		0,37		0,27			
Reduktion Betriebsdauer	0,95		0,95		0,95		0,95			
Reduktion Windrichtung	0,66		0,68		0,67		0,67			
Gesamte Reduktion	0,24		0,27		0,23		0,17			
Met.wahrsch.Beschattung	165		225		50		116			

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP18 - Franz-Josef-Magnus-Straße 26, 57518 Betzdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

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

429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31	10:27 (WEA05) 08:06	08:58 (WEA06) 07:15	07:07	06:05	05:22
	16:34	10:53 (WEA05) 17:19	09:23 (WEA06) 18:09	20:00	20:49	21:32
2	08:31	10:28 (WEA05) 08:05	08:58 (WEA06) 07:13	07:05	06:03	05:21
	16:35	10:53 (WEA05) 17:21	09:22 (WEA06) 18:10	20:02	20:50	21:33
3	08:31	10:29 (WEA05) 08:03	08:58 (WEA06) 07:11	07:03	06:01	05:20
	16:36	10:53 (WEA05) 17:23	09:22 (WEA06) 18:12	20:03	20:52	21:34
4	08:31	10:31 (WEA05) 08:02	08:59 (WEA06) 07:09	07:01	05:59	05:20
	16:37	10:53 (WEA05) 17:25	09:22 (WEA06) 18:14	20:05	20:53	21:35
5	08:31	10:31 (WEA05) 08:00	09:00 (WEA06) 07:07	06:58	05:58	05:19
	16:38	10:52 (WEA05) 17:27	09:21 (WEA06) 18:16	20:07	20:55	21:36
6	08:30	10:33 (WEA05) 07:59	09:00 (WEA06) 07:05	06:56	05:56	05:18
	16:39	10:52 (WEA05) 17:28	09:20 (WEA06) 18:17	20:08	20:57	21:37
7	08:30	10:34 (WEA05) 07:57	09:02 (WEA06) 07:03	06:54	05:54	05:18
	16:40	10:51 (WEA05) 17:30	09:20 (WEA06) 18:19	20:10	20:58	21:38
8	08:30	10:37 (WEA05) 07:55	09:04 (WEA06) 07:00	06:52	05:53	05:17
	16:42	10:50 (WEA05) 17:32	09:18 (WEA06) 18:21	20:12	21:00	21:39
9	08:29	10:39 (WEA05) 07:54	09:06 (WEA06) 06:58	06:50	05:51	05:17
	16:43	10:48 (WEA05) 17:34	09:15 (WEA06) 18:22	20:13	21:01	21:40
10	08:29	07:52	06:56	06:47	05:49	05:17
	16:44	17:35	18:24	20:15	21:03	21:40
11	08:28	07:50	06:54	06:45	05:48	05:16
	16:46	17:37	18:26	20:16	21:04	21:41
12	08:28	07:48	06:52	06:43	05:46	05:16
	16:47	17:39	18:27	20:18	21:06	21:42
13	08:27	07:47	06:49	06:41	05:45	05:16
	16:48	17:41	18:29	20:20	21:07	21:42
14	08:26	07:45	06:47	06:39	05:43	05:15
	16:50	17:43	18:31	20:21	21:09	21:43
15	08:26	07:43	06:45	06:37	05:42	05:15
	16:51	17:44	18:32	20:23	21:10	21:44
16	08:25	07:41	06:43	06:35	05:40	05:15
	16:53	17:46	18:34	20:25	21:12	21:44
17	08:24	07:39	06:41	06:33	05:39	05:15
	16:54	17:48	18:36	20:26	21:13	21:45
18	08:23	07:37	06:38	06:30	05:37	05:15
	16:56	17:50	18:37	20:28	21:15	21:45
19	08:22	09:02 (WEA06) 07:35	06:36	06:28	05:36	05:15
	16:58	09:11 (WEA06) 17:51	18:39	20:29	21:16	21:45
20	08:21	09:01 (WEA06) 07:34	06:34	06:26	05:35	05:15
	16:59	09:13 (WEA06) 17:53	18:41	20:31	21:17	21:46
21	08:20	09:00 (WEA06) 07:32	06:32	06:24	05:33	05:15
	17:01	09:15 (WEA06) 17:55	18:42	20:33	21:19	21:46
22	08:19	08:59 (WEA06) 07:30	06:29	06:22	05:32	05:16
	17:02	09:17 (WEA06) 17:57	18:44	20:34	21:20	21:46
23	08:18	08:59 (WEA06) 07:28	06:27	06:20	05:31	05:16
	17:04	09:18 (WEA06) 17:58	18:46	20:36	21:21	21:46
24	08:17	08:57 (WEA06) 07:26	06:25	06:18	05:30	05:16
	17:06	09:18 (WEA06) 18:00	18:47	20:37	21:23	21:46
25	08:16	08:57 (WEA06) 07:24	06:23	06:16	05:29	05:16
	17:07	09:20 (WEA06) 18:02	18:49	20:39	21:24	21:46
26	08:15	08:58 (WEA06) 07:21	06:21	06:14	05:27	05:17
	17:09	09:21 (WEA06) 18:04	18:50	20:41	21:25	21:46
27	08:13	08:57 (WEA06) 07:19	06:18	06:12	05:26	05:17
	17:11	09:21 (WEA06) 18:05	18:52	20:42	21:26	21:46
28	08:12	08:57 (WEA06) 07:17	06:16	06:11	05:25	05:18
	17:12	09:22 (WEA06) 18:07	18:54	20:44	21:28	21:46
29	08:11	08:57 (WEA06)	07:14	06:09	05:24	05:18
	17:14	09:22 (WEA06)	19:55	20:45	21:29	21:46
30	08:09	08:57 (WEA06)	07:12	06:07	05:24	05:19
	17:16	09:23 (WEA06)	19:57	20:47	21:30	21:46
31	08:08	08:57 (WEA06)	07:09		05:23	
	17:18	09:22 (WEA06)	19:59		21:31	
Sonnenscheinstunden	264	280	367	414	480	493
astr.max.mögl.Beschattung	441	178				
Red.Sonnenscheinwahrsch.	0,21	0,30				
Reduktion Betriebsdauer	0,95	0,95				
Reduktion Windrichtung	0,64	0,65				
Gesamte Reduktion	0,12	0,19				
Met.wahrsch.Beschattung	55	33				

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP18 - Franz-Josef-Magnus-Straße 26, 57518 Betzdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

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

429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:06	08:08 16:27
2	05:20 21:45	05:56 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	05:21 21:45	05:57 21:13	06:44 20:12	07:31 19:05	07:23 17:02	08:11 16:26
4	05:21 21:45	05:58 21:11	06:46 20:10	07:33 19:03	07:24 17:00	08:12 16:26
5	05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00	07:26 16:59	08:13 16:25
6	05:23 21:44	06:01 21:08	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	05:24 21:43	06:03 21:06	06:51 20:03	07:37 18:56	07:29 16:55	08:16 16:24
8	05:25 21:43	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	07:33 16:52	08:18 16:24
10	05:27 21:41	06:07 21:01	06:55 19:56	07:42 18:49	07:35 16:51	08:19 16:24
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24
12	05:29 21:40	06:10 20:57	06:58 19:52	07:46 18:45	07:38 16:48	08:21 16:24
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:40 16:46	08:22 16:23
14	05:31 21:38	06:14 20:53	07:01 19:47	07:49 18:41	07:41 16:45	08:23 16:24
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:44	08:24 16:24
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:45 16:42	08:25 16:24
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	08:26 16:24
18	05:35 21:34	06:20 20:45	07:08 19:38	07:55 18:33	07:48 16:40	08:26 16:24
19	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:50 16:38	08:27 16:24
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	08:28 16:25
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	08:28 16:25
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	08:29 16:26
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	08:29 16:26
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:58 16:33	08:30 16:27
25	05:44 21:26	06:30 20:31	07:18 19:23	08:07 18:19	07:59 16:32	08:30 16:27
26	05:46 21:25	06:32 20:29	07:20 19:20	08:09 18:17	08:01 16:31	08:30 16:28
27	05:47 21:23	06:34 20:27	07:22 19:18	08:11 18:15	08:02 16:30	08:31 16:29
28	05:48 21:22	06:35 20:25	07:23 19:16	08:12 18:13	08:04 16:30	08:31 16:30
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 18:11	08:05 16:29	08:31 16:30
30	05:51 21:19	06:38 20:21	07:26 19:11	08:16 18:09	08:07 16:28	08:31 16:31
31	05:53 21:17	06:40 20:18	07:28 19:07	08:18 18:07	08:09 16:27	08:31 16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung					447	754
Red.Sonnenscheinwahrsch.					0,25	0,17
Reduktion Betriebsdauer					0,95	0,95
Reduktion Windrichtung					0,65	0,62
Gesamte Reduktion					0,15	0,10
Met.wahrsch.Beschattung					67	74

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP19 - Lerchenweg 12, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März	April	Mai	Juni
1	08:31		10:58 (WEA06)	08:06	11:11 (WEA06)	07:15	07:07	06:05
	16:33	79	14:24 (WEA05)	17:19	14:28 (WEA05)	18:09	20:00	20:49
2	08:31		10:59 (WEA06)	08:05	11:13 (WEA06)	07:13	07:05	06:03
	16:35	77	14:24 (WEA05)	17:21	14:25 (WEA05)	18:10	20:02	20:50
3	08:31		10:59 (WEA06)	08:03	11:16 (WEA06)	07:11	07:03	06:01
	16:36	76	14:25 (WEA05)	17:23	11:26 (WEA06)	18:12	20:03	20:52
4	08:31		10:58 (WEA06)	08:02		07:09	07:01	05:59
	16:37	76	14:25 (WEA05)	17:25		18:14	20:05	20:53
5	08:31		10:59 (WEA06)	08:00		07:07	06:58	05:58
	16:38	73	14:26 (WEA05)	17:26		18:16	20:07	20:55
6	08:30		10:59 (WEA06)	07:59		07:05	06:56	05:56
	16:39	70	14:27 (WEA05)	17:28		18:17	20:08	20:56
7	08:30		10:59 (WEA06)	07:57		07:02	06:54	05:54
	16:40	67	14:28 (WEA05)	17:30		18:19	20:10	20:58
8	08:30		10:59 (WEA06)	07:55		07:00	06:52	05:52
	16:42	68	14:29 (WEA05)	17:32		18:21	20:12	21:00
9	08:29		10:59 (WEA06)	07:54		06:58	06:50	05:51
	16:43	69	14:29 (WEA05)	17:34		18:22	20:13	21:01
10	08:29		10:59 (WEA06)	07:52		06:56	06:47	05:49
	16:44	69	14:29 (WEA05)	17:35		18:24	20:15	21:03
11	08:28		11:00 (WEA06)	07:50		06:54	06:45	05:48
	16:46	69	14:30 (WEA05)	17:37		18:26	20:16	21:04
12	08:28		11:00 (WEA06)	07:48		06:52	06:43	05:46
	16:47	71	14:31 (WEA05)	17:39		18:27	20:18	21:06
13	08:27		11:00 (WEA06)	07:47		06:49	06:41	05:44
	16:48	71	14:31 (WEA05)	17:41		18:29	20:20	21:07
14	08:26		10:59 (WEA06)	07:45		06:47	06:39	05:43
	16:50	73	14:31 (WEA05)	17:42		18:31	20:21	21:09
15	08:26		11:00 (WEA06)	07:43		06:45	06:37	05:41
	16:51	72	14:32 (WEA05)	17:44		18:32	20:23	21:10
16	08:25		11:00 (WEA06)	07:41		06:43	06:35	05:40
	16:53	72	14:32 (WEA05)	17:46		18:34	20:24	21:12
17	08:24		11:00 (WEA06)	07:39		06:41	06:33	05:39
	16:54	73	14:32 (WEA05)	17:48		18:36	20:26	21:13
18	08:23		11:00 (WEA06)	07:37		06:38	06:30	05:37
	16:56	73	14:33 (WEA05)	17:50		18:37	20:28	21:14
19	08:22		11:01 (WEA06)	07:35		06:36	06:28	05:36
	16:57	73	14:33 (WEA05)	17:51		18:39	20:29	21:16
20	08:21		11:01 (WEA06)	07:33		06:34	06:26	05:35
	16:59	72	14:33 (WEA05)	17:53		18:41	20:31	21:17
21	08:20		11:02 (WEA06)	07:32		06:32	06:24	05:33
	17:01	73	14:34 (WEA05)	17:55		18:42	20:33	21:19
22	08:19		11:02 (WEA06)	07:30		06:29	06:22	05:32
	17:02	72	14:34 (WEA05)	17:57		18:44	20:34	21:20
23	08:18		11:03 (WEA06)	07:28		06:27	06:20	05:31
	17:04	70	14:34 (WEA05)	17:58		18:46	20:36	21:21
24	08:17		11:03 (WEA06)	07:26		06:25	06:18	05:30
	17:06	69	14:33 (WEA05)	18:00		18:47	20:37	21:23
25	08:16		11:04 (WEA06)	07:23		06:23	06:16	05:29
	17:07	67	14:33 (WEA05)	18:02		18:49	20:39	21:24
26	08:14		11:05 (WEA06)	07:21		06:21	06:14	05:27
	17:09	65	14:33 (WEA05)	18:04		18:50	20:41	21:25
27	08:13		11:05 (WEA06)	07:19		06:18	06:12	05:26
	17:11	62	14:32 (WEA05)	18:05		18:52	20:42	21:26
28	08:12		11:06 (WEA06)	07:17		06:16	06:10	05:25
	17:12	60	14:32 (WEA05)	18:07		18:54	20:44	21:28
29	08:11		11:06 (WEA06)			07:14	06:09	05:24
	17:14	57	14:31 (WEA05)			19:55	20:45	21:29
30	08:09		11:08 (WEA06)			07:12	06:07	05:24
	17:16	52	14:31 (WEA05)			19:57	20:47	21:30
31	08:08		11:09 (WEA06)			07:09		05:23
	17:18	46	14:29 (WEA05)			19:59		21:31
Sonnenscheinstunden	264			280		367	414	480
astr.max.mögl.Beschattung		2136		80				493
Red.Sonnenscheinwahrsch.		0,21		0,30				
Reduktion Betriebsdauer		0,95		0,95				
Reduktion Windrichtung		0,60		0,60				
Gesamte Reduktion		0,12		0,18				
Met.wahrsch.Beschattung		254		14				

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP19 - Lerchenweg 12, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:05	08:08 16:27
2	05:20 21:45	05:55 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	05:21 21:45	05:57 21:13	06:44 20:12	07:31 19:05	07:22 17:02	08:11 16:26
4	05:21 21:45	05:58 21:11	06:46 20:10	07:33 19:02	07:24 17:00	08:12 16:26
5	05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00	07:26 16:59	08:13 16:25
6	05:23 21:44	06:01 21:08	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	05:24 21:43	06:03 21:06	06:51 20:03	07:37 18:56	07:29 16:55	08:16 16:24
8	05:25 21:43	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	10:46 (WEA06) 08:17
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	07:33 16:52	10:57 (WEA06) 16:24
10	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	10:44 (WEA06) 16:24
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	10:41 (WEA06) 16:24
12	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	10:39 (WEA06) 16:23
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:40 16:46	10:38 (WEA06) 16:23
14	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	14:03 (WEA05) 16:23
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	10:38 (WEA06) 16:24
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:45 16:42	10:38 (WEA06) 16:24
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	14:06 (WEA05) 16:24
18	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	10:37 (WEA06) 16:24
19	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:50 16:38	14:07 (WEA05) 16:24
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	10:37 (WEA06) 16:25
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	14:09 (WEA05) 16:25
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	10:37 (WEA06) 16:26
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	10:38 (WEA06) 16:26
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:58 16:33	14:10 (WEA05) 16:27
25	05:44 21:26	06:30 20:31	07:18 19:23	08:07 17:18	07:59 16:32	10:38 (WEA06) 16:27
26	05:46 21:24	06:32 20:29	07:20 19:20	08:09 17:17	08:01 16:31	14:10 (WEA05) 16:28
27	05:47 21:23	06:34 20:27	07:21 19:18	08:11 17:15	08:02 16:30	10:39 (WEA06) 16:29
28	05:48 21:22	06:35 20:25	07:23 19:16	08:12 17:13	08:04 16:29	14:11 (WEA05) 16:30
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 17:11	08:05 16:29	10:41 (WEA06) 16:31
30	05:51 21:19	06:38 20:20	07:26 19:11	08:16 17:09	08:06 16:28	14:12 (WEA05) 16:31
31	05:53 21:17	06:40 20:18		07:17 17:07		08:31 16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung					1425	2363
Red.Sonnenscheinwahrsch.					0,25	0,17
Reduktion Betriebsdauer					0,95	0,95
Reduktion Windrichtung					0,60	0,60
Gesamte Reduktion					0,14	0,10
Met.wahrsch.Beschattung					201	225

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP20 - Am Arsberg 46, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März		April	Mai	Juni
1	08:31		11:39 (WEA06)	08:06	14:48 (WEA05)	07:15	07:07	06:05	05:22
	16:33	50	14:58 (WEA05)	17:19	15:18 (WEA05)	18:09	20:00	20:49	21:32
2	08:31		11:40 (WEA06)	08:05	14:49 (WEA05)	07:13	07:05	06:03	05:21
	16:34	49	14:59 (WEA05)	17:21	15:17 (WEA05)	18:10	20:02	20:50	21:33
3	08:31		11:41 (WEA06)	08:03	14:50 (WEA05)	07:11	07:03	06:01	05:20
	16:36	51	15:01 (WEA05)	17:23	15:16 (WEA05)	18:12	20:03	20:52	21:34
4	08:31		11:40 (WEA06)	08:02	14:52 (WEA05)	07:09	07:01	05:59	05:20
	16:37	54	15:02 (WEA05)	17:25	15:16 (WEA05)	18:14	20:05	20:53	21:35
5	08:31		11:41 (WEA06)	08:00	14:53 (WEA05)	07:07	06:58	05:58	05:19
	16:38	55	15:03 (WEA05)	17:26	15:14 (WEA05)	18:16	20:07	20:55	21:36
6	08:30		11:42 (WEA06)	07:59	14:55 (WEA05)	07:05	06:56	05:56	05:18
	16:39	57	15:05 (WEA05)	17:28	15:12 (WEA05)	18:17	20:08	20:56	21:37
7	08:30		11:41 (WEA06)	07:57	15:00 (WEA05)	07:02	06:54	05:54	05:18
	16:40	60	15:06 (WEA05)	17:30	15:10 (WEA05)	18:19	20:10	20:58	21:38
8	08:30		11:42 (WEA06)	07:55		07:00	06:52	05:52	05:17
	16:42	61	15:07 (WEA05)	17:32		18:21	20:12	21:00	21:39
9	08:29		11:42 (WEA06)	07:54		06:58	06:50	05:51	05:17
	16:43	62	15:08 (WEA05)	17:34		18:22	20:13	21:01	21:40
10	08:29		11:42 (WEA06)	07:52		06:56	06:47	05:49	05:16
	16:44	64	15:09 (WEA05)	17:35		18:24	20:15	21:03	21:40
11	08:28		11:43 (WEA06)	07:50		06:54	06:45	05:48	05:16
	16:46	64	15:10 (WEA05)	17:37		18:26	20:16	21:04	21:41
12	08:28		11:43 (WEA06)	07:48		06:52	06:43	05:46	05:16
	16:47	66	15:11 (WEA05)	17:39		18:27	20:18	21:06	21:42
13	08:27		11:44 (WEA06)	07:47		06:49	06:41	05:44	05:16
	16:48	67	15:12 (WEA05)	17:41		18:29	20:20	21:07	21:42
14	08:26		11:44 (WEA06)	07:45		06:47	06:39	05:43	05:15
	16:50	67	15:12 (WEA05)	17:42		18:31	20:21	21:09	21:43
15	08:26		11:44 (WEA06)	07:43		06:45	06:37	05:41	05:15
	16:51	69	15:13 (WEA05)	17:44		18:32	20:23	21:10	21:44
16	08:25		11:45 (WEA06)	07:41		06:43	06:35	05:40	05:15
	16:53	69	15:14 (WEA05)	17:46		18:34	20:24	21:12	21:44
17	08:24		11:45 (WEA06)	07:39		06:41	06:33	05:39	05:15
	16:54	70	15:15 (WEA05)	17:48		18:36	20:26	21:13	21:44
18	08:23		11:46 (WEA06)	07:37		06:38	06:30	05:37	05:15
	16:56	69	15:15 (WEA05)	17:50		18:37	20:28	21:14	21:45
19	08:22		11:46 (WEA06)	07:35		06:36	06:28	05:36	05:15
	16:57	71	15:16 (WEA05)	17:51		18:39	20:29	21:16	21:45
20	08:21		11:47 (WEA06)	07:33		06:34	06:26	05:35	05:15
	16:59	70	15:17 (WEA05)	17:53		18:41	20:31	21:17	21:46
21	08:20		11:48 (WEA06)	07:31		06:32	06:24	05:33	05:15
	17:01	69	15:17 (WEA05)	17:55		18:42	20:33	21:19	21:46
22	08:19		11:49 (WEA06)	07:30		06:29	06:22	05:32	05:16
	17:02	69	15:18 (WEA05)	17:57		18:44	20:34	21:20	21:46
23	08:18		11:50 (WEA06)	07:28		06:27	06:20	05:31	05:16
	17:04	68	15:19 (WEA05)	17:58		18:46	20:36	21:21	21:46
24	08:17		11:50 (WEA06)	07:26		06:25	06:18	05:30	05:16
	17:06	66	15:18 (WEA05)	18:00		18:47	20:37	21:23	21:46
25	08:16		11:52 (WEA06)	07:23		06:23	06:16	05:29	05:16
	17:07	64	15:19 (WEA05)	18:02		18:49	20:39	21:24	21:46
26	08:14		11:53 (WEA06)	07:21		06:20	06:14	05:27	05:17
	17:09	62	15:19 (WEA05)	18:04		18:50	20:41	21:25	21:46
27	08:13		11:54 (WEA06)	07:19		06:18	06:12	05:26	05:17
	17:11	59	15:19 (WEA05)	18:05		18:52	20:42	21:26	21:46
28	08:12		11:56 (WEA06)	07:17		06:16	06:10	05:25	05:18
	17:12	56	15:19 (WEA05)	18:07		18:54	20:44	21:28	21:46
29	08:11		11:58 (WEA06)			07:14	06:09	05:24	05:18
	17:14	52	15:19 (WEA05)			19:55	20:45	21:29	21:46
30	08:09		12:02 (WEA06)			07:12	06:07	05:24	05:19
	17:16	43	15:19 (WEA05)			19:57	20:47	21:30	21:46
31	08:08		14:47 (WEA05)			07:09		05:23	
	17:18	31	15:18 (WEA05)			19:59		21:31	
Sonnenscheinstunden		264		280		367	414	480	493
astr.max.mögl.Beschattung		1884		156					
Red.Sonnenscheinwahrsch.		0,21		0,30					
Reduktion Betriebsdauer		0,95		0,95					
Reduktion Windrichtung		0,61		0,62					
Gesamte Reduktion		0,12		0,18					
Met.wahrsch.Beschattung		226		28					

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP20 - Am Arsberg 46, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:05	08:08 16:27
2	05:20 21:45	05:55 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	05:21 21:45	05:57 21:12	06:44 20:12	07:31 19:05	07:22 17:02	08:11 16:26
4	05:21 21:45	05:58 21:11	06:46 20:10	07:33 19:02	07:24 17:00	14:29 (WEA05) 14:40 (WEA05)
5	05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00	07:26 16:59	14:25 (WEA05) 14:42 (WEA05)
6	05:23 21:44	06:01 21:07	06:49 20:05	07:36 18:58	07:28 16:57	14:23 (WEA05) 14:44 (WEA05)
7	05:24 21:43	06:03 21:06	06:50 20:03	07:37 18:56	07:29 16:55	14:22 (WEA05) 14:46 (WEA05)
8	05:25 21:43	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	14:21 (WEA05) 14:47 (WEA05)
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	07:33 16:52	14:20 (WEA05) 14:48 (WEA05)
10	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	14:19 (WEA05) 14:49 (WEA05)
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	14:19 (WEA05) 14:50 (WEA05)
12	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	11:32 (WEA06) 14:50 (WEA05)
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:40 16:46	11:30 (WEA06) 14:51 (WEA05)
14	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	11:28 (WEA06) 14:51 (WEA05)
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	11:27 (WEA06) 14:52 (WEA05)
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:45 16:42	11:26 (WEA06) 14:52 (WEA05)
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	11:25 (WEA06) 14:52 (WEA05)
18	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	11:24 (WEA06) 14:52 (WEA05)
19	05:36 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:50 16:38	11:24 (WEA06) 14:53 (WEA05)
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	11:24 (WEA06) 14:53 (WEA05)
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	11:24 (WEA06) 14:53 (WEA05)
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	11:23 (WEA06) 14:53 (WEA05)
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	11:23 (WEA06) 14:53 (WEA05)
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:58 16:33	11:24 (WEA06) 14:53 (WEA05)
25	05:44 21:26	06:30 20:31	07:18 19:23	08:07 18:18	07:59 16:32	11:23 (WEA06) 14:53 (WEA05)
26	05:46 21:24	06:32 20:29	07:20 19:20	08:09 18:17	08:01 16:31	11:24 (WEA06) 14:53 (WEA05)
27	05:47 21:23	06:34 20:27	07:21 19:18	08:10 18:15	08:02 16:30	11:24 (WEA06) 14:53 (WEA05)
28	05:48 21:22	06:35 20:25	07:23 19:16	08:12 18:13	08:04 16:29	11:24 (WEA06) 14:52 (WEA05)
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 18:11	08:05 16:29	11:25 (WEA06) 14:53 (WEA05)
30	05:51 21:19	06:38 20:20	07:26 19:11	08:16 18:09	08:06 16:28	11:24 (WEA06) 14:52 (WEA05)
31	05:53 21:17	06:40 20:18	07:28 19:11	08:18 18:07	08:08 16:28	11:24 (WEA06) 14:52 (WEA05)
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung					1417	1603
Red.Sonnenscheinwahrsch.					0,25	0,17
Reduktion Betriebsdauer					0,95	0,95
Reduktion Windrichtung					0,61	0,60
Gesamte Reduktion					0,14	0,10
Met.wahrsch.Beschattung					202	153

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP21 - Am Arsberg 26, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März		April	Mai	Juni
1	08:31	12:21 (WEA06)	08:06	15:13 (WEA05)	07:15	07:07	06:05	05:22	
	16:33	37	12:58 (WEA06)	17:19	28	15:41 (WEA05)	18:09	20:00	21:32
2	08:31	12:22 (WEA06)	08:05	15:13 (WEA05)	07:13	07:05	06:03	05:21	
	16:34	37	12:59 (WEA06)	17:21	27	15:40 (WEA05)	18:10	20:02	21:33
3	08:31	12:23 (WEA06)	08:03	15:14 (WEA05)	07:11	07:03	06:01	05:20	
	16:36	37	13:00 (WEA06)	17:23	25	15:39 (WEA05)	18:12	20:03	21:34
4	08:31	12:23 (WEA06)	08:02	15:16 (WEA05)	07:09	07:00	05:59	05:20	
	16:37	36	12:59 (WEA06)	17:25	23	15:39 (WEA05)	18:14	20:05	21:35
5	08:31	12:23 (WEA06)	08:00	15:17 (WEA05)	07:07	06:58	05:58	05:19	
	16:38	37	13:00 (WEA06)	17:26	21	15:38 (WEA05)	18:16	20:07	21:36
6	08:30	12:24 (WEA06)	07:59	15:19 (WEA05)	07:05	06:56	05:56	05:18	
	16:39	37	13:01 (WEA06)	17:28	17	15:36 (WEA05)	18:17	20:08	21:37
7	08:30	12:24 (WEA06)	07:57	15:22 (WEA05)	07:02	06:54	05:54	05:18	
	16:40	37	13:01 (WEA06)	17:30	12	15:34 (WEA05)	18:19	20:10	21:38
8	08:30	12:25 (WEA06)	07:55		07:00	06:52	05:52	05:17	
	16:41	37	13:02 (WEA06)	17:32		18:21	20:12	21:00	21:39
9	08:29	12:25 (WEA06)	07:54		06:58	06:50	05:51	05:17	
	16:43	44	15:23 (WEA05)	17:34		18:22	20:13	21:01	21:40
10	08:29	12:26 (WEA06)	07:52		06:56	06:47	05:49	05:16	
	16:44	47	15:25 (WEA05)	17:35		18:24	20:15	21:03	21:40
11	08:28	12:27 (WEA06)	07:50		06:54	06:45	05:48	05:16	
	16:45	49	15:27 (WEA05)	17:37		18:26	20:16	21:04	21:41
12	08:28	12:27 (WEA06)	07:48		06:52	06:43	05:46	05:16	
	16:47	51	15:29 (WEA05)	17:39		18:27	20:18	21:06	21:42
13	08:27	12:28 (WEA06)	07:47		06:49	06:41	05:44	05:16	
	16:48	52	15:30 (WEA05)	17:41		18:29	20:20	21:07	21:42
14	08:26	12:28 (WEA06)	07:45		06:47	06:39	05:43	05:15	
	16:50	54	15:31 (WEA05)	17:42		18:31	20:21	21:09	21:43
15	08:26	12:29 (WEA06)	07:43		06:45	06:37	05:41	05:15	
	16:51	55	15:32 (WEA05)	17:44		18:32	20:23	21:10	21:44
16	08:25	12:29 (WEA06)	07:41		06:43	06:35	05:40	05:15	
	16:53	56	15:33 (WEA05)	17:46		18:34	20:24	21:12	21:44
17	08:24	12:30 (WEA06)	07:39		06:41	06:32	05:39	05:15	
	16:54	56	15:34 (WEA05)	17:48		18:36	20:26	21:13	21:44
18	08:23	12:31 (WEA06)	07:37		06:38	06:30	05:37	05:15	
	16:56	57	15:35 (WEA05)	17:50		18:37	20:28	21:14	21:45
19	08:22	12:32 (WEA06)	07:35		06:36	06:28	05:36	05:15	
	16:57	56	15:36 (WEA05)	17:51		18:39	20:29	21:16	21:45
20	08:21	12:34 (WEA06)	07:33		06:34	06:26	05:35	05:15	
	16:59	55	15:37 (WEA05)	17:53		18:41	20:31	21:17	21:46
21	08:20	12:35 (WEA06)	07:31		06:32	06:24	05:33	05:15	
	17:01	55	15:38 (WEA05)	17:55		18:42	20:33	21:19	21:46
22	08:19	12:37 (WEA06)	07:29		06:29	06:22	05:32	05:16	
	17:02	52	15:39 (WEA05)	17:57		18:44	20:34	21:20	21:46
23	08:18	12:39 (WEA06)	07:28		06:27	06:20	05:31	05:16	
	17:04	50	15:40 (WEA05)	17:58		18:45	20:36	21:21	21:46
24	08:17	12:40 (WEA06)	07:25		06:25	06:18	05:30	05:16	
	17:06	48	15:40 (WEA05)	18:00		18:47	20:37	21:23	21:46
25	08:16	12:44 (WEA06)	07:23		06:23	06:16	05:29	05:16	
	17:07	40	15:40 (WEA05)	18:02		18:49	20:39	21:24	21:46
26	08:14	15:10 (WEA05)	07:21		06:20	06:14	05:27	05:17	
	17:09	31	15:41 (WEA05)	18:04		18:50	20:41	21:25	21:46
27	08:13	15:10 (WEA05)	07:19		06:18	06:12	05:26	05:17	
	17:11	31	15:41 (WEA05)	18:05		18:52	20:42	21:26	21:46
28	08:12	15:11 (WEA05)	07:17		06:16	06:10	05:25	05:18	
	17:12	30	15:41 (WEA05)	18:07		18:54	20:44	21:28	21:46
29	08:11	15:11 (WEA05)			07:14	06:09	05:24	05:18	
	17:14	30	15:41 (WEA05)		19:55	20:45	21:29	21:46	
30	08:09	15:12 (WEA05)			07:12	06:07	05:24	05:19	
	17:16	29	15:41 (WEA05)		19:57	20:47	21:30	21:46	
31	08:08	15:12 (WEA05)			07:09		05:23		
	17:18	29	15:41 (WEA05)		19:59		21:31		
Sonnenscheinstunden	264		280		367	414	480	493	
astr.max.mögl.Beschattung		1352		153					
Red.Sonnenscheinwahrsch.		0,21		0,30					
Reduktion Betriebsdauer		0,95		0,95					
Reduktion Windrichtung		0,61		0,62					
Gesamte Reduktion		0,12		0,18					
Met.wahrsch.Beschattung		162		28					

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP21 - Am Arsberg 26, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:05	08:08 16:27
2	05:20 21:45	05:55 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	05:21 21:45	05:57 21:12	06:44 20:12	07:31 19:05	07:22 17:02	08:11 16:26
4	05:21 21:45	05:58 21:11	06:46 20:10	07:33 19:02	07:24 17:00	08:12 16:26
5	05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00	07:26 16:59	08:13 16:25
6	05:23 21:44	06:01 21:07	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	05:24 21:43	06:03 21:06	06:50 20:03	07:37 18:56	07:29 16:55	08:16 16:24
8	05:25 21:43	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:51	07:33 16:52	08:18 16:24
10	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	08:19 16:24
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24
12	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	08:21 16:23
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:40 16:46	08:22 16:23
14	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	08:23 16:23
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	08:24 16:24
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:45 16:42	08:25 16:24
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	08:25 16:24
18	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	08:26 16:24
19	05:36 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:50 16:38	08:27 16:24
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	08:28 16:25
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	08:28 16:25
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	08:29 16:26
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	08:29 16:26
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:57 16:33	08:30 16:27
25	05:44 21:26	06:30 20:31	07:18 19:23	08:07 18:18	07:59 16:32	08:30 16:27
26	05:46 21:24	06:32 20:29	07:20 19:20	08:09 18:16	08:01 16:31	08:30 16:28
27	05:47 21:23	06:33 20:27	07:21 19:18	08:10 18:15	08:02 16:30	08:31 16:29
28	05:48 21:22	06:35 20:25	07:23 19:16	08:12 18:13	08:04 16:29	08:31 16:30
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 18:11	08:05 16:29	08:31 16:30
30	05:51 21:19	06:38 20:20	07:26 19:11	08:16 18:09	08:06 16:28	08:31 16:31
31	05:53 21:17	06:40 20:18	07:28 19:09	08:18 18:07	08:08 16:27	08:31 16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung					1077	1169
Red.Sonnenscheinwahrsch.					0,25	0,17
Reduktion Betriebsdauer					0,95	0,95
Reduktion Windrichtung					0,61	0,60
Gesamte Reduktion					0,14	0,09
Met.wahrsch.Beschattung					154	111

Tabellen-Layout: Die Daten für jeden Tag 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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP22 - Am Krahstück 31, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März		April	Mai	Juni
1	08:31	13:08 (WEA06)	08:06	15:40 (WEA05)	07:15	07:07	06:05	05:22	
	16:33	36	13:44 (WEA06)	17:19	27	16:07 (WEA05)	18:09	20:00	21:32
2	08:31	13:09 (WEA06)	08:05	15:40 (WEA05)	07:13	07:05	06:03	05:21	
	16:34	35	13:44 (WEA06)	17:21	26	16:06 (WEA05)	18:10	20:02	21:33
3	08:31	13:10 (WEA06)	08:03	15:40 (WEA05)	07:11	07:03	06:01	05:20	
	16:36	35	13:45 (WEA06)	17:23	26	16:06 (WEA05)	18:12	20:03	21:34
4	08:31	13:10 (WEA06)	08:02	15:41 (WEA05)	07:09	07:00	05:59	05:20	
	16:37	35	13:45 (WEA06)	17:25	25	16:06 (WEA05)	18:14	20:05	21:35
5	08:31	13:10 (WEA06)	08:00	15:42 (WEA05)	07:07	06:58	05:58	05:19	
	16:38	36	13:46 (WEA06)	17:26	23	16:05 (WEA05)	18:16	20:07	21:36
6	08:30	13:11 (WEA06)	07:59	15:43 (WEA05)	07:05	06:56	05:56	05:18	
	16:39	35	13:46 (WEA06)	17:28	21	16:04 (WEA05)	18:17	20:08	21:37
7	08:30	13:11 (WEA06)	07:57	15:45 (WEA05)	07:02	06:54	05:54	05:18	
	16:40	35	13:46 (WEA06)	17:30	19	16:04 (WEA05)	18:19	20:10	21:38
8	08:30	13:13 (WEA06)	07:55	15:46 (WEA05)	07:00	06:52	05:52	05:17	
	16:41	34	13:47 (WEA06)	17:32	16	16:02 (WEA05)	18:21	20:11	21:39
9	08:29	13:13 (WEA06)	07:54	15:48 (WEA05)	06:58	06:50	05:51	05:17	
	16:43	34	13:47 (WEA06)	17:34	12	16:00 (WEA05)	18:22	20:13	21:40
10	08:29	13:13 (WEA06)	07:52			06:56	06:47	05:49	05:16
	16:44	34	13:47 (WEA06)	17:35		18:24	20:15	21:03	21:40
11	08:28	13:14 (WEA06)	07:50			06:54	06:45	05:48	05:16
	16:45	33	13:47 (WEA06)	17:37		18:26	20:16	21:04	21:41
12	08:28	13:15 (WEA06)	07:48			06:52	06:43	05:46	05:16
	16:47	32	13:47 (WEA06)	17:39		18:27	20:18	21:06	21:42
13	08:27	13:16 (WEA06)	07:47			06:49	06:41	05:44	05:16
	16:48	31	13:47 (WEA06)	17:41		18:29	20:20	21:07	21:42
14	08:26	13:16 (WEA06)	07:45			06:47	06:39	05:43	05:15
	16:50	31	13:47 (WEA06)	17:42		18:31	20:21	21:09	21:43
15	08:26	13:17 (WEA06)	07:43			06:45	06:37	05:41	05:15
	16:51	30	13:47 (WEA06)	17:44		18:32	20:23	21:10	21:44
16	08:25	13:18 (WEA06)	07:41			06:43	06:35	05:40	05:15
	16:53	28	13:46 (WEA06)	17:46		18:34	20:24	21:12	21:44
17	08:24	13:19 (WEA06)	07:39			06:41	06:32	05:39	05:15
	16:54	34	15:52 (WEA05)	17:48		18:36	20:26	21:13	21:44
18	08:23	13:20 (WEA06)	07:37			06:38	06:30	05:37	05:15
	16:56	37	15:55 (WEA05)	17:50		18:37	20:28	21:14	21:45
19	08:22	13:22 (WEA06)	07:35			06:36	06:28	05:36	05:15
	16:57	38	15:57 (WEA05)	17:51		18:39	20:29	21:16	21:45
20	08:21	13:24 (WEA06)	07:33			06:34	06:26	05:34	05:15
	16:59	37	15:58 (WEA05)	17:53		18:41	20:31	21:17	21:46
21	08:20	13:26 (WEA06)	07:31			06:32	06:24	05:33	05:15
	17:01	37	16:00 (WEA05)	17:55		18:42	20:33	21:19	21:46
22	08:19	13:28 (WEA06)	07:29			06:29	06:22	05:32	05:15
	17:02	34	16:01 (WEA05)	17:57		18:44	20:34	21:20	21:46
23	08:18	13:33 (WEA06)	07:27			06:27	06:20	05:31	05:16
	17:04	28	16:03 (WEA05)	17:58		18:45	20:36	21:21	21:46
24	08:17	15:39 (WEA05)	07:25			06:25	06:18	05:30	05:16
	17:06	24	16:03 (WEA05)	18:00		18:47	20:37	21:23	21:46
25	08:16	15:39 (WEA05)	07:23			06:23	06:16	05:28	05:16
	17:07	25	16:04 (WEA05)	18:02		18:49	20:39	21:24	21:46
26	08:14	15:39 (WEA05)	07:21			06:20	06:14	05:27	05:17
	17:09	26	16:05 (WEA05)	18:04		18:50	20:41	21:25	21:46
27	08:13	15:38 (WEA05)	07:19			06:18	06:12	05:26	05:17
	17:11	27	16:05 (WEA05)	18:05		18:52	20:42	21:26	21:46
28	08:12	15:39 (WEA05)	07:17			06:16	06:10	05:25	05:18
	17:12	27	16:06 (WEA05)	18:07		18:54	20:44	21:28	21:46
29	08:11	15:38 (WEA05)				07:14	06:09	05:24	05:18
	17:14	28	16:06 (WEA05)			19:55	20:45	21:29	21:46
30	08:09	15:39 (WEA05)				07:12	06:07	05:23	05:19
	17:16	27	16:06 (WEA05)			19:57	20:47	21:30	21:46
31	08:08	15:39 (WEA05)				07:09		05:23	
	17:18	27	16:06 (WEA05)			19:59		21:31	
Sonnenscheinstunden	264		280			367	414	480	493
astr.max.mögl.Beschattung	990		195						
Red.Sonnenscheinwahrsch.	0,21		0,30						
Reduktion Betriebsdauer	0,95		0,95						
Reduktion Windrichtung	0,59		0,62						
Gesamte Reduktion	0,12		0,18						
Met.wahrsch.Beschattung	115		35						

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP22 - Am Krahstück 31, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19	05:54	06:41	07:28	07:19	15:22 (WEA05) 08:08
	21:46	21:16	20:16	19:09	17:05	15:26 (WEA05) 16:27
2	05:20	05:55	06:43	07:29	07:21	15:18 (WEA05) 08:09
	21:45	21:14	20:14	19:07	17:04	15:30 (WEA05) 16:27
3	05:21	05:57	06:44	07:31	07:22	15:16 (WEA05) 08:11
	21:45	21:12	20:12	19:05	17:02	15:32 (WEA05) 16:26
4	05:21	05:58	06:46	07:33	07:24	15:14 (WEA05) 08:12
	21:45	21:11	20:10	19:02	17:00	15:34 (WEA05) 16:26
5	05:22	06:00	06:47	07:34	07:26	15:12 (WEA05) 08:13
	21:44	21:09	20:07	19:00	16:59	15:34 (WEA05) 16:25
6	05:23	06:01	06:49	07:36	07:28	15:12 (WEA05) 08:14
	21:44	21:07	20:05	18:58	16:57	15:35 (WEA05) 16:25
7	05:24	06:03	06:50	07:37	07:29	15:11 (WEA05) 08:16
	21:43	21:06	20:03	18:56	16:55	15:36 (WEA05) 16:24
8	05:25	06:04	06:52	07:39	07:31	15:11 (WEA05) 08:17
	21:43	21:04	20:01	18:54	16:54	15:37 (WEA05) 16:24
9	05:26	06:06	06:54	07:41	07:33	15:11 (WEA05) 08:18
	21:42	21:02	19:59	18:51	16:52	15:37 (WEA05) 16:24
10	05:27	06:07	06:55	07:42	07:34	15:11 (WEA05) 08:19
	21:41	21:00	19:56	18:49	16:51	15:38 (WEA05) 16:24
11	05:28	06:09	06:57	07:44	07:36	15:10 (WEA05) 08:20
	21:41	20:59	19:54	18:47	16:49	15:37 (WEA05) 16:23
12	05:29	06:10	06:58	07:45	07:38	15:10 (WEA05) 08:21
	21:40	20:57	19:52	18:45	16:48	15:37 (WEA05) 16:23
13	05:30	06:12	07:00	07:47	07:40	15:10 (WEA05) 08:22
	21:39	20:55	19:50	18:43	16:46	15:38 (WEA05) 16:23
14	05:31	06:13	07:01	07:49	07:41	15:11 (WEA05) 08:23
	21:38	20:53	19:47	18:41	16:45	15:38 (WEA05) 16:23
15	05:32	06:15	07:03	07:50	07:43	15:11 (WEA05) 08:24
	21:37	20:51	19:45	18:39	16:43	15:38 (WEA05) 16:23
16	05:33	06:17	07:04	07:52	07:45	15:12 (WEA05) 08:25
	21:36	20:49	19:43	18:37	16:42	15:38 (WEA05) 16:24
17	05:34	06:18	07:06	07:54	07:46	15:12 (WEA05) 08:25
	21:35	20:47	19:41	18:34	16:41	15:37 (WEA05) 16:24
18	05:35	06:20	07:07	07:55	07:48	15:13 (WEA05) 08:26
	21:34	20:45	19:38	18:32	16:40	15:37 (WEA05) 16:24
19	05:36	06:21	07:09	07:57	07:50	13:07 (WEA06) 08:27
	21:33	20:43	19:36	18:30	16:38	15:37 (WEA05) 16:24
20	05:38	06:23	07:11	07:59	07:51	13:03 (WEA06) 08:28
	21:32	20:41	19:34	18:28	16:37	15:36 (WEA05) 16:25
21	05:39	06:24	07:12	08:00	07:53	13:01 (WEA06) 08:28
	21:31	20:39	19:32	18:26	16:36	15:35 (WEA05) 16:25
22	05:40	06:26	07:14	08:02	07:54	13:00 (WEA06) 08:29
	21:30	20:37	19:29	18:24	16:35	15:34 (WEA05) 16:26
23	05:42	06:27	07:15	08:04	07:56	12:59 (WEA06) 08:29
	21:28	20:35	19:27	18:22	16:34	15:34 (WEA05) 16:26
24	05:43	06:29	07:17	08:05	07:57	12:58 (WEA06) 08:30
	21:27	20:33	19:25	18:20	16:33	15:33 (WEA05) 16:27
25	05:44	06:30	07:18	07:07	07:59	12:57 (WEA06) 08:30
	21:26	20:31	19:23	17:18	16:32	15:30 (WEA05) 16:27
26	05:46	06:32	07:20	07:09	08:01	12:57 (WEA06) 08:30
	21:24	20:29	19:20	17:17	16:31	13:25 (WEA06) 16:28
27	05:47	06:33	07:21	07:10	08:02	12:57 (WEA06) 08:31
	21:23	20:27	19:18	17:15	16:30	13:27 (WEA06) 16:29
28	05:48	06:35	07:23	07:12	08:04	12:56 (WEA06) 08:31
	21:22	20:25	19:16	17:13	16:29	13:27 (WEA06) 16:30
29	05:50	06:37	07:25	07:14	08:05	12:57 (WEA06) 08:31
	21:20	20:23	19:14	17:11	16:29	13:28 (WEA06) 16:30
30	05:51	06:38	07:26	07:16	08:06	12:56 (WEA06) 08:31
	21:19	20:20	19:11	17:09	16:28	13:28 (WEA06) 16:31
31	05:53	06:40		07:17		08:31
	21:17	20:18		17:07		16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung					809	1094
Red.Sonnenscheinwahrsch.					0,25	0,17
Reduktion Betriebsdauer					0,95	0,95
Reduktion Windrichtung					0,61	0,58
Gesamte Reduktion					0,14	0,09
Met.wahrsch.Beschattung					114	100

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP23 - Rehzugstraße 5, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar		März		April	Mai	Juni
1	08:31	13:44 (WEA06)	08:06	16:01 (WEA05)	07:15	07:07	06:05	05:22	
	16:33	30	14:14 (WEA06)	17:19	19	16:20 (WEA05)	18:09	20:00	21:32
2	08:31	13:44 (WEA06)	08:05	16:00 (WEA05)	07:13	07:05	06:03	05:21	
	16:34	31	14:15 (WEA06)	17:21	21	16:21 (WEA05)	18:10	20:02	21:33
3	08:31	13:45 (WEA06)	08:03	15:59 (WEA05)	07:11	07:03	06:01	05:20	
	16:36	31	14:16 (WEA06)	17:23	22	16:21 (WEA05)	18:12	20:03	21:34
4	08:31	13:44 (WEA06)	08:02	15:59 (WEA05)	07:09	07:00	05:59	05:20	
	16:37	32	14:16 (WEA06)	17:25	24	16:23 (WEA05)	18:14	20:05	21:35
5	08:31	13:45 (WEA06)	08:00	15:59 (WEA05)	07:07	06:58	05:58	05:19	
	16:38	32	14:17 (WEA06)	17:26	24	16:23 (WEA05)	18:16	20:07	21:36
6	08:30	13:45 (WEA06)	07:59	15:58 (WEA05)	07:05	06:56	05:56	05:18	
	16:39	33	14:18 (WEA06)	17:28	25	16:23 (WEA05)	18:17	20:08	21:37
7	08:30	13:45 (WEA06)	07:57	15:59 (WEA05)	07:02	06:54	05:54	05:18	
	16:40	33	14:18 (WEA06)	17:30	25	16:24 (WEA05)	18:19	20:10	21:38
8	08:30	13:46 (WEA06)	07:55	15:59 (WEA05)	07:00	06:52	05:52	05:17	
	16:41	33	14:19 (WEA06)	17:32	25	16:24 (WEA05)	18:21	20:11	21:39
9	08:29	13:46 (WEA06)	07:54	15:59 (WEA05)	06:58	06:50	05:51	05:17	
	16:43	33	14:19 (WEA06)	17:34	25	16:24 (WEA05)	18:22	20:13	21:40
10	08:29	13:46 (WEA06)	07:52	15:59 (WEA05)	06:56	06:47	05:49	05:16	
	16:44	33	14:19 (WEA06)	17:35	24	16:23 (WEA05)	18:24	20:15	21:40
11	08:28	13:47 (WEA06)	07:50	15:59 (WEA05)	06:54	06:45	05:48	05:16	
	16:45	34	14:21 (WEA06)	17:37	24	16:23 (WEA05)	18:26	20:16	21:41
12	08:28	13:47 (WEA06)	07:48	16:00 (WEA05)	06:52	06:43	05:46	05:16	
	16:47	34	14:21 (WEA06)	17:39	22	16:22 (WEA05)	18:27	20:18	21:42
13	08:27	13:47 (WEA06)	07:47	16:02 (WEA05)	06:49	06:41	05:44	05:16	
	16:48	34	14:21 (WEA06)	17:41	20	16:22 (WEA05)	18:29	20:20	21:42
14	08:26	13:47 (WEA06)	07:45	16:03 (WEA05)	06:47	06:39	05:43	05:15	
	16:50	34	14:21 (WEA06)	17:42	18	16:21 (WEA05)	18:31	20:21	21:43
15	08:26	13:47 (WEA06)	07:43	16:05 (WEA05)	06:45	06:37	05:41	05:15	
	16:51	35	14:22 (WEA06)	17:44	14	16:19 (WEA05)	18:32	20:23	21:43
16	08:25	13:48 (WEA06)	07:41	16:08 (WEA05)	06:43	06:35	05:40	05:15	
	16:53	34	14:22 (WEA06)	17:46	8	16:16 (WEA05)	18:34	20:24	21:44
17	08:24	13:48 (WEA06)	07:39		06:41	06:32	05:39	05:15	
	16:54	34	14:22 (WEA06)	17:48		18:36	20:26	21:13	21:44
18	08:23	13:49 (WEA06)	07:37		06:38	06:30	05:37	05:15	
	16:56	34	14:23 (WEA06)	17:50		18:37	20:28	21:14	21:45
19	08:22	13:49 (WEA06)	07:35		06:36	06:28	05:36	05:15	
	16:57	34	14:23 (WEA06)	17:51		18:39	20:29	21:16	21:45
20	08:21	13:50 (WEA06)	07:33		06:34	06:26	05:34	05:15	
	16:59	33	14:23 (WEA06)	17:53		18:41	20:31	21:17	21:46
21	08:20	13:51 (WEA06)	07:31		06:32	06:24	05:33	05:15	
	17:01	32	14:23 (WEA06)	17:55		18:42	20:33	21:19	21:46
22	08:19	13:52 (WEA06)	07:29		06:29	06:22	05:32	05:15	
	17:02	31	14:23 (WEA06)	17:57		18:44	20:34	21:20	21:46
23	08:18	13:53 (WEA06)	07:27		06:27	06:20	05:31	05:16	
	17:04	30	14:23 (WEA06)	17:58		18:45	20:36	21:21	21:46
24	08:17	13:53 (WEA06)	07:25		06:25	06:18	05:30	05:16	
	17:06	30	14:23 (WEA06)	18:00		18:47	20:37	21:23	21:46
25	08:16	13:54 (WEA06)	07:23		06:23	06:16	05:28	05:16	
	17:07	28	14:22 (WEA06)	18:02		18:49	20:39	21:24	21:46
26	08:14	13:56 (WEA06)	07:21		06:20	06:14	05:27	05:17	
	17:09	26	14:22 (WEA06)	18:04		18:50	20:41	21:25	21:46
27	08:13	13:56 (WEA06)	07:19		06:18	06:12	05:26	05:17	
	17:11	25	14:21 (WEA06)	18:05		18:52	20:42	21:26	21:46
28	08:12	13:58 (WEA06)	07:17		06:16	06:10	05:25	05:18	
	17:12	22	14:20 (WEA06)	18:07		18:54	20:44	21:28	21:46
29	08:11	14:00 (WEA06)			07:14	06:09	05:24	05:18	
	17:14	30	16:15 (WEA05)		19:55	20:45	21:29	21:46	
30	08:09	14:03 (WEA06)			07:12	06:07	05:23	05:19	
	17:16	28	16:17 (WEA05)		19:57	20:47	21:30	21:46	
31	08:08	14:06 (WEA06)			07:09		05:23		
	17:18	24	16:18 (WEA05)		19:59		21:31		
Sonnenscheinstunden	264		280		367	414	480	493	
astr.max.mögl.Beschattung	967		340						
Red.Sonnenscheinwahrsch.	0,21		0,30						
Reduktion Betriebsdauer	0,95		0,95						
Reduktion Windrichtung	0,60		0,64						
Gesamte Reduktion	0,12		0,19						
Met.wahrsch.Beschattung	114		63						

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP23 - Rehzugstraße 5, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September	Oktober		November		Dezember	
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09		07:19 17:05	15:29 (WEA05) 15:53 (WEA05)	08:08 16:27	13:29 (WEA06) 14:03 (WEA06)
2	05:20 21:45	05:55 21:14	06:43 20:14	07:29 19:07		07:21 17:04	15:28 (WEA05) 15:53 (WEA05)	08:09 16:27	13:29 (WEA06) 14:02 (WEA06)
3	05:21 21:45	05:57 21:12	06:44 20:12	07:31 19:05		07:22 17:02	15:28 (WEA05) 15:54 (WEA05)	08:11 16:26	13:30 (WEA06) 14:03 (WEA06)
4	05:21 21:45	05:58 21:11	06:46 20:10	07:33 19:02		07:24 17:00	15:28 (WEA05) 15:53 (WEA05)	08:12 16:26	13:30 (WEA06) 14:03 (WEA06)
5	05:22 21:44	06:00 21:09	06:47 20:07	07:34 19:00		07:26 16:59	15:28 (WEA05) 15:53 (WEA05)	08:13 16:25	13:30 (WEA06) 14:03 (WEA06)
6	05:23 21:44	06:01 21:07	06:49 20:05	07:36 18:58		07:28 16:57	15:28 (WEA05) 15:53 (WEA05)	08:14 16:25	13:32 (WEA06) 14:04 (WEA06)
7	05:24 21:43	06:03 21:06	06:50 20:03	07:37 18:56		07:29 16:55	15:29 (WEA05) 15:53 (WEA05)	08:16 16:24	13:32 (WEA06) 14:04 (WEA06)
8	05:25 21:43	06:04 21:04	06:52 20:01	07:39 18:54		07:31 16:54	15:30 (WEA05) 15:52 (WEA05)	08:17 16:24	13:32 (WEA06) 14:04 (WEA06)
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:51		07:33 16:52	15:31 (WEA05) 15:52 (WEA05)	08:18 16:24	13:33 (WEA06) 14:04 (WEA06)
10	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49		07:34 16:51	15:32 (WEA05) 15:51 (WEA05)	08:19 16:24	13:33 (WEA06) 14:04 (WEA06)
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47		07:36 16:49	15:36 (WEA06) 15:49 (WEA05)	08:20 16:23	13:34 (WEA06) 14:04 (WEA06)
12	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45		07:38 16:48	15:49 (WEA05) 15:48 (WEA05)	08:21 16:23	13:34 (WEA06) 14:04 (WEA06)
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43		07:40 16:46	15:31 (WEA06) 15:46 (WEA05)	08:22 16:23	13:35 (WEA06) 14:05 (WEA06)
14	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41		07:41 16:45	15:30 (WEA06) 15:52 (WEA06)	08:23 16:23	13:36 (WEA06) 14:05 (WEA06)
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39		07:43 16:43	15:29 (WEA06) 15:54 (WEA06)	08:24 16:23	13:36 (WEA06) 14:05 (WEA06)
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37		07:45 16:42	15:29 (WEA06) 15:55 (WEA06)	08:25 16:24	13:37 (WEA06) 14:06 (WEA06)
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:34		07:46 16:41	15:27 (WEA06) 15:55 (WEA06)	08:25 16:24	13:38 (WEA06) 14:06 (WEA06)
18	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32		07:48 16:40	15:27 (WEA06) 15:57 (WEA06)	08:26 16:24	13:39 (WEA06) 14:07 (WEA06)
19	05:36 21:33	06:21 20:43	07:09 19:36	07:57 18:30		07:49 16:38	15:27 (WEA06) 15:57 (WEA06)	08:27 16:24	13:39 (WEA06) 14:07 (WEA06)
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28		07:51 16:37	15:27 (WEA06) 15:58 (WEA06)	08:28 16:25	13:40 (WEA06) 14:08 (WEA06)
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26		07:53 16:36	15:26 (WEA06) 15:58 (WEA06)	08:28 16:25	13:40 (WEA06) 14:07 (WEA06)
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24		07:54 16:35	15:26 (WEA06) 15:59 (WEA06)	08:29 16:26	13:41 (WEA06) 14:08 (WEA06)
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22		07:56 16:34	15:26 (WEA06) 14:00 (WEA06)	08:29 16:26	13:41 (WEA06) 14:09 (WEA06)
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20		07:57 16:33	15:27 (WEA06) 14:01 (WEA06)	08:30 16:27	13:42 (WEA06) 14:10 (WEA06)
25	05:44 21:26	06:30 20:31	07:18 19:23	08:07 18:18		07:59 16:32	15:26 (WEA06) 14:00 (WEA06)	08:30 16:27	13:42 (WEA06) 14:10 (WEA06)
26	05:46 21:24	06:32 20:29	07:20 19:20	08:09 17:17	15:36 (WEA05)	08:01 16:31	13:27 (WEA06) 14:01 (WEA06)	08:30 16:28	13:42 (WEA06) 14:10 (WEA06)
27	05:47 21:23	06:33 20:27	07:21 19:18	08:10 17:15	15:34 (WEA05)	08:02 16:30	13:26 (WEA06) 14:01 (WEA06)	08:31 16:29	13:42 (WEA06) 14:11 (WEA06)
28	05:48 21:22	06:35 20:25	07:23 19:16	08:12 17:13	15:32 (WEA05)	08:04 16:29	13:27 (WEA06) 14:01 (WEA06)	08:31 16:30	13:42 (WEA06) 14:11 (WEA06)
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 17:11	15:30 (WEA05)	08:05 16:29	13:28 (WEA06) 14:02 (WEA06)	08:31 16:30	13:43 (WEA06) 14:12 (WEA06)
30	05:51 21:19	06:38 20:20	07:26 19:11	08:16 17:09	15:29 (WEA05)	08:06 16:28	13:28 (WEA06) 14:02 (WEA06)	08:31 16:31	13:43 (WEA06) 14:12 (WEA06)
31	05:53 21:17	06:40 20:18	07:28 17:07	08:18 17:07	15:29 (WEA05)	08:08 16:27	13:28 (WEA06) 14:02 (WEA06)	08:31 16:32	13:43 (WEA06) 14:13 (WEA06)
Sonnenscheinstunden	496	450	380	333		270		250	
astr.max.mögl.Beschattung				111		851			925
Red.Sonnenscheinwahrsch.				0,27		0,25			0,17
Reduktion Betriebsdauer				0,95		0,95			0,95
Reduktion Windrichtung				0,64		0,61			0,60
Gesamte Reduktion				0,16		0,14			0,09
Met.wahrsch.Beschattung				18		121			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)

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP24 - Am bhf Schutzbach 2, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

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

429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März		April		Mai		Juni	
1	08:31	08:06	07:15		07:07	17:23 (WEA04)	06:05	17:59 (WEA06)	05:22	18:03 (WEA06)
	16:33	17:19	18:09		20:00	17:34 (WEA04)	20:49	18:38 (WEA06)	21:32	18:41 (WEA06)
2	08:31	08:05	07:13		07:05		06:03	17:59 (WEA06)	05:21	18:04 (WEA06)
	16:34	17:21	18:10		20:02		20:50	18:39 (WEA06)	21:33	18:42 (WEA06)
3	08:31	08:03	07:11		07:03		06:01	17:58 (WEA06)	05:20	18:05 (WEA06)
	16:36	17:23	18:12		20:03		20:52	18:40 (WEA06)	21:34	18:41 (WEA06)
4	08:31	08:02	07:09		07:00		05:59	17:57 (WEA06)	05:20	18:05 (WEA06)
	16:37	17:25	18:14		20:05		20:53	18:40 (WEA06)	21:35	18:40 (WEA06)
5	08:31	08:00	07:07		06:58		05:58	17:57 (WEA06)	05:19	18:06 (WEA06)
	16:38	17:26	18:16		20:07		20:55	18:41 (WEA06)	21:36	18:41 (WEA06)
6	08:30	07:59	07:05		06:56		05:56	17:56 (WEA06)	05:18	18:06 (WEA06)
	16:39	17:28	18:17		20:08		20:56	18:42 (WEA06)	21:37	18:40 (WEA06)
7	08:30	07:57	07:02		06:54		05:54	17:55 (WEA06)	05:18	18:07 (WEA06)
	16:40	17:30	18:19		20:10		20:58	18:42 (WEA06)	21:38	18:40 (WEA06)
8	08:30	07:55	07:00		06:52		05:52	17:56 (WEA06)	05:17	18:08 (WEA06)
	16:41	17:32	18:21		20:11		21:00	18:42 (WEA06)	21:39	18:40 (WEA06)
9	08:29	07:54	06:58		06:50		05:51	17:55 (WEA06)	05:17	18:08 (WEA06)
	16:43	17:34	18:22		20:13		21:01	18:42 (WEA06)	21:40	18:40 (WEA06)
10	08:29	07:52	06:56	16:30 (WEA04)	06:47		05:49	17:55 (WEA06)	05:16	18:09 (WEA06)
	16:44	17:35	18:24	6	20:15		21:03	18:43 (WEA06)	21:40	18:40 (WEA06)
11	08:28	07:50	06:54	16:25 (WEA04)	06:45		05:48	17:55 (WEA06)	05:16	18:10 (WEA06)
	16:45	17:37	18:26	16	20:16		21:04	18:43 (WEA06)	21:41	18:40 (WEA06)
12	08:28	07:48	06:52	16:22 (WEA04)	06:43		05:46	17:55 (WEA06)	05:16	18:10 (WEA06)
	16:47	17:39	18:27	22	20:18		21:06	18:43 (WEA06)	21:42	18:39 (WEA06)
13	08:27	07:47	06:49	16:20 (WEA04)	06:41		05:44	17:54 (WEA06)	05:16	18:11 (WEA06)
	16:48	17:41	18:29	26	20:20		21:07	18:43 (WEA06)	21:42	18:39 (WEA06)
14	08:26	07:45	06:47	16:18 (WEA04)	06:39		05:43	17:55 (WEA06)	05:15	18:11 (WEA06)
	16:50	17:42	18:31	28	20:21		21:09	18:43 (WEA06)	21:43	18:39 (WEA06)
15	08:26	07:43	06:45	16:17 (WEA04)	06:37		05:41	17:55 (WEA06)	05:15	18:12 (WEA06)
	16:51	17:44	18:32	30	20:23		21:10	18:44 (WEA06)	21:43	18:39 (WEA06)
16	08:25	07:41	06:43	16:16 (WEA04)	06:35		05:40	17:55 (WEA06)	05:15	18:13 (WEA06)
	16:53	17:46	18:34	32	20:24		21:12	18:43 (WEA06)	21:44	18:39 (WEA06)
17	08:24	07:39	06:41	16:15 (WEA04)	06:32		05:39	17:55 (WEA06)	05:15	18:13 (WEA06)
	16:54	17:48	18:36	34	20:26		21:13	18:43 (WEA06)	21:44	18:39 (WEA06)
18	08:23	07:37	06:38	16:13 (WEA04)	06:30		05:37	17:56 (WEA06)	05:15	18:13 (WEA06)
	16:56	17:50	18:37	35	20:28		21:14	18:44 (WEA06)	21:45	18:39 (WEA06)
19	08:22	07:35	06:36	16:13 (WEA04)	06:28		05:36	17:57 (WEA06)	05:15	18:14 (WEA06)
	16:57	17:51	18:39	36	20:29		21:16	18:44 (WEA06)	21:45	18:39 (WEA06)
20	08:21	07:33	06:34	16:13 (WEA04)	06:26		05:35	17:56 (WEA06)	05:15	18:14 (WEA06)
	16:59	17:53	18:41	36	20:31		21:17	18:43 (WEA06)	21:45	18:39 (WEA06)
21	08:20	07:31	06:32	16:13 (WEA04)	06:24		05:33	17:57 (WEA06)	05:15	18:15 (WEA06)
	17:01	17:55	18:42	36	20:32		21:19	18:43 (WEA06)	21:46	18:40 (WEA06)
22	08:19	07:29	06:29	16:12 (WEA04)	06:22		05:32	17:57 (WEA06)	05:16	18:15 (WEA06)
	17:02	17:57	18:44	36	20:34		21:20	18:43 (WEA06)	21:46	18:40 (WEA06)
23	08:18	07:27	06:27	16:12 (WEA04)	06:20		05:31	17:58 (WEA06)	05:16	18:15 (WEA06)
	17:04	17:58	18:45	36	20:36		21:21	18:43 (WEA06)	21:46	18:40 (WEA06)
24	08:17	07:25	06:25	16:13 (WEA04)	06:18		05:30	17:58 (WEA06)	05:16	18:14 (WEA06)
	17:06	18:00	18:47	35	20:37		21:23	18:43 (WEA06)	21:46	18:40 (WEA06)
25	08:16	07:23	06:23	16:13 (WEA04)	06:16	18:12 (WEA06)	05:29	17:59 (WEA06)	05:16	18:15 (WEA06)
	17:07	18:02	18:49	34	20:39	18:27 (WEA06)	21:24	18:43 (WEA06)	21:46	18:41 (WEA06)
26	08:14	07:21	06:20	16:13 (WEA04)	06:14	18:08 (WEA06)	05:27	17:59 (WEA06)	05:17	18:15 (WEA06)
	17:09	18:03	18:50	32	20:41	18:30 (WEA06)	21:25	18:42 (WEA06)	21:46	18:41 (WEA06)
27	08:13	07:19	06:18	16:14 (WEA04)	06:12	18:06 (WEA06)	05:26	18:00 (WEA06)	05:17	18:15 (WEA06)
	17:11	18:05	18:52	31	20:42	18:33 (WEA06)	21:26	18:42 (WEA06)	21:46	18:42 (WEA06)
28	08:12	07:17	06:16	16:15 (WEA04)	06:10	18:04 (WEA06)	05:25	18:00 (WEA06)	05:18	18:15 (WEA06)
	17:12	18:07	18:54	29	20:44	18:35 (WEA06)	21:27	18:42 (WEA06)	21:46	18:42 (WEA06)
29	08:10		07:14	17:16 (WEA04)	06:09	18:02 (WEA06)	05:24	18:02 (WEA06)	05:18	18:15 (WEA06)
	17:14		19:55	26	20:45	18:36 (WEA06)	21:29	18:43 (WEA06)	21:46	18:43 (WEA06)
30	08:09		07:12	17:18 (WEA04)	06:07	18:01 (WEA06)	05:24	18:02 (WEA06)	05:19	18:14 (WEA06)
	17:16		19:57	23	20:47	18:37 (WEA06)	21:30	18:42 (WEA06)	21:46	18:43 (WEA06)
31	08:08		07:09	17:20 (WEA04)			05:23	18:03 (WEA06)		
	17:18		19:58	17	17:37 (WEA04)		21:31	18:42 (WEA06)		
Sonnenscheinstunden	264	280	367		414		480		492	
astr.max.mögl.Beschattung			636		176		1395		878	
Red.Sonnenscheinwahrsch.			0,29		0,37		0,40		0,32	
Reduktion Betriebsdauer			0,95		0,95		0,95		0,95	
Reduktion Windrichtung			0,67		0,68		0,68		0,68	
Gesamte Reduktion			0,18		0,24		0,26		0,21	
Met.wahrsch.Beschattung			115		42		361		184	

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP24 - Am bhf Schutzbach 2, 57518 Alsdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember
1	05:19	18:15 (WEA06)	05:54	18:05 (WEA06)	06:41	07:28	17:00 (WEA04)	07:19	08:08	
	21:46	29 18:44 (WEA06)	21:16	18:54 (WEA06)	20:16	19:09	23 17:23 (WEA04)	17:05	16:27	
2	05:20	18:14 (WEA06)	05:55	18:05 (WEA06)	06:43	07:29	17:02 (WEA04)	07:21	08:09	
	21:45	30 18:44 (WEA06)	21:14	18:53 (WEA06)	20:14	19:07	19 17:21 (WEA04)	17:04	16:27	
3	05:21	18:14 (WEA06)	05:57	18:06 (WEA06)	06:44	07:31	17:05 (WEA04)	07:22	08:10	
	21:45	31 18:45 (WEA06)	21:12	18:53 (WEA06)	20:12	19:05	12 17:17 (WEA04)	17:02	16:26	
4	05:21	18:14 (WEA06)	05:58	18:05 (WEA06)	06:46	07:33		07:24	08:12	
	21:45	31 18:45 (WEA06)	21:11	18:53 (WEA06)	20:10	19:02		17:00	16:26	
5	05:22	18:14 (WEA06)	06:00	18:05 (WEA06)	06:47	07:34		07:26	08:13	
	21:44	32 18:46 (WEA06)	21:09	18:52 (WEA06)	20:07	19:00		16:59	16:25	
6	05:23	18:13 (WEA06)	06:01	18:06 (WEA06)	06:49	07:36		07:28	08:14	
	21:44	33 18:46 (WEA06)	21:07	18:52 (WEA06)	20:05	18:58		16:57	16:25	
7	05:24	18:13 (WEA06)	06:03	18:06 (WEA06)	06:50	07:37		07:29	08:16	
	21:43	34 18:47 (WEA06)	21:06	18:51 (WEA06)	20:03	18:56		16:55	16:24	
8	05:25	18:12 (WEA06)	06:04	18:07 (WEA06)	06:52	07:39		07:31	08:17	
	21:43	35 18:47 (WEA06)	21:04	18:51 (WEA06)	20:01	18:54		16:54	16:24	
9	05:26	18:12 (WEA06)	06:06	18:07 (WEA06)	06:54	07:41		07:33	08:18	
	21:42	36 18:48 (WEA06)	21:02	18:49 (WEA06)	19:58	18:51		16:52	16:24	
10	05:27	18:12 (WEA06)	06:07	18:07 (WEA06)	06:55	07:42		07:34	08:19	
	21:41	37 18:49 (WEA06)	21:00	18:48 (WEA06)	19:56	18:49		16:51	16:24	
11	05:28	18:12 (WEA06)	06:09	18:08 (WEA06)	06:57	07:44		07:36	08:20	
	21:40	37 18:49 (WEA06)	20:59	18:48 (WEA06)	19:54	9 17:25 (WEA04)	18:47	16:49	16:24	
12	05:29	18:11 (WEA06)	06:10	18:08 (WEA06)	06:58	07:45		07:38	08:21	
	21:40	39 18:50 (WEA06)	20:57	18:46 (WEA06)	19:52	17 17:29 (WEA04)	18:45	16:48	16:23	
13	05:30	18:11 (WEA06)	06:12	18:10 (WEA06)	07:00	07:47		07:39	08:22	
	21:39	39 18:50 (WEA06)	20:55	18:45 (WEA06)	19:50	22 17:31 (WEA04)	18:43	16:46	16:23	
14	05:31	18:10 (WEA06)	06:13	18:10 (WEA06)	07:01	07:49		07:41	08:23	
	21:38	41 18:51 (WEA06)	20:53	18:43 (WEA06)	19:47	25 17:32 (WEA04)	18:41	16:45	16:23	
15	05:32	18:10 (WEA06)	06:15	18:12 (WEA06)	07:03	07:50		07:43	08:24	
	21:37	41 18:51 (WEA06)	20:51	18:42 (WEA06)	19:45	28 17:33 (WEA04)	18:39	16:43	16:24	
16	05:33	18:10 (WEA06)	06:17	18:14 (WEA06)	07:04	07:52		07:45	08:25	
	21:36	42 18:52 (WEA06)	20:49	18:39 (WEA06)	19:43	31 17:34 (WEA04)	18:37	16:42	16:24	
17	05:34	18:09 (WEA06)	06:18	18:16 (WEA06)	07:06	07:54		07:46	08:25	
	21:35	43 18:52 (WEA06)	20:47	18:37 (WEA06)	19:41	32 17:34 (WEA04)	18:34	16:41	16:24	
18	05:35	18:09 (WEA06)	06:20	18:19 (WEA06)	07:07	07:55		07:48	08:26	
	21:34	43 18:52 (WEA06)	20:45	18:33 (WEA06)	19:38	33 17:34 (WEA04)	18:32	16:40	16:24	
19	05:36	18:08 (WEA06)	06:21		07:09	07:57		07:49	08:27	
	21:33	44 18:52 (WEA06)	20:43		19:36	35 17:34 (WEA04)	18:30	16:38	16:24	
20	05:38	18:08 (WEA06)	06:23		07:11	16:59 (WEA04)	07:59	07:51	08:27	
	21:32	44 18:52 (WEA06)	20:41		19:34	35 17:34 (WEA04)	18:28	16:37	16:25	
21	05:39	18:08 (WEA06)	06:24		07:12	16:59 (WEA04)	08:00	07:53	08:28	
	21:31	46 18:54 (WEA06)	20:39		19:32	36 17:35 (WEA04)	18:26	16:36	16:25	
22	05:40	18:07 (WEA06)	06:26		07:14	16:57 (WEA04)	08:02	07:54	08:29	
	21:30	47 18:54 (WEA06)	20:37		19:29	37 17:34 (WEA04)	18:24	16:35	16:26	
23	05:42	18:07 (WEA06)	06:27		07:15	16:57 (WEA04)	08:04	07:56	08:29	
	21:28	47 18:54 (WEA06)	20:35		19:27	37 17:34 (WEA04)	18:22	16:34	16:26	
24	05:43	18:06 (WEA06)	06:29		07:17	16:57 (WEA04)	08:05	07:57	08:30	
	21:27	47 18:53 (WEA06)	20:33		19:25	36 17:33 (WEA04)	18:20	16:33	16:27	
25	05:44	18:07 (WEA06)	06:30		07:18	16:57 (WEA04)	07:07	07:59	08:30	
	21:26	47 18:54 (WEA06)	20:31		19:22	35 17:32 (WEA04)	17:18	16:32	16:27	
26	05:46	18:06 (WEA06)	06:32		07:20	16:56 (WEA04)	07:09	08:00	08:30	
	21:24	48 18:54 (WEA06)	20:29		19:20	35 17:31 (WEA04)	17:17	16:31	16:28	
27	05:47	18:06 (WEA06)	06:33		07:21	16:57 (WEA04)	07:10	08:02	08:31	
	21:23	48 18:54 (WEA06)	20:27		19:18	33 17:30 (WEA04)	17:15	16:30	16:29	
28	05:48	18:05 (WEA06)	06:35		07:23	16:57 (WEA04)	07:12	08:03	08:31	
	21:22	49 18:54 (WEA06)	20:25		19:16	31 17:28 (WEA04)	17:13	16:29	16:30	
29	05:50	18:06 (WEA06)	06:37		07:25	16:58 (WEA04)	07:14	08:05	08:31	
	21:20	48 18:54 (WEA06)	20:23		19:14	29 17:27 (WEA04)	17:11	16:29	16:30	
30	05:51	18:05 (WEA06)	06:38		07:26	16:59 (WEA04)	07:16	08:06	08:31	
	21:19	49 18:54 (WEA06)	20:20		19:11	27 17:26 (WEA04)	17:09	16:28	16:31	
31	05:53	18:05 (WEA06)	06:40				07:17		08:31	
	21:17	48 18:53 (WEA06)	20:18				17:07		16:32	
Sonnenscheinstunden	496		450		380		333		270	250
astr.max.mögl.Beschattung	1265		693		603		54			
Red.Sonnenscheinwahrsch.	0,39		0,41		0,37		0,27			
Reduktion Betriebsdauer	0,95		0,95		0,95		0,95			
Reduktion Windrichtung	0,68		0,68		0,67		0,67			
Gesamte Reduktion	0,25		0,27		0,23		0,17			
Met.wahrsch.Beschattung	318		185		141		9			

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP25 - Bahnhofsweg 1, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März		April		Mai		Juni	
1	08:31	08:06	07:15		07:07	17:51 (WEA04)	06:05		05:22	18:51 (WEA06)
	16:33	17:19	18:09		20:00	29 18:20 (WEA04)	20:49		21:32	35 19:26 (WEA06)
2	08:31	08:05	07:13		07:05	17:50 (WEA04)	06:03		05:21	18:51 (WEA06)
	16:34	17:21	18:10		20:02	31 18:21 (WEA04)	20:50		21:33	37 19:28 (WEA06)
3	08:31	08:03	07:11		07:03	17:49 (WEA04)	06:01		05:20	18:50 (WEA06)
	16:36	17:23	18:12		20:03	33 18:22 (WEA04)	20:52		21:34	38 19:28 (WEA06)
4	08:31	08:02	07:09		07:00	17:48 (WEA04)	05:59		05:20	18:50 (WEA06)
	16:37	17:25	18:14		20:05	33 18:21 (WEA04)	20:53		21:35	38 19:28 (WEA06)
5	08:31	08:00	07:07		06:58	17:47 (WEA04)	05:58		05:19	18:50 (WEA06)
	16:38	17:26	18:16		20:07	35 18:22 (WEA04)	20:55		21:36	39 19:29 (WEA06)
6	08:30	07:59	07:05		06:56	17:47 (WEA04)	05:56		05:18	18:50 (WEA06)
	16:39	17:28	18:17		20:08	35 18:22 (WEA04)	20:56		21:37	39 19:29 (WEA06)
7	08:30	07:57	07:02		06:54	17:46 (WEA04)	05:54		05:18	18:50 (WEA06)
	16:40	17:30	18:19		20:10	36 18:22 (WEA04)	20:58		21:38	40 19:30 (WEA06)
8	08:30	07:55	07:00		06:52	17:46 (WEA04)	05:52		05:17	18:50 (WEA06)
	16:41	17:32	18:21		20:11	36 18:22 (WEA04)	20:59		21:39	41 19:31 (WEA06)
9	08:29	07:54	06:58		06:50	17:46 (WEA04)	05:51		05:17	18:50 (WEA06)
	16:43	17:34	18:22		20:13	36 18:22 (WEA04)	21:01		21:39	41 19:31 (WEA06)
10	08:29	07:52	06:56		06:47	17:46 (WEA04)	05:49		05:17	18:50 (WEA06)
	16:44	17:35	18:24		20:15	36 18:22 (WEA04)	21:03		21:40	41 19:31 (WEA06)
11	08:28	07:50	06:54		06:45	17:46 (WEA04)	05:48		05:16	18:50 (WEA06)
	16:45	17:37	18:26		20:16	34 18:20 (WEA04)	21:04		21:41	42 19:32 (WEA06)
12	08:28	07:48	06:52		06:43	17:46 (WEA04)	05:46		05:16	18:50 (WEA06)
	16:47	17:39	18:27		20:18	34 18:20 (WEA04)	21:06		21:42	41 19:31 (WEA06)
13	08:27	07:47	06:49		06:41	17:46 (WEA04)	05:44		05:16	18:50 (WEA06)
	16:48	17:41	18:29		20:20	33 18:19 (WEA04)	21:07		21:42	42 19:32 (WEA06)
14	08:26	07:45	06:47		06:39	17:47 (WEA04)	05:43		05:15	18:50 (WEA06)
	16:50	17:42	18:31		20:21	31 18:18 (WEA04)	21:09		21:43	42 19:32 (WEA06)
15	08:25	07:43	06:45		06:37	17:48 (WEA04)	05:41		05:15	18:50 (WEA06)
	16:51	17:44	18:32		20:23	29 18:17 (WEA04)	21:10		21:43	43 19:33 (WEA06)
16	08:25	07:41	06:43		06:35	17:49 (WEA04)	05:40		05:15	18:51 (WEA06)
	16:53	17:46	18:34		20:24	27 18:16 (WEA04)	21:11		21:44	42 19:33 (WEA06)
17	08:24	07:39	06:41		06:32	17:50 (WEA04)	05:39		05:15	18:51 (WEA06)
	16:54	17:48	18:36		20:26	25 18:15 (WEA04)	21:13		21:44	42 19:33 (WEA06)
18	08:23	07:37	06:38		06:30	17:52 (WEA04)	05:37		05:15	18:51 (WEA06)
	16:56	17:50	18:37		20:28	21 18:13 (WEA04)	21:14		21:45	43 19:34 (WEA06)
19	08:22	07:35	06:36		06:28	17:54 (WEA04)	05:36		05:15	18:51 (WEA06)
	16:57	17:51	18:39		20:29	17 18:11 (WEA04)	21:16		21:45	43 19:34 (WEA06)
20	08:21	07:33	06:34		06:26	17:58 (WEA04)	05:35		05:15	18:51 (WEA06)
	16:59	17:53	18:41		20:31	9 18:07 (WEA04)	21:17		21:45	43 19:34 (WEA06)
21	08:20	07:31	06:32		06:24		05:33	19:03 (WEA06)	05:15	18:52 (WEA06)
	17:01	17:55	18:42		20:32		21:19	8 19:11 (WEA06)	21:46	43 19:35 (WEA06)
22	08:19	07:29	06:29		06:22		05:32	19:00 (WEA06)	05:16	18:52 (WEA06)
	17:02	17:57	18:44		20:34		21:20	15 19:15 (WEA06)	21:46	43 19:35 (WEA06)
23	08:18	07:27	06:27		06:20		05:31	18:58 (WEA06)	05:16	18:52 (WEA06)
	17:04	17:58	18:45		20:36		21:21	19 19:17 (WEA06)	21:46	43 19:35 (WEA06)
24	08:17	07:25	06:25		06:18		05:30	18:56 (WEA06)	05:16	18:52 (WEA06)
	17:06	18:00	18:47		20:37		21:22	23 19:19 (WEA06)	21:46	43 19:35 (WEA06)
25	08:16	07:23	06:23		06:16		05:29	18:55 (WEA06)	05:16	18:53 (WEA06)
	17:07	18:02	18:49		20:39		21:24	25 19:20 (WEA06)	21:46	42 19:35 (WEA06)
26	08:14	07:21	06:20		06:14		05:27	18:54 (WEA06)	05:17	18:53 (WEA06)
	17:09	18:03	18:50		20:41		21:25	27 19:21 (WEA06)	21:46	42 19:35 (WEA06)
27	08:13	07:19	06:18		06:12		05:26	18:53 (WEA06)	05:17	18:53 (WEA06)
	17:11	18:05	18:52		20:42		21:26	29 19:22 (WEA06)	21:46	43 19:36 (WEA06)
28	08:12	07:17	06:16	17:02 (WEA04)	06:10		05:25	18:52 (WEA06)	05:18	18:53 (WEA06)
	17:12	18:07	18:54	9 17:11 (WEA04)	20:44		21:27	31 19:23 (WEA06)	21:46	43 19:36 (WEA06)
29	08:10		07:14	17:58 (WEA04)	06:09		05:24	18:53 (WEA06)	05:18	18:54 (WEA06)
	17:14		19:55	17 18:15 (WEA04)	20:45		21:29	32 19:25 (WEA06)	21:46	42 19:36 (WEA06)
30	08:09		07:12	17:56 (WEA04)	06:07		05:24	18:52 (WEA06)	05:19	18:54 (WEA06)
	17:16		19:57	22 18:18 (WEA04)	20:47		21:30	34 19:26 (WEA06)	21:46	42 19:36 (WEA06)
31	08:08		07:09	17:53 (WEA04)			05:23	18:51 (WEA06)		
	17:18		19:58	26 18:19 (WEA04)			21:31	35 19:26 (WEA06)		
Sonnenscheinstunden	264	280	367		414		480		492	
astr.max.mögl.Beschattung			74		600		278		1238	
Red.Sonnenscheinwahrsch.			0,29		0,37		0,40		0,32	
Reduktion Betriebsdauer			0,95		0,95		0,95		0,95	
Reduktion Windrichtung			0,67		0,67		0,66		0,66	
Gesamte Reduktion			0,18		0,23		0,25		0,20	
Met.wahrsch.Beschattung			13		141		69		251	

Tabellen-Layout: Die Daten für jeden Tag 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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:
17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP25 - Bahnhofsweg 1, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember
1	05:19		18:54 (WEA06)	05:54	06:41		17:45 (WEA04)	07:28	07:19		08:08
	21:46	42	19:36 (WEA06)	21:16	20:16	35	18:20 (WEA04)	19:09	17:05		16:27
2	05:20		18:54 (WEA06)	05:55	06:43		17:44 (WEA04)	07:29	07:21		08:09
	21:45	41	19:35 (WEA06)	21:14	20:14	36	18:20 (WEA04)	19:07	17:04		16:27
3	05:21		18:55 (WEA06)	05:57	06:44		17:44 (WEA04)	07:31	07:22		08:10
	21:45	41	19:36 (WEA06)	21:12	20:12	36	18:20 (WEA04)	19:05	17:02		16:26
4	05:21		18:55 (WEA06)	05:58	06:46		17:43 (WEA04)	07:32	07:24		08:12
	21:45	41	19:36 (WEA06)	21:11	20:10	36	18:19 (WEA04)	19:02	17:00		16:26
5	05:22		18:56 (WEA06)	06:00	06:47		17:42 (WEA04)	07:34	07:26		08:13
	21:44	40	19:36 (WEA06)	21:09	20:07	36	18:18 (WEA04)	19:00	16:59		16:25
6	05:23		18:56 (WEA06)	06:01	06:49		17:43 (WEA04)	07:36	07:28		08:14
	21:44	39	19:35 (WEA06)	21:07	20:05	35	18:18 (WEA04)	18:58	16:57		16:25
7	05:24		18:56 (WEA06)	06:03	06:50		17:42 (WEA04)	07:37	07:29		08:15
	21:43	40	19:36 (WEA06)	21:06	20:03	35	18:17 (WEA04)	18:56	16:55		16:24
8	05:25		18:57 (WEA06)	06:04	06:52		17:43 (WEA04)	07:39	07:31		08:17
	21:42	39	19:36 (WEA06)	21:04	20:01	33	18:16 (WEA04)	18:54	16:54		16:24
9	05:26		18:58 (WEA06)	06:06	06:54		17:42 (WEA04)	07:41	07:33		08:18
	21:42	37	19:35 (WEA06)	21:02	19:58	33	18:15 (WEA04)	18:51	16:52		16:24
10	05:27		18:58 (WEA06)	06:07	06:55		17:43 (WEA04)	07:42	07:34		08:19
	21:41	37	19:35 (WEA06)	21:00	19:56	31	18:14 (WEA04)	18:49	16:51		16:24
11	05:28		18:59 (WEA06)	06:09	06:57		17:43 (WEA04)	07:44	07:36		08:20
	21:40	36	19:35 (WEA06)	20:59	19:54	29	18:12 (WEA04)	18:47	16:49		16:24
12	05:29		18:59 (WEA06)	06:10	06:58		17:45 (WEA04)	07:45	07:38		08:21
	21:40	36	19:35 (WEA06)	20:57	19:52	26	18:11 (WEA04)	18:45	16:48		16:23
13	05:30		19:00 (WEA06)	06:12	07:00		17:46 (WEA04)	07:47	07:39		08:22
	21:39	34	19:34 (WEA06)	20:55	19:50	22	18:08 (WEA04)	18:43	16:46		16:23
14	05:31		19:01 (WEA06)	06:13	07:01		17:48 (WEA04)	07:49	07:41		08:23
	21:38	33	19:34 (WEA06)	20:53	19:47	18	18:06 (WEA04)	18:41	16:45		16:23
15	05:32		19:01 (WEA06)	06:15	07:03		17:51 (WEA04)	07:50	07:43		08:24
	21:37	32	19:33 (WEA06)	20:51	19:45	11	18:02 (WEA04)	18:39	16:43		16:24
16	05:33		19:02 (WEA06)	06:17	07:04			07:52	07:44		08:25
	21:36	30	19:32 (WEA06)	20:49	19:43			18:37	16:42		16:24
17	05:34		19:03 (WEA06)	06:18	07:06			07:54	07:46		08:25
	21:35	28	19:31 (WEA06)	20:47	19:41			18:34	16:41		16:24
18	05:35		19:04 (WEA06)	06:20	07:07			07:55	07:48		08:26
	21:34	26	19:30 (WEA06)	20:45	19:38			18:32	16:40		16:24
19	05:36		19:05 (WEA06)	06:21	07:09			07:57	07:49		08:27
	21:33	24	19:29 (WEA06)	20:43	19:36			18:30	16:38		16:24
20	05:38		19:07 (WEA06)	06:23	07:11			07:59	07:51		08:27
	21:32	20	19:27 (WEA06)	20:41	19:34			18:28	16:37		16:25
21	05:39		19:09 (WEA06)	06:24	07:12			08:00	07:53		08:28
	21:31	18	19:27 (WEA06)	20:39	19:32			18:26	16:36		16:25
22	05:40		19:12 (WEA06)	06:26	07:14			08:02	07:54		08:29
	21:30	12	19:24 (WEA06)	20:37	19:29			18:24	16:35		16:26
23	05:42			06:27	07:15			08:04	07:56		08:29
	21:28			20:35	10 18:01 (WEA04)			18:22	16:34		16:26
24	05:43			06:29	17:58 (WEA04)			08:05	07:57		08:30
	21:27			20:33	17 18:15 (WEA04)			18:20	16:33		16:27
25	05:44			06:30	17:55 (WEA04)			07:07	07:59		08:30
	21:26			20:31	21 18:16 (WEA04)			17:18	16:32		16:27
26	05:46			06:32	17:53 (WEA04)			07:09	08:00		08:30
	21:24			20:29	25 18:18 (WEA04)			17:17	16:31		16:28
27	05:47			06:33	17:51 (WEA04)			07:10	08:02		08:31
	21:23			20:27	27 18:18 (WEA04)			17:15	16:30		16:29
28	05:48			06:35	17:50 (WEA04)			07:12	08:03		08:31
	21:22			20:25	29 18:19 (WEA04)			17:13	16:29		16:30
29	05:50			06:37	17:48 (WEA04)			07:14	08:05		08:31
	21:20			20:23	31 18:19 (WEA04)			17:11	16:29		16:30
30	05:51			06:38	17:47 (WEA04)			07:16	08:06		08:31
	21:19			20:20	33 18:20 (WEA04)			17:09	16:28		16:31
31	05:53			06:40	17:46 (WEA04)			07:17			08:31
	21:17			20:18	34 18:20 (WEA04)			17:07			16:32
Sonnenscheinstunden	496			450		380		333	270		250
astr.max.mögl.Beschattung		726		227		452					
Red.Sonnenscheinwahrsch.		0,39		0,41		0,37					
Reduktion Betriebsdauer		0,95		0,95		0,95					
Reduktion Windrichtung		0,66		0,67		0,67					
Gesamte Reduktion		0,24		0,26		0,24					
Met.wahrsch.Beschattung		176		60		106					

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP26 - Auf dem Ebenhahn 17, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April		Mai		Jun	
1	08:31 16:33	08:06 17:19	07:15 18:09	07:07 18:00		06:05 20:48		18:51 (WEA04) 21:32	05:22 21:32
2	08:31 16:35	08:05 17:21	07:13 18:10	07:05 18:02		06:03 20:50	27	18:51 (WEA04) 21:33	05:21 21:33
3	08:31 16:36	08:03 17:23	07:11 18:12	07:03 18:03		06:01 20:52	29	18:49 (WEA04) 21:34	05:20 21:34
4	08:31 16:37	08:02 17:25	07:09 18:14	07:00 18:05		05:59 20:53	31	18:48 (WEA04) 21:35	05:20 21:35
5	08:31 16:38	08:00 17:26	07:07 18:16	06:58 18:07		05:58 20:55	33	18:48 (WEA04) 21:36	05:19 21:36
6	08:30 16:39	07:59 17:28	07:05 18:17	06:56 18:08		05:56 20:56	34	18:47 (WEA04) 21:37	05:18 21:37
7	08:30 16:40	07:57 17:30	07:02 18:19	06:54 18:10		05:54 20:58	35	18:46 (WEA04) 21:38	05:18 21:38
8	08:30 16:42	07:55 17:32	07:00 18:21	06:52 18:11		05:52 20:59	36	18:46 (WEA04) 21:39	05:17 21:39
9	08:29 16:43	07:54 17:34	06:58 18:22	06:50 18:13		05:51 21:01	37	18:46 (WEA04) 21:40	05:17 21:40
10	08:29 16:44	07:52 17:35	06:56 18:24	06:47 18:15		05:49 21:03	37	18:46 (WEA04) 21:41	05:17 21:41
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 18:16		05:48 21:04	37	18:45 (WEA04) 21:42	05:16 21:42
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 18:18		05:46 21:06	38	18:46 (WEA04) 21:43	05:16 21:43
13	08:27 16:48	07:47 17:41	06:49 18:29	06:41 18:20		05:44 21:07	38	18:45 (WEA04) 21:44	05:16 21:44
14	08:26 16:50	07:45 17:42	06:47 18:31	06:39 18:21		05:43 21:09	38	18:46 (WEA04) 21:45	05:15 21:45
15	08:25 16:51	07:43 17:44	06:45 18:32	06:37 18:23		05:41 21:10	37	18:46 (WEA04) 21:46	05:15 21:46
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 18:24		05:40 21:11	37	18:46 (WEA04) 21:47	05:15 21:47
17	08:24 16:54	07:39 17:48	06:41 18:36	06:32 18:26		05:39 21:13	37	18:46 (WEA04) 21:48	05:15 21:48
18	08:23 16:56	07:37 17:50	06:38 18:37	06:30 18:28		05:37 21:14	37	18:47 (WEA04) 21:49	05:15 21:49
19	08:22 16:57	07:35 17:51	06:36 18:39	06:28 18:29		05:36 21:16	36	18:47 (WEA04) 21:50	05:15 21:50
20	08:21 16:59	07:33 17:53	06:34 18:41	06:26 18:31		05:35 21:17	36	18:47 (WEA04) 21:51	05:15 21:51
21	08:20 17:01	07:31 17:55	06:32 18:42	06:24 18:32		05:33 21:19	35	18:48 (WEA04) 21:52	05:15 21:52
22	08:19 17:02	07:29 17:57	06:29 18:44	06:22 18:34		05:32 21:20	34	18:48 (WEA04) 21:53	05:16 21:53
23	08:18 17:04	07:27 17:58	06:27 18:45	06:20 18:36		05:31 21:21	34	18:49 (WEA04) 21:54	05:16 21:54
24	08:17 17:06	07:25 18:00	06:25 18:47	06:18 18:37		05:30 21:22	32	18:50 (WEA04) 21:55	05:16 21:55
25	08:16 17:07	07:23 18:02	06:23 18:49	06:16 18:39		05:29 21:24	31	18:51 (WEA04) 21:56	05:16 21:56
26	08:14 17:09	07:21 18:04	06:20 18:50	06:14 18:41		05:27 21:25	31	18:51 (WEA04) 21:57	05:17 21:57
27	08:13 17:11	07:19 18:05	06:18 18:52	06:12 18:42	7	19:02 (WEA04) 19:09 (WEA04)	29	18:52 (WEA04) 21:58	05:17 21:58
28	08:12 17:12	07:17 18:07	06:16 18:54	06:10 18:44	15	18:58 (WEA04) 19:13 (WEA04)	28	18:53 (WEA04) 21:59	05:18 21:59
29	08:10 17:14		07:14 19:55	06:09 18:45	20	18:55 (WEA04) 19:15 (WEA04)	26	18:54 (WEA04) 22:00	05:18 22:00
30	08:09 17:16		07:12 19:57	06:07 18:47	24	18:53 (WEA04) 19:17 (WEA04)	25	18:55 (WEA04) 22:01	05:19 22:01
31	08:08 17:18		07:09 19:58			05:23 21:31	23	18:56 (WEA04) 22:02	05:19 22:02
Sonnenscheinstunden	264	280	367	414		480		492	
astr.max.mögl.Beschattung				66		1021		87	
Red.Sonnenscheinwahrsch.				0,37		0,40		0,32	
Reduktion Betriebsdauer				0,95		0,95		0,95	
Reduktion Windrichtung				0,67		0,67		0,67	
Gesamte Reduktion				0,24		0,26		0,21	
Met.wahrsch.Beschattung				16		260		18	

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP26 - Auf dem Ebenhahn 17, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

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

429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember	
1	05:19		05:54		18:56 (WEA04)	06:41	07:28		07:19		08:08	
	21:46		21:16	38	19:34 (WEA04)	20:16	19:09		17:05		16:27	
2	05:20		05:55		18:56 (WEA04)	06:43	07:29		07:21		08:09	
	21:45		21:14	37	19:33 (WEA04)	20:14	19:07		17:04		16:27	
3	05:21		05:57		18:56 (WEA04)	06:44	07:31		07:22		08:10	
	21:45		21:12	38	19:34 (WEA04)	20:12	19:05		17:02		16:26	
4	05:21		05:58		18:56 (WEA04)	06:46	07:32		07:24		08:12	
	21:45		21:11	37	19:33 (WEA04)	20:10	19:02		17:00		16:26	
5	05:22		06:00		18:56 (WEA04)	06:47	07:34		07:26		08:13	
	21:44		21:09	36	19:32 (WEA04)	20:07	19:00		16:59		16:25	
6	05:23		19:11 (WEA04)	06:01	18:57 (WEA04)	06:49	07:36		07:28		08:14	
	21:44	5	19:16 (WEA04)	21:07	19:32 (WEA04)	20:05	18:58		16:57		16:25	
7	05:24		19:09 (WEA04)	06:03	18:57 (WEA04)	06:50	07:37		07:29		08:15	
	21:43	10	19:19 (WEA04)	21:06	19:31 (WEA04)	20:03	18:56		16:55		16:24	
8	05:25		19:08 (WEA04)	06:04	18:58 (WEA04)	06:52	07:39		07:31		08:17	
	21:42	13	19:21 (WEA04)	21:04	19:31 (WEA04)	20:01	18:54		16:54		16:24	
9	05:26		19:07 (WEA04)	06:06	18:58 (WEA04)	06:54	07:41		07:33		08:18	
	21:42	15	19:22 (WEA04)	21:02	19:30 (WEA04)	19:58	18:51		16:52		16:24	
10	05:27		19:06 (WEA04)	06:07	18:58 (WEA04)	06:55	07:42		07:34		08:19	
	21:41	17	19:23 (WEA04)	21:00	19:29 (WEA04)	19:56	18:49		16:51		16:24	
11	05:28		19:05 (WEA04)	06:09	18:59 (WEA04)	06:57	07:44		07:36		08:20	
	21:40	20	19:25 (WEA04)	20:59	19:28 (WEA04)	19:54	18:47		16:49		16:24	
12	05:29		19:05 (WEA04)	06:10	19:00 (WEA04)	06:58	07:45		07:38		08:21	
	21:40	21	19:26 (WEA04)	20:57	19:26 (WEA04)	19:52	18:45		16:48		16:23	
13	05:30		19:04 (WEA04)	06:12	19:02 (WEA04)	07:00	07:47		07:39		08:22	
	21:39	22	19:26 (WEA04)	20:55	19:25 (WEA04)	19:50	18:43		16:46		16:23	
14	05:31		19:03 (WEA04)	06:13	19:03 (WEA04)	07:01	07:49		07:41		08:23	
	21:38	24	19:27 (WEA04)	20:53	19:22 (WEA04)	19:47	18:41		16:45		16:23	
15	05:32		19:02 (WEA04)	06:15	19:06 (WEA04)	07:03	07:50		07:43		08:24	
	21:37	26	19:28 (WEA04)	20:51	19:20 (WEA04)	19:45	18:39		16:43		16:24	
16	05:33		19:02 (WEA04)	06:17	19:12 (WEA04)	07:04	07:52		07:44		08:25	
	21:36	27	19:29 (WEA04)	20:49	19:13 (WEA04)	19:43	18:37		16:42		16:24	
17	05:34		19:01 (WEA04)	06:18		07:06	07:54		07:46		08:25	
	21:35	28	19:29 (WEA04)	20:47		19:41	18:34		16:41		16:24	
18	05:35		19:00 (WEA04)	06:20		07:07	07:55		07:48		08:26	
	21:34	30	19:30 (WEA04)	20:45		19:38	18:32		16:40		16:24	
19	05:37		19:00 (WEA04)	06:21		07:09	07:57		07:49		08:27	
	21:33	30	19:30 (WEA04)	20:43		19:36	18:30		16:38		16:24	
20	05:38		18:59 (WEA04)	06:23		07:11	07:59		07:51		08:27	
	21:32	32	19:31 (WEA04)	20:41		19:34	18:28		16:37		16:25	
21	05:39		18:59 (WEA04)	06:24		07:12	08:00		07:53		08:28	
	21:31	33	19:32 (WEA04)	20:39		19:32	18:26		16:36		16:25	
22	05:40		18:59 (WEA04)	06:26		07:14	08:02		07:54		08:29	
	21:30	33	19:32 (WEA04)	20:37		19:29	18:24		16:35		16:26	
23	05:42		18:58 (WEA04)	06:27		07:15	08:04		07:56		08:29	
	21:28	35	19:33 (WEA04)	20:35		19:27	18:22		16:34		16:26	
24	05:43		18:57 (WEA04)	06:29		07:17	08:05		07:57		08:30	
	21:27	36	19:33 (WEA04)	20:33		19:25	18:20		16:33		16:27	
25	05:44		18:58 (WEA04)	06:30		07:18	07:07		07:59		08:30	
	21:26	36	19:34 (WEA04)	20:31		19:22	17:18		16:32		16:27	
26	05:46		18:57 (WEA04)	06:32		07:20	07:09		08:00		08:30	
	21:24	37	19:34 (WEA04)	20:29		19:20	17:17		16:31		16:28	
27	05:47		18:57 (WEA04)	06:33		07:21	07:10		08:02		08:31	
	21:23	37	19:34 (WEA04)	20:27		19:18	17:15		16:30		16:29	
28	05:48		18:56 (WEA04)	06:35		07:23	07:12		08:03		08:31	
	21:22	37	19:33 (WEA04)	20:25		19:16	17:13		16:29		16:30	
29	05:50		18:56 (WEA04)	06:37		07:25	07:14		08:05		08:31	
	21:20	38	19:34 (WEA04)	20:23		19:14	17:11		16:29		16:30	
30	05:51		18:56 (WEA04)	06:38		07:26	07:16		08:06		08:31	
	21:19	38	19:34 (WEA04)	20:20		19:11	17:09		16:28		16:31	
31	05:53		18:55 (WEA04)	06:40			07:17				08:31	
	21:17	38	19:33 (WEA04)	20:18			17:07				16:32	
Sonnenscheinstunden	496			450		380	333		270		250	
astr.max.mögl.Beschattung		718		463								
Red.Sonnenscheinwahrsch.		0,39		0,41								
Reduktion Betriebsdauer		0,95		0,95								
Reduktion Windrichtung		0,67		0,67								
Gesamte Reduktion		0,25		0,26								
Met.wahrsch.Beschattung		178		122								

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP29 - Zur Grünen Au 9, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:31 16:34	08:06 17:19	07:15 18:09	07:07 20:00	06:05 20:48	05:22 21:32	05:19 21:46	05:54 21:54	06:41 20:16	07:28 19:09	07:19 17:05	08:08 16:27
2	08:31 16:35	08:05 17:21	07:13 18:10	07:05 20:02	06:03 20:50	05:21 21:33	05:20 21:45	05:55 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	08:31 16:36	08:03 17:23	07:11 18:12	07:03 20:03	06:01 20:52	05:20 21:34	05:21 21:45	05:57 21:12	06:44 20:12	07:31 19:05	07:22 17:02	08:10 16:26
4	08:31 16:37	08:02 17:25	07:09 18:14	07:00 20:05	05:59 20:53	05:20 21:35	05:21 21:45	05:58 21:11	06:46 20:10	07:32 19:02	07:24 17:00	08:12 16:26
5	08:31 16:38	08:00 17:26	07:07 18:16	06:58 20:07	05:58 20:55	05:19 21:36	05:22 21:44	05:52 21:09	06:47 20:07	07:34 19:00	07:26 16:59	08:13 16:25
6	08:30 16:39	07:59 17:28	07:05 18:17	06:56 20:08	05:56 20:56	05:18 21:37	05:23 21:44	06:01 21:07	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	08:30 16:40	07:57 17:30	07:02 18:19	06:54 20:10	05:54 20:58	05:18 21:38	05:24 21:43	06:03 21:06	06:50 20:03	07:37 18:56	07:29 16:55	08:15 16:24
8	08:30 16:42	07:55 17:32	07:00 18:21	06:52 20:11	05:52 20:59	05:17 21:39	05:25 21:42	06:04 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24
9	08:29 16:43	07:54 17:34	06:58 18:22	06:50 20:13	05:51 21:01	05:17 21:39	05:26 21:42	06:06 21:02	06:54 19:58	07:41 18:51	07:33 16:52	08:18 16:24
10	08:29 16:44	07:52 17:35	06:56 18:24	06:47 20:15	05:49 21:03	05:17 21:40	05:27 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	08:19 16:24
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 20:16	05:48 21:04	05:16 21:41	05:28 21:40	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 20:18	05:46 21:06	05:16 21:42	05:29 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:48	08:21 16:23
13	08:27 16:48	07:47 17:41	06:49 18:29	06:41 20:20	05:44 21:07	05:16 21:42	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:39 16:46	08:22 16:23
14	08:26 16:50	07:45 17:42	06:47 18:31	06:39 20:21	05:43 21:09	05:15 21:43	05:31 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	08:23 16:23
15	08:25 16:51	07:43 17:44	06:45 18:32	06:37 20:23	05:41 21:10	05:15 21:43	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	08:24 16:24
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 20:24	05:40 21:11	05:15 21:44	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:44 16:42	08:25 16:24
17	08:24 16:54	07:39 17:48	06:41 18:36	06:32 20:26	05:39 21:13	05:15 21:44	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:34	07:46 16:41	08:25 16:24
18	08:23 16:56	07:37 17:50	06:38 18:37	06:30 20:28	05:37 21:14	05:15 21:45	05:35 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	08:26 16:24
19	08:22 16:57	07:35 17:51	06:36 18:39	06:28 20:29	05:36 21:16	05:15 21:45	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:49 16:38	08:27 16:24
20	08:21 16:59	07:33 17:53	06:34 18:41	06:26 20:31	05:35 21:17	05:15 21:45	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	08:27 16:25
21	08:20 17:01	07:31 17:55	06:32 18:42	06:24 20:32	05:33 21:18	05:15 21:46	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	08:28 16:25
22	08:19 17:02	07:29 17:57	06:29 18:44	06:22 20:34	05:32 21:20	05:16 21:46	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	08:29 16:26
23	08:18 17:04	07:27 17:58	06:27 18:45	06:20 20:36	05:31 21:21	05:16 21:46	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	08:29 16:26
24	08:17 17:06	07:25 18:00	06:25 18:47	06:18 20:37	05:30 21:22	05:16 21:46	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:57 16:33	08:30 16:27
25	08:16 17:07	07:23 18:02	06:23 18:49	06:16 20:39	05:29 21:24	05:16 21:46	05:44 21:26	06:30 20:31	07:18 19:22	07:07 18:18	07:59 16:32	08:30 16:27
26	08:14 17:09	07:21 18:04	06:20 18:50	06:14 20:41	05:27 21:25	05:17 21:46	05:46 21:24	06:32 20:29	07:20 19:20	07:09 18:17	08:00 16:31	08:30 16:28
27	08:13 17:11	07:19 18:05	06:18 18:52	06:12 20:42	05:26 21:26	05:17 21:46	05:47 21:23	06:33 20:27	07:21 19:18	07:10 18:15	08:02 16:30	08:31 16:29
28	08:12 17:12	07:17 18:07	06:16 18:54	06:10 20:44	05:25 21:27	05:18 21:46	05:48 21:22	06:35 20:25	07:23 19:16	07:12 18:13	08:03 16:29	08:31 16:30
29	08:10 17:14	07:14 19:55	07:14 20:45	06:09 21:29	05:24 21:29	05:18 21:46	05:50 21:20	06:37 20:23	07:25 19:14	07:14 18:11	08:05 16:29	08:31 16:30
30	08:09 17:16	07:12 19:57	07:12 20:47	06:07 21:30	05:24 21:30	05:19 21:46	05:51 21:19	06:38 20:20	07:26 19:11	07:16 18:09	08:06 16:28	08:31 16:31
31	08:08 17:18	07:09 19:58	07:09 21:31	05:23 21:31	05:23 21:31	05:23 21:31	05:53 21:17	06:40 20:18	07:17 19:07	07:17 18:07	08:31 16:32	08:31 16:32
Sonnenscheinstunden	264	280	367	414	480	492	496	450	380	333	270	250
astr.max.mögl.Beschattung												
Red.Sonnenscheinwahrsch.												
Reduktion Betriebsdauer												
Reduktion Windrichtung												
Gesamte Reduktion												
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)
	Minuten mit Schatten		

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP30 - In d. Eichwies 6, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

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

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP31 - In d. Eichwies 11, 57520 Schutzbach

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:31 16:34	08:06 17:19	07:15 18:09	07:07 20:00	06:05 20:48	05:22 21:32	05:19 21:46	05:54 21:16	06:41 20:16	18:30 (WEA01) 19:09	07:28 17:05	07:19 16:27
2	08:31 16:35	08:05 17:21	07:13 18:10	07:05 20:02	06:03 20:50	05:21 21:33	05:20 21:45	05:56 21:14	06:43 20:14	18:30 (WEA01) 19:07	07:29 17:04	07:21 16:27
3	08:31 16:36	08:03 17:23	07:11 18:12	07:03 20:03	06:01 20:52	05:20 21:34	05:21 21:45	05:57 21:12	06:44 20:12	18:30 (WEA01) 19:05	07:31 17:02	07:22 16:26
4	08:31 16:37	08:02 17:25	07:09 18:14	07:00 20:05	18:44 (WEA01) 20:53	05:59 21:35	05:20 21:44	05:58 21:11	06:46 20:10	18:31 (WEA01) 19:02	07:32 17:00	07:24 16:26
5	08:31 16:38	08:00 17:26	07:07 18:16	06:58 20:07	18:39 (WEA01) 20:55	05:58 21:36	05:19 21:44	06:00 21:09	06:47 20:07	18:31 (WEA01) 19:00	07:34 16:59	07:26 16:25
6	08:30 16:39	07:59 17:28	07:05 18:17	06:56 20:08	18:37 (WEA01) 20:56	05:56 21:37	05:18 21:44	06:01 21:07	06:49 20:05	18:33 (WEA01) 18:58	07:36 16:57	07:28 16:25
7	08:30 16:40	07:57 17:30	07:02 18:19	06:54 20:10	18:35 (WEA01) 20:58	05:54 21:38	05:18 21:43	06:03 21:06	06:50 20:03	18:34 (WEA01) 18:56	07:37 16:55	07:29 16:24
8	08:30 16:42	07:55 17:32	07:00 18:21	06:52 20:11	18:34 (WEA01) 20:59	05:52 21:39	05:17 21:42	06:04 21:04	06:52 20:01	18:38 (WEA01) 18:54	07:39 16:54	07:31 16:24
9	08:29 16:43	07:54 17:34	06:58 18:22	06:50 20:13	18:32 (WEA01) 21:01	05:51 21:39	05:17 21:42	06:06 21:02	06:54 19:58	07:41 18:51	07:33 16:52	07:33 16:24
10	08:29 16:44	07:52 17:35	06:56 18:24	06:47 20:15	18:32 (WEA01) 21:03	05:49 21:40	05:17 21:41	06:07 21:00	06:55 19:56	07:42 18:49	07:34 16:51	07:34 16:24
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 20:16	18:30 (WEA01) 21:04	05:48 21:41	05:16 21:40	06:09 20:59	06:57 19:57	07:44 18:47	07:36 16:49	07:36 16:24
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 20:18	18:29 (WEA01) 21:06	05:46 21:42	05:16 21:40	06:10 20:57	06:58 19:52	07:45 18:45	07:38 16:45	07:38 16:23
13	08:27 16:48	07:47 17:41	06:49 18:29	06:41 20:20	18:29 (WEA01) 21:07	05:44 21:42	05:16 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:39 16:46	07:39 16:23
14	08:26 16:50	07:45 17:42	06:47 18:31	06:39 20:21	18:29 (WEA01) 21:09	05:43 21:43	05:15 21:38	06:13 20:53	07:01 19:47	07:49 18:41	07:41 16:45	07:41 16:23
15	08:25 16:51	07:43 17:44	06:45 18:32	06:37 20:23	18:29 (WEA01) 21:10	05:41 21:43	05:15 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:43	07:43 16:24
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 20:24	18:29 (WEA01) 21:11	05:40 21:44	05:15 21:36	06:17 20:49	07:04 19:43	07:52 18:37	07:44 16:42	07:44 16:24
17	08:24 16:54	07:39 17:48	06:41 18:36	06:33 20:26	18:29 (WEA01) 21:13	05:39 21:44	05:15 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	07:46 16:24
18	08:23 16:56	07:37 17:50	06:38 18:37	06:30 20:28	18:29 (WEA01) 21:14	05:37 21:45	05:15 21:34	06:20 20:45	07:07 19:38	07:55 18:32	07:48 16:40	07:48 16:24
19	08:22 16:57	07:35 17:51	06:36 18:39	06:28 20:29	18:30 (WEA01) 21:16	05:36 21:45	05:15 21:33	06:21 20:43	07:09 19:36	07:57 18:30	07:49 16:38	07:49 16:24
20	08:21 16:59	07:33 17:53	06:34 18:41	06:26 20:31	18:31 (WEA01) 21:17	05:35 21:45	05:15 21:32	06:23 20:41	07:11 19:34	07:59 18:28	07:51 16:37	07:51 16:25
21	08:20 17:01	07:31 17:55	06:32 18:42	06:24 20:32	18:31 (WEA01) 21:18	05:33 21:46	05:15 21:31	06:24 20:39	07:12 19:32	08:00 18:26	07:53 16:36	08:28 16:25
22	08:19 17:02	07:29 17:57	06:29 18:44	06:22 20:34	18:33 (WEA01) 21:20	05:32 21:46	05:16 21:30	06:26 20:37	07:14 19:29	08:02 18:24	07:54 16:35	08:29 16:26
23	08:18 17:04	07:27 17:58	06:27 18:45	06:20 20:36	18:34 (WEA01) 21:21	05:31 21:46	05:16 21:28	06:27 20:35	07:15 19:27	08:04 18:22	07:56 16:34	08:29 16:26
24	08:17 17:06	07:25 18:00	06:25 18:47	06:18 20:37	18:36 (WEA01) 21:22	05:30 21:46	05:16 21:27	06:29 20:33	07:17 19:25	08:05 18:20	07:57 16:33	08:29 16:27
25	08:16 17:07	07:23 18:02	06:23 18:49	06:16 20:39	18:42 (WEA01) 21:24	05:29 21:46	05:16 21:26	06:30 20:31	07:18 19:22	08:07 17:18	07:59 16:32	08:30 16:27
26	08:14 17:09	07:21 18:04	06:20 18:50	06:14 20:40	18:43 (WEA01) 21:25	05:27 21:46	05:17 21:24	06:32 20:29	07:20 19:20	07:09 17:17	08:00 16:31	08:31 16:28
27	08:13 17:11	07:19 18:05	06:18 18:52	06:12 20:42	18:44 (WEA01) 21:26	05:26 21:46	05:17 21:23	06:33 20:27	07:21 19:18	07:10 17:15	08:02 16:30	08:30 16:29
28	08:12 17:12	07:17 18:07	06:16 18:54	06:10 20:44	18:45 (WEA01) 21:27	05:25 21:46	05:18 21:22	06:35 20:25	07:23 19:16	07:12 17:13	08:03 16:29	08:31 16:30
29	08:10 17:14	07:14 18:09	06:14 19:00	06:09 20:45	18:46 (WEA01) 21:28	05:24 21:46	05:18 21:20	06:37 20:23	07:25 19:14	07:14 17:11	08:05 16:29	08:31 16:30
30	08:09 17:16	07:12 18:05	06:12 19:00	06:07 20:47	18:47 (WEA01) 21:29	05:24 21:46	05:19 21:20	06:38 20:20	07:26 19:11	07:16 17:09	08:06 16:28	08:31 16:31
31	08:08 17:18	07:09 18:00	06:11 19:01	06:08 20:48	18:48 (WEA01) 21:30	05:23 21:46	05:19 21:20	06:40 20:18	07:27 19:00	07:17 17:07	08:07 16:32	08:31 16:32
Sonnenscheinstunden	264	280	367	414	480	492	496	450	380	333	270	250
astr.max.mögl.Beschattung				516				350	176			
Red.Sonnenscheinwahrsch.				0,37				0,41	0,37			
Reduktion Betriebsdauer				0,95				0,95	0,95			
Reduktion Windrichtung				0,68				0,68	0,68			
Gesamte Reduktion				0,24				0,27	0,24			
Met.wahrsch.Beschattung				123				94	42			

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP32 - Auf d. Höhe 13, 57520 Molzhain

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April		Mai		Juni	
1	08:31 16:34	08:06 17:20	07:15 18:09	07:07 20:00	11	07:39 (WEA01) 07:50 (WEA01)	06:05 20:49	05:22 21:32	06:15 (WEA02) 06:55 (WEA02)
2	08:31 16:35	08:05 17:21	07:13 18:11	07:05 20:02	17	07:36 (WEA01) 07:53 (WEA01)	06:03 20:50	05:21 21:33	06:14 (WEA02) 06:55 (WEA02)
3	08:31 16:36	08:03 17:23	07:11 18:12	07:03 20:03	20	07:34 (WEA01) 07:54 (WEA01)	06:01 20:52	05:21 21:34	06:14 (WEA02) 06:55 (WEA02)
4	08:31 16:37	08:02 17:25	07:09 18:14	07:01 20:05	23	07:33 (WEA01) 07:56 (WEA01)	06:00 20:53	05:20 21:35	06:15 (WEA02) 06:55 (WEA02)
5	08:31 16:38	08:00 17:27	07:07 18:16	06:58 20:07	26	07:30 (WEA01) 07:56 (WEA01)	05:58 20:55	05:19 21:36	06:14 (WEA02) 06:55 (WEA02)
6	08:30 16:39	07:59 17:28	07:05 18:17	06:56 20:08	26	07:30 (WEA01) 07:56 (WEA01)	05:56 20:57	05:19 21:37	06:15 (WEA02) 06:56 (WEA02)
7	08:30 16:40	07:57 17:30	07:03 18:19	06:54 20:10	28	07:29 (WEA01) 07:57 (WEA01)	05:54 20:58	05:18 21:38	06:15 (WEA02) 06:56 (WEA02)
8	08:30 16:42	07:55 17:32	07:00 18:21	06:52 20:12	29	07:28 (WEA01) 07:57 (WEA01)	05:53 21:00	05:18 21:39	06:15 (WEA02) 06:56 (WEA02)
9	08:29 16:43	07:54 17:34	06:58 18:22	06:50 20:13	29	07:28 (WEA01) 07:57 (WEA01)	05:51 21:01	05:17 21:40	06:15 (WEA02) 06:56 (WEA02)
10	08:29 16:44	07:52 17:36	06:56 18:24	06:48 20:15	29	07:28 (WEA01) 07:57 (WEA01)	05:49 21:03	05:17 21:40	06:15 (WEA02) 06:56 (WEA02)
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 20:16	28	07:28 (WEA01) 07:56 (WEA01)	05:48 21:04	05:16 21:41	06:16 (WEA02) 06:57 (WEA02)
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 20:18	28	07:27 (WEA01) 07:55 (WEA01)	05:46 21:06	05:16 21:42	06:16 (WEA02) 06:57 (WEA02)
13	08:27 16:49	07:47 17:41	06:49 18:29	06:41 20:20	27	07:27 (WEA01) 07:54 (WEA01)	05:45 21:07	05:16 21:42	06:17 (WEA02) 06:57 (WEA02)
14	08:26 16:50	07:45 17:43	06:47 18:31	06:39 20:21	26	07:27 (WEA01) 07:53 (WEA01)	05:43 21:09	05:16 21:43	06:17 (WEA02) 06:57 (WEA02)
15	08:26 16:51	07:43 17:44	06:45 18:32	06:37 20:23	24	07:28 (WEA01) 07:52 (WEA01)	05:42 21:10	05:15 21:44	06:16 (WEA02) 06:57 (WEA02)
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 20:25	22	07:29 (WEA01) 07:51 (WEA01)	05:40 21:12	05:15 21:44	06:16 (WEA02) 06:57 (WEA02)
17	08:24 16:55	07:39 17:48	06:41 18:36	06:33 20:26	20	07:30 (WEA01) 07:50 (WEA01)	05:39 21:13	05:15 21:44	06:17 (WEA02) 06:57 (WEA02)
18	08:23 16:56	07:37 17:50	06:38 18:37	06:31 20:28	16	07:31 (WEA01) 07:47 (WEA01)	05:37 21:14	05:15 21:45	06:17 (WEA02) 06:57 (WEA02)
19	08:22 16:58	07:35 17:51	06:36 18:39	06:29 20:29	11	07:34 (WEA01) 07:45 (WEA01)	05:36 21:16	05:15 21:45	06:17 (WEA02) 06:58 (WEA02)
20	08:21 16:59	07:34 17:53	06:34 18:41	06:26 20:31			05:35 21:17	05:15 21:46	06:18 (WEA02) 06:59 (WEA02)
21	08:20 17:01	07:32 17:55	06:32 18:42	06:24 20:33			05:33 21:19	05:16 21:46	06:18 (WEA02) 06:59 (WEA02)
22	08:19 17:02	07:30 17:57	06:30 18:44	06:22 20:34			05:32 21:20	05:16 21:46	06:18 (WEA02) 06:59 (WEA02)
23	08:18 17:04	07:28 17:58	06:27 18:46	06:20 20:36			05:31 21:21	05:16 21:46	06:18 (WEA02) 06:59 (WEA02)
24	08:17 17:06	07:26 18:00	06:25 18:47	06:18 20:37			05:30 21:23	05:16 21:46	06:19 (WEA02) 07:00 (WEA02)
25	08:16 17:07	07:24 18:02	06:23 18:49	06:16 20:39			05:29 21:24	05:17 21:46	06:19 (WEA02) 06:59 (WEA02)
26	08:14 17:09	07:21 18:04	06:21 18:50	06:14 20:41			05:28 21:25	05:17 21:46	06:19 (WEA02) 06:59 (WEA02)
27	08:13 17:11	07:19 18:05	06:18 18:52	06:13 20:42			05:27 21:26	05:17 21:46	06:19 (WEA02) 07:00 (WEA02)
28	08:12 17:13	07:17 18:07	06:16 18:54	06:11 20:44			05:26 21:28	05:18 21:46	06:19 (WEA02) 07:00 (WEA02)
29	08:11 17:14		07:14 19:55	06:09 20:45			05:25 21:29	05:18 21:46	06:20 (WEA02) 07:00 (WEA02)
30	08:09 17:16		07:12 19:57	06:07 20:47			05:24 21:30	05:19 21:46	06:19 (WEA02) 07:00 (WEA02)
31	08:08 17:18		07:09 19:59				05:23 21:31		
Sonnenscheinstunden	264	280	367	414			480	492	
astr.max.mögl.Beschattung				440			602	1222	
Red.Sonnenscheinwahrsch.				0,37			0,40	0,32	
Reduktion Betriebsdauer				0,95			0,95	0,95	
Reduktion Windrichtung				0,68			0,67	0,67	
Gesamte Reduktion				0,24			0,25	0,21	
Met.wahrsch.Beschattung				105			152	251	

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP32 - Auf d. Höhe 13, 57520 Molzhain

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli			August			September			Oktober			November			Dezember		
1	05:20		06:20 (WEA02)	05:54		06:41		07:27 (WEA01)	07:28		07:19		07:19		08:08		
	21:46	41	07:01 (WEA02)	21:16		20:16	28	07:55 (WEA01)	19:09		17:06		17:06		16:27		
2	05:20		06:20 (WEA02)	05:56		06:43		07:26 (WEA01)	07:29		07:21		07:21		08:09		
	21:45	41	07:01 (WEA02)	21:14		20:14	29	07:55 (WEA01)	19:07		17:04		17:04		16:27		
3	05:21		06:20 (WEA02)	05:57		06:44		07:26 (WEA01)	07:31		07:23		07:23		08:11		
	21:45	41	07:01 (WEA02)	21:13		20:12	29	07:55 (WEA01)	19:05		17:02		17:02		16:26		
4	05:22		06:20 (WEA02)	05:59		06:46		07:25 (WEA01)	07:33		07:24		07:24		08:12		
	21:45	41	07:01 (WEA02)	21:11		20:10	29	07:54 (WEA01)	19:03		17:00		17:00		16:26		
5	05:22		06:21 (WEA02)	06:00		06:48		07:26 (WEA01)	07:34		07:26		07:26		08:13		
	21:44	41	07:02 (WEA02)	21:09		20:07	28	07:54 (WEA01)	19:00		16:59		16:59		16:25		
6	05:23		06:21 (WEA02)	06:02		06:49		07:26 (WEA01)	07:36		07:28		07:28		08:14		
	21:44	41	07:02 (WEA02)	21:08		20:05	26	07:52 (WEA01)	18:58		16:57		16:57		16:25		
7	05:24		06:21 (WEA02)	06:03		06:51		07:27 (WEA01)	07:37		07:29		07:29		08:16		
	21:43	41	07:02 (WEA02)	21:06		20:03	25	07:52 (WEA01)	18:56		16:55		16:55		16:25		
8	05:25		06:21 (WEA02)	06:05		06:52		07:27 (WEA01)	07:39		07:31		07:31		08:17		
	21:43	41	07:02 (WEA02)	21:04		20:01	23	07:50 (WEA01)	18:54		16:54		16:54		16:24		
9	05:26		06:21 (WEA02)	06:06		06:54		07:28 (WEA01)	07:41		07:33		07:33		08:18		
	21:42	41	07:02 (WEA02)	21:02		19:59	21	07:49 (WEA01)	18:52		16:52		16:52		16:24		
10	05:27		06:22 (WEA02)	06:08		06:55		07:29 (WEA01)	07:42		07:35		07:35		08:19		
	21:41	40	07:02 (WEA02)	21:00		19:56	17	07:46 (WEA01)	18:49		16:51		16:51		16:24		
11	05:28		06:22 (WEA02)	06:09		06:57		07:32 (WEA01)	07:44		07:36		07:36		08:20		
	21:41	40	07:02 (WEA02)	20:59		19:54	12	07:44 (WEA01)	18:47		16:49		16:49		16:24		
12	05:29		06:22 (WEA02)	06:11		06:58			07:46		07:38		07:38		08:21		
	21:40	40	07:02 (WEA02)	20:57		19:52			18:45		16:48		16:48		16:24		
13	05:30		06:23 (WEA02)	06:12		07:00			07:47		07:40		07:40		08:22		
	21:39	39	07:02 (WEA02)	20:55		19:50			18:43		16:46		16:46		16:24		
14	05:31		06:23 (WEA02)	06:14		07:01			07:49		07:41		07:41		08:23		
	21:38	39	07:02 (WEA02)	20:53		19:47			18:41		16:45		16:45		16:24		
15	05:32		06:23 (WEA02)	06:15		07:03			07:50		07:43		07:43		08:24		
	21:37	39	07:02 (WEA02)	20:51		19:45			18:39		16:44		16:44		16:24		
16	05:33		06:23 (WEA02)	06:17		07:04			07:52		07:45		07:45		08:25		
	21:36	39	07:02 (WEA02)	20:49		19:43			18:37		16:42		16:42		16:24		
17	05:34		06:24 (WEA02)	06:18		07:06			07:54		07:46		07:46		08:25		
	21:35	38	07:02 (WEA02)	20:47		19:41			18:35		16:41		16:41		16:24		
18	05:35		06:24 (WEA02)	06:20		07:08			07:55		07:48		07:48		08:26		
	21:34	38	07:02 (WEA02)	20:45		19:38			18:33		16:40		16:40		16:24		
19	05:37		06:24 (WEA02)	06:21		07:09			07:57		07:50		07:50		08:27		
	21:33	37	07:01 (WEA02)	20:43		19:36			18:31		16:39		16:39		16:25		
20	05:38		06:26 (WEA02)	06:23		07:11			07:59		07:51		07:51		08:28		
	21:32	36	07:02 (WEA02)	20:41		19:34			18:29		16:37		16:37		16:25		
21	05:39		06:26 (WEA02)	06:24		07:12			08:00		07:53		07:53		08:28		
	21:31	35	07:01 (WEA02)	20:39		19:32			18:27		16:36		16:36		16:25		
22	05:40		06:26 (WEA02)	06:26		07:14			08:02		07:54		07:54		08:29		
	21:30	34	07:00 (WEA02)	20:37		19:29			18:25		16:35		16:35		16:26		
23	05:42		06:27 (WEA02)	06:27		07:15			08:04		07:56		07:56		08:29		
	21:28	33	07:00 (WEA02)	20:35		19:27			18:23		16:34		16:34		16:26		
24	05:43		06:28 (WEA02)	06:29		07:17			08:05		07:58		07:58		08:30		
	21:27	32	07:00 (WEA02)	20:33	12	07:49 (WEA01)			18:21		16:33		16:33		16:27		
25	05:44		06:29 (WEA02)	06:31		07:18			07:07		07:59		07:59		08:30		
	21:26	30	06:59 (WEA02)	20:31	17	07:51 (WEA01)			17:19		16:32		16:32		16:28		
26	05:46		06:30 (WEA02)	06:32		07:33 (WEA01)			07:09		08:01		08:01		08:30		
	21:24	27	06:57 (WEA02)	20:29	20	07:53 (WEA01)			17:17		16:31		16:31		16:28		
27	05:47		06:31 (WEA02)	06:34		07:31 (WEA01)			07:11		08:02		08:02		08:31		
	21:23	25	06:56 (WEA02)	20:27	22	07:53 (WEA01)			17:15		16:30		16:30		16:29		
28	05:49		06:33 (WEA02)	06:35		07:30 (WEA01)			07:12		08:04		08:04		08:31		
	21:22	22	06:55 (WEA02)	20:25	24	07:54 (WEA01)			17:13		16:30		16:30		16:30		
29	05:50		06:34 (WEA02)	06:37		07:28 (WEA01)			07:14		08:05		08:05		08:31		
	21:20	19	06:53 (WEA02)	20:23	26	07:54 (WEA01)			17:11		16:29		16:29		16:31		
30	05:51		06:36 (WEA02)	06:38		07:28 (WEA01)			07:16		08:06		08:06		08:31		
	21:19	15	06:51 (WEA02)	20:21	27	07:55 (WEA01)			17:09		16:28		16:28		16:31		
31	05:53		06:40 (WEA02)	06:40		07:27 (WEA01)			07:17						08:31		
	21:17	8	06:48 (WEA02)	20:18	28	07:55 (WEA01)			17:07						16:32		
Sonnenscheinstunden	496			450		380			333		270		250				
astr.max.mögl.Beschattung		1074		176		267											
Red.Sonnenscheinwahrsch.		0,39		0,41		0,37											
Reduktion Betriebsdauer		0,95		0,95		0,95											
Reduktion Windrichtung		0,67		0,68		0,68											
Gesamte Reduktion		0,25		0,27		0,24											
Met.wahrsch.Beschattung		264		47		64											

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:

17.10.2023 09:23/3.6.361

SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP33 - Oberbergstraße 29, 57520 Molzhain

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1	08:31 16:34	08:06 17:20	07:15 18:09	07:07 20:00	07:38 (WEA01) 20:49	05:22 21:32	06:28 (WEA02) 07:04 (WEA02)
2	08:31 16:35	08:05 17:21	07:13 18:11	07:05 20:02	07:37 (WEA01) 20:50	05:21 21:33	06:28 (WEA02) 07:03 (WEA02)
3	08:31 16:36	08:03 17:23	07:11 18:12	07:03 20:03	07:36 (WEA01) 20:52	05:21 21:34	06:28 (WEA02) 07:03 (WEA02)
4	08:31 16:37	08:02 17:25	07:09 18:14	07:01 20:05	07:36 (WEA01) 20:53	05:20 21:35	06:29 (WEA02) 07:03 (WEA02)
5	08:31 16:38	08:00 17:27	07:07 18:16	06:58 20:07	07:34 (WEA01) 20:58	05:19 21:36	06:29 (WEA02) 07:03 (WEA02)
6	08:30 16:39	07:59 17:28	07:05 18:17	06:56 20:08	07:34 (WEA01) 20:57	05:19 21:37	06:30 (WEA02) 07:03 (WEA02)
7	08:30 16:40	07:57 17:30	07:03 18:19	06:54 20:10	07:34 (WEA01) 20:58	05:18 21:38	06:30 (WEA02) 07:03 (WEA02)
8	08:30 16:42	07:55 17:32	07:00 18:21	06:52 20:12	07:34 (WEA01) 21:00	05:18 21:39	06:31 (WEA02) 07:03 (WEA02)
9	08:29 16:43	07:54 17:34	06:58 18:22	06:50 20:13	07:34 (WEA01) 21:01	05:17 21:40	06:31 (WEA02) 07:02 (WEA02)
10	08:29 16:44	07:52 17:36	06:56 18:24	06:48 20:15	07:35 (WEA01) 21:03	05:17 21:40	06:31 (WEA02) 07:02 (WEA02)
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 20:16	07:35 (WEA01) 21:04	05:16 21:41	06:32 (WEA02) 07:03 (WEA02)
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 20:18	07:35 (WEA01) 21:06	05:16 21:42	06:33 (WEA02) 07:03 (WEA02)
13	08:27 16:49	07:47 17:41	06:49 18:29	06:41 20:20	07:36 (WEA01) 21:07	05:16 21:42	06:33 (WEA02) 07:03 (WEA02)
14	08:26 16:50	07:45 17:43	06:47 18:31	06:39 20:21	07:38 (WEA01) 21:09	05:16 21:43	06:33 (WEA02) 07:02 (WEA02)
15	08:26 16:51	07:43 17:44	06:45 18:32	06:37 20:23	07:41 (WEA01) 21:10	05:15 21:44	06:33 (WEA02) 07:02 (WEA02)
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 20:25	07:49 (WEA01) 21:12	05:15 21:44	06:33 (WEA02) 07:02 (WEA02)
17	08:24 16:55	07:39 17:48	06:41 18:36	06:33 20:26	07:53 (WEA01) 21:13	05:15 21:44	06:34 (WEA02) 07:02 (WEA02)
18	08:23 16:56	07:37 17:50	06:38 18:37	06:31 20:28	07:56 (WEA01) 21:14	05:15 21:45	06:34 (WEA02) 07:02 (WEA02)
19	08:22 16:58	07:35 17:51	06:36 18:39	06:29 20:29	07:59 (WEA01) 21:16	05:15 21:45	06:34 (WEA02) 07:03 (WEA02)
20	08:21 16:59	07:34 17:53	06:34 18:41	06:26 20:31	07:53 (WEA01) 21:17	05:15 21:46	06:35 (WEA02) 07:04 (WEA02)
21	08:20 17:01	07:32 17:55	06:32 18:42	06:24 20:33	07:56 (WEA01) 21:19	05:16 21:46	06:35 (WEA02) 07:04 (WEA02)
22	08:19 17:02	07:30 17:57	06:30 18:44	06:22 20:34	07:59 (WEA01) 21:20	05:16 21:46	06:35 (WEA02) 07:04 (WEA02)
23	08:18 17:04	07:28 17:58	06:27 18:46	06:20 20:36	07:56 (WEA01) 21:21	05:16 21:46	06:35 (WEA02) 07:04 (WEA02)
24	08:17 17:06	07:26 18:00	06:25 18:47	06:18 20:37	07:59 (WEA01) 21:23	05:16 21:46	06:36 (WEA02) 07:04 (WEA02)
25	08:16 17:07	07:24 18:02	06:23 18:49	06:16 20:39	07:56 (WEA01) 21:24	05:17 21:46	06:36 (WEA02) 07:04 (WEA02)
26	08:14 17:09	07:22 18:04	06:21 18:50	06:14 20:41	07:59 (WEA01) 21:25	05:17 21:46	06:36 (WEA02) 07:04 (WEA02)
27	08:13 17:11	07:19 18:05	06:18 18:52	06:13 20:42	07:56 (WEA01) 21:26	05:17 21:46	06:36 (WEA02) 07:05 (WEA02)
28	08:12 17:13	07:17 18:07	06:16 18:54	06:11 20:44	07:59 (WEA01) 21:28	05:18 21:46	06:36 (WEA02) 07:05 (WEA02)
29	08:11 17:14		07:14 19:55	06:09 20:45	07:56 (WEA01) 21:29	05:18 21:46	06:36 (WEA02) 07:06 (WEA02)
30	08:09 17:16		07:12 19:57	06:07 20:47	07:43 (WEA01) 21:30	05:19 21:46	06:36 (WEA02) 07:06 (WEA02)
31	08:08 17:18		07:09 19:59	06:07 20:47	07:40 (WEA01) 21:31	05:19 21:46	06:36 (WEA02) 07:06 (WEA02)
Sonnenscheinstunden	264	280	367	414	480	492	
astr.max.mögl.Beschattung			45	347	910	915	
Red.Sonnenscheinwahrsch.			0,29	0,37	0,40	0,32	
Reduktion Betriebsdauer			0,95	0,95	0,95	0,95	
Reduktion Windrichtung			0,68	0,68	0,67	0,67	
Gesamte Reduktion			0,19	0,24	0,25	0,21	
Met.wahrsch.Beschattung			8	83	230	188	

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:



17.10.2023 09:23/3.6.361

SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP33 - Oberbergstraße 29, 57520 Molzhain

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli			August			September			Oktober			November			Dezember		
1	05:20		06:36 (WEA02)	05:54		06:39 (WEA02)	06:41		07:34 (WEA01)	07:28		07:19			08:08		
	21:46	31	07:07 (WEA02)	21:16	32	07:11 (WEA02)	20:16	24	07:58 (WEA01)	19:09		17:06			16:27		
2	05:20		06:37 (WEA02)	05:56		06:39 (WEA02)	06:43		07:33 (WEA01)	07:29		07:21			08:09		
	21:45	31	07:08 (WEA02)	21:14	31	07:10 (WEA02)	20:14	25	07:58 (WEA01)	19:07		17:04			16:27		
3	05:21		06:36 (WEA02)	05:57		06:41 (WEA02)	06:44		07:32 (WEA01)	07:31		07:23			08:11		
	21:45	31	07:07 (WEA02)	21:13	29	07:10 (WEA02)	20:12	26	07:58 (WEA01)	19:05		17:02			16:26		
4	05:22		06:36 (WEA02)	05:59		06:41 (WEA02)	06:46		07:31 (WEA01)	07:33		07:24			08:12		
	21:45	32	07:08 (WEA02)	21:11	27	07:08 (WEA02)	20:10	27	07:58 (WEA01)	19:03		17:00			16:26		
5	05:22		06:36 (WEA02)	06:00		06:43 (WEA02)	06:48		07:31 (WEA01)	07:34		07:26			08:13		
	21:44	33	07:09 (WEA02)	21:09	24	07:07 (WEA02)	20:07	27	07:58 (WEA01)	19:00		16:59			16:25		
6	05:23		06:36 (WEA02)	06:02		06:44 (WEA02)	06:49		07:30 (WEA01)	07:36		07:28			08:14		
	21:44	33	07:09 (WEA02)	21:08	21	07:05 (WEA02)	20:05	28	07:58 (WEA01)	18:58		16:57			16:25		
7	05:24		06:36 (WEA02)	06:03		06:45 (WEA02)	06:51		07:31 (WEA01)	07:37		07:29			08:16		
	21:43	33	07:09 (WEA02)	21:06	18	07:03 (WEA02)	20:03	27	07:58 (WEA01)	18:56		16:55			16:25		
8	05:25		06:36 (WEA02)	06:05		06:49 (WEA02)	06:52		07:30 (WEA01)	07:39		07:31			08:17		
	21:43	34	07:10 (WEA02)	21:04	12	07:01 (WEA02)	20:01	27	07:57 (WEA01)	18:54		16:54			16:24		
9	05:26		06:36 (WEA02)	06:06			06:54		07:31 (WEA01)	07:41		07:33			08:18		
	21:42	34	07:10 (WEA02)	21:02			19:59	25	07:56 (WEA01)	18:52		16:52			16:24		
10	05:27		06:36 (WEA02)	06:08			06:55		07:30 (WEA01)	07:42		07:35			08:19		
	21:41	35	07:11 (WEA02)	21:00			19:56	25	07:55 (WEA01)	18:49		16:51			16:24		
11	05:28		06:36 (WEA02)	06:09			06:57		07:31 (WEA01)	07:44		07:36			08:20		
	21:41	35	07:11 (WEA02)	20:59			19:54	23	07:54 (WEA01)	18:47		16:49			16:24		
12	05:29		06:36 (WEA02)	06:11			06:58		07:32 (WEA01)	07:46		07:38			08:21		
	21:40	36	07:12 (WEA02)	20:57			19:52	20	07:52 (WEA01)	18:45		16:48			16:24		
13	05:30		06:36 (WEA02)	06:12			07:00		07:34 (WEA01)	07:47		07:40			08:22		
	21:39	36	07:12 (WEA02)	20:55			19:50	16	07:50 (WEA01)	18:43		16:46			16:24		
14	05:31		06:36 (WEA02)	06:14			07:01		07:35 (WEA01)	07:49		07:41			08:23		
	21:38	36	07:12 (WEA02)	20:53			19:47	12	07:47 (WEA01)	18:41		16:45			16:24		
15	05:32		06:35 (WEA02)	06:15			07:03			07:50		07:43			08:24		
	21:37	38	07:13 (WEA02)	20:51			19:45			18:39		16:44			16:24		
16	05:33		06:35 (WEA02)	06:17			07:04			07:52		07:45			08:25		
	21:36	38	07:13 (WEA02)	20:49			19:43			18:37		16:42			16:24		
17	05:34		06:35 (WEA02)	06:18			07:06			07:54		07:46			08:25		
	21:35	38	07:13 (WEA02)	20:47			19:41			18:35		16:41			16:24		
18	05:35		06:35 (WEA02)	06:20			07:08			07:55		07:48			08:26		
	21:34	38	07:13 (WEA02)	20:45			19:38			18:33		16:40			16:24		
19	05:37		06:35 (WEA02)	06:21			07:09			07:57		07:50			08:27		
	21:33	38	07:13 (WEA02)	20:43			19:36			18:31		16:39			16:25		
20	05:38		06:36 (WEA02)	06:23			07:11			07:59		07:51			08:28		
	21:32	38	07:14 (WEA02)	20:41			19:34			18:29		16:37			16:25		
21	05:39		06:36 (WEA02)	06:24			07:12			08:00		07:53			08:28		
	21:31	38	07:14 (WEA02)	20:39			19:32			18:27		16:36			16:25		
22	05:40		06:36 (WEA02)	06:26			07:14			08:02		07:54			08:29		
	21:30	38	07:14 (WEA02)	20:37			19:29			18:25		16:35			16:26		
23	05:42		06:35 (WEA02)	06:27			07:15			08:04		07:56			08:29		
	21:28	39	07:14 (WEA02)	20:35			19:27			18:23		16:34			16:26		
24	05:43		06:36 (WEA02)	06:29			07:17			08:05		07:58			08:30		
	21:27	38	07:14 (WEA02)	20:33			19:25			18:21		16:33			16:27		
25	05:44		06:36 (WEA02)	06:31			07:18			07:07		07:59			08:30		
	21:26	38	07:14 (WEA02)	20:31			19:23			17:19		16:32			16:28		
26	05:46		06:36 (WEA02)	06:32			07:20			07:09		08:01			08:30		
	21:24	38	07:14 (WEA02)	20:29			19:20			17:17		16:31			16:28		
27	05:47		06:36 (WEA02)	06:34			07:22			07:11		08:02			08:31		
	21:23	37	07:13 (WEA02)	20:27			19:18			17:15		16:30			16:29		
28	05:49		06:37 (WEA02)	06:35		07:43 (WEA01)	07:23			07:12		08:04			08:31		
	21:22	36	07:13 (WEA02)	20:25	8	07:51 (WEA01)	19:16			17:13		16:30			16:30		
29	05:50		06:37 (WEA02)	06:37		07:39 (WEA01)	07:25			07:14		08:05			08:31		
	21:20	36	07:13 (WEA02)	20:23	15	07:54 (WEA01)	19:14			17:11		16:29			16:31		
30	05:51		06:37 (WEA02)	06:38		07:37 (WEA01)	07:26			07:16		08:06			08:31		
	21:19	35	07:12 (WEA02)	20:21	19	07:56 (WEA01)	19:11			17:09		16:28			16:31		
31	05:53		06:39 (WEA02)	06:40		07:35 (WEA01)				07:17					08:31		
	21:17	33	07:12 (WEA02)	20:18	21	07:56 (WEA01)				17:07					16:32		
Sonnenscheinstunden	496			450			380			333		270			250		
astr.max.mögl.Beschattung		1104			257			332									
Red.Sonnenscheinwahrsch.		0,39			0,41			0,37									
Reduktion Betriebsdauer		0,95			0,95			0,95									
Reduktion Windrichtung		0,67			0,67			0,68									
Gesamte Reduktion		0,25			0,26			0,24									
Met.wahrsch.Beschattung		271			68			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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	--------------------------------	---------------------------	----------------------------

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP34 - Lindentalstraße, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Januar		Februar		März		April		Mai		Juni	
1	08:31 16:34	08:06 17:20		07:15 18:09	26	07:59 (WEA01) 08:25 (WEA01)	07:07 20:00	08:25 (WEA02) 08:55 (WEA02)	06:05 20:49	05:22 21:32	06:44 (WEA03) 07:22 (WEA03)
2	08:31 16:35	08:05 17:21		07:13 18:11	26	07:59 (WEA01) 08:25 (WEA01)	07:05 20:02	08:26 (WEA02) 08:53 (WEA02)	06:03 20:50	05:21 21:33	06:45 (WEA03) 07:23 (WEA03)
3	08:31 16:36	08:03 17:23		07:11 18:12	26	07:59 (WEA01) 08:25 (WEA01)	07:03 20:03	08:27 (WEA02) 08:52 (WEA02)	06:01 20:52	05:20 21:34	06:45 (WEA03) 07:22 (WEA03)
4	08:31 16:37	08:02 17:25		07:09 18:14	25	07:59 (WEA01) 08:24 (WEA01)	07:01 20:05	08:29 (WEA02) 08:49 (WEA02)	06:00 20:53	05:20 21:35	06:46 (WEA03) 07:23 (WEA03)
5	08:31 16:38	08:00 17:27		07:07 18:16	25	07:58 (WEA01) 08:23 (WEA01)	06:58 20:07	08:31 (WEA02) 08:45 (WEA02)	05:58 20:55	05:19 21:36	06:45 (WEA03) 07:22 (WEA03)
6	08:30 16:39	07:59 17:28		07:05 18:17	23	07:59 (WEA01) 08:22 (WEA01)	06:56 20:08		05:56 20:57	05:19 21:37	06:46 (WEA03) 07:23 (WEA03)
7	08:30 16:40	07:57 17:30		07:03 18:19	21	08:00 (WEA01) 08:21 (WEA01)	06:54 20:10		05:54 20:58	05:18 21:38	06:46 (WEA03) 07:22 (WEA03)
8	08:30 16:42	07:55 17:32		07:00 18:21	18	08:01 (WEA01) 08:19 (WEA01)	06:52 20:12		05:53 21:00	05:18 21:39	06:47 (WEA03) 07:23 (WEA03)
9	08:29 16:43	07:54 17:34		06:58 18:22	14	08:03 (WEA01) 08:17 (WEA01)	06:50 20:13		05:51 21:01	05:17 21:40	06:47 (WEA03) 07:22 (WEA03)
10	08:29 16:44	07:52 17:36		06:56 18:24	7	08:06 (WEA01) 08:13 (WEA01)	06:48 20:15		05:49 21:03	05:17 21:40	06:47 (WEA03) 07:22 (WEA03)
11	08:28 16:46	07:50 17:37		06:54 18:26			06:45 20:16		05:48 21:04	05:16 21:41	06:48 (WEA03) 07:22 (WEA03)
12	08:28 16:47	07:48 17:39		06:52 18:27			06:43 20:18		05:46 21:06	05:16 21:42	06:49 (WEA03) 07:23 (WEA03)
13	08:27 16:49	07:47 17:41		06:49 18:29	15	07:39 (WEA02) 07:54 (WEA02)	06:41 20:20		05:45 21:07	05:16 21:42	06:49 (WEA03) 07:23 (WEA03)
14	08:26 16:50	07:45 17:43		06:47 18:31	21	07:36 (WEA02) 07:57 (WEA02)	06:39 20:21		05:43 21:09	05:16 21:43	06:49 (WEA03) 07:22 (WEA03)
15	08:26 16:51	07:43 17:44		06:45 18:32	25	07:33 (WEA02) 07:58 (WEA02)	06:37 20:23		05:42 21:10	05:15 21:44	06:49 (WEA03) 07:22 (WEA03)
16	08:25 16:53	07:41 17:46		06:43 18:34	29	07:31 (WEA02) 08:00 (WEA02)	06:35 20:25		05:40 21:12	05:15 21:44	06:49 (WEA03) 07:22 (WEA03)
17	08:24 16:54	07:39 17:48		06:41 18:36	31	07:30 (WEA02) 08:01 (WEA02)	06:33 20:26		05:39 21:13	05:15 21:44	06:50 (WEA03) 07:22 (WEA03)
18	08:23 16:56	07:37 17:50		06:38 18:37	33	07:29 (WEA02) 08:02 (WEA02)	06:31 20:28		05:37 21:14	05:15 21:45	06:50 (WEA03) 07:22 (WEA03)
19	08:22 16:58	07:35 17:51		06:36 18:39	35	07:27 (WEA02) 08:02 (WEA02)	06:28 20:29		05:36 21:16	05:15 21:45	06:50 (WEA03) 07:22 (WEA03)
20	08:21 16:59	07:34 17:53		06:34 18:41	36	07:26 (WEA02) 08:02 (WEA02)	06:26 20:31		05:35 21:17	05:15 21:46	06:51 (WEA03) 07:23 (WEA03)
21	08:20 17:01	07:32 17:55		06:32 18:42	38	07:25 (WEA02) 08:03 (WEA02)	06:24 20:33		05:33 21:19	05:16 21:46	06:51 (WEA03) 07:23 (WEA03)
22	08:19 17:02	07:30 17:57	08:08 (WEA01)	06:30 18:44	38	07:25 (WEA02) 08:03 (WEA02)	06:22 20:34		05:32 21:20	05:16 21:46	06:51 (WEA03) 07:23 (WEA03)
23	08:18 17:04	07:28 17:58	08:05 (WEA01)	06:27 18:46	38	08:05 (WEA01) 08:02 (WEA02)	06:20 20:36		05:31 21:21	05:16 21:46	06:51 (WEA03) 07:23 (WEA03)
24	08:17 17:06	07:26 18:00	08:03 (WEA01)	06:25 18:47	39	08:22 (WEA01) 08:02 (WEA02)	06:18 20:37		05:30 21:23	05:16 21:46	06:52 (WEA03) 07:24 (WEA03)
25	08:16 17:07	07:24 18:02	08:02 (WEA01)	06:23 18:49	39	08:02 (WEA02) 08:24 (WEA01)	06:16 20:39		05:29 21:24	05:17 21:46	06:52 (WEA03) 07:24 (WEA03)
26	08:14 17:09	07:22 18:04	08:01 (WEA01)	06:21 18:50	39	08:02 (WEA02) 08:25 (WEA01)	06:14 20:41		05:28 21:25	05:17 21:46	06:51 (WEA03) 07:24 (WEA03)
27	08:13 17:11	07:19 18:05	08:00 (WEA01)	06:18 18:52	38	08:02 (WEA02) 08:01 (WEA02)	06:13 20:42		05:27 21:26	05:17 21:46	06:52 (WEA03) 07:25 (WEA03)
28	08:12 17:13	07:17 18:07	07:59 (WEA01)	06:16 18:54	37	08:00 (WEA02) 08:23 (WEA02)	06:11 20:44		05:26 21:28	05:18 21:46	06:52 (WEA03) 07:25 (WEA03)
29	08:11 17:14		08:25 (WEA01)	07:15 19:55	36	08:23 (WEA02) 08:59 (WEA02)	06:09 20:45		05:25 21:29	05:18 21:46	06:52 (WEA03) 07:26 (WEA03)
30	08:09 17:16			07:12 19:57	34	08:24 (WEA02) 08:58 (WEA02)	06:07 20:47		05:24 21:30	05:19 21:46	06:52 (WEA03) 07:26 (WEA03)
31	08:08 17:18			07:09 19:59	32	08:24 (WEA02) 08:56 (WEA02)			05:23 21:31	06:44 (WEA03) 07:23 (WEA03)	
Sonneneinstrahlung		264	280	367		414		480		492	
astr. max. mögl. Beschattung			141	844		116		982		1022	
Red. Sonneneinstrahlung			0,30	0,29		0,37		0,40		0,32	
Reduktion Betriebsdauer			0,95	0,95		0,95		0,95		0,95	
Reduktion Windrichtung			0,67	0,66		0,66		0,66		0,66	
Gesamte Reduktion			0,19	0,18		0,23		0,25		0,20	
Met. wahrsch. Beschattung			27	152		27		247		209	

Tabellen-Layout: Die Daten für jeden Tag 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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:
17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP34 - Lindentalstraße, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember
1	05:20	06:52 (WEA03)	05:54	06:56 (WEA03)	06:41	07:28	08:21 (WEA02)	07:19	08:08	
	21:46	34 07:26 (WEA03)	21:16	34 07:30 (WEA03)	20:16	19:09	8 08:29 (WEA02)	17:06	16:27	
2	05:20	06:53 (WEA03)	05:56	06:56 (WEA03)	06:43	07:29		07:21	08:09	
	21:45	34 07:27 (WEA03)	21:14	33 07:29 (WEA03)	20:14	19:07		17:04	16:27	
3	05:21	06:52 (WEA03)	05:57	06:58 (WEA03)	06:44	07:31		07:23	08:11	
	21:45	35 07:27 (WEA03)	21:13	31 07:29 (WEA03)	20:12	19:05		17:02	16:26	
4	05:22	06:52 (WEA03)	05:59	06:58 (WEA03)	06:46	07:33	08:41 (WEA01)	07:24	08:12	
	21:45	36 07:28 (WEA03)	21:11	29 07:27 (WEA03)	20:10	19:03	12 08:53 (WEA01)	17:00	16:26	
5	05:22	06:52 (WEA03)	06:00	07:00 (WEA03)	06:48	07:34	08:39 (WEA01)	07:26	08:13	
	21:44	36 07:28 (WEA03)	21:09	27 07:27 (WEA03)	20:07	19:00	17 08:56 (WEA01)	16:59	16:25	
6	05:23	06:53 (WEA03)	06:02	07:01 (WEA03)	06:49	07:36	08:37 (WEA01)	07:28	08:14	
	21:44	36 07:29 (WEA03)	21:08	24 07:25 (WEA03)	20:05	18:58	19 08:56 (WEA01)	16:57	16:25	
7	05:24	06:52 (WEA03)	06:03	07:02 (WEA03)	06:51	07:37	08:35 (WEA01)	07:29	08:16	
	21:43	37 07:29 (WEA03)	21:06	20 07:22 (WEA03)	20:03	18:56	22 08:57 (WEA01)	16:55	16:25	
8	05:25	06:52 (WEA03)	06:05	07:05 (WEA03)	06:52	08:23 (WEA02)	07:39	08:35 (WEA01)	07:31	08:17
	21:43	37 07:29 (WEA03)	21:04	15 07:20 (WEA03)	20:01	20 08:43 (WEA02)	18:54	23 08:58 (WEA01)	16:54	16:24
9	05:26	06:52 (WEA03)	06:06	07:09 (WEA03)	06:54	08:21 (WEA02)	07:41	08:33 (WEA01)	07:33	08:18
	21:42	38 07:30 (WEA03)	21:02	6 07:15 (WEA03)	19:59	25 08:46 (WEA02)	18:52	25 08:58 (WEA01)	16:52	16:24
10	05:27	06:52 (WEA03)	06:08	06:55	06:55	08:19 (WEA02)	07:42	08:33 (WEA01)	07:35	08:19
	21:41	38 07:30 (WEA03)	21:01	19:56	27 08:46 (WEA02)	18:49	26 08:59 (WEA01)	16:51	16:24	
11	05:28	06:52 (WEA03)	06:09	06:57	06:57	08:18 (WEA02)	07:44	08:33 (WEA01)	07:36	08:20
	21:41	39 07:31 (WEA03)	20:59	19:54	30 08:48 (WEA02)	18:47	26 08:59 (WEA01)	16:49	16:24	
12	05:29	06:52 (WEA03)	06:11	06:58	06:58	08:16 (WEA02)	07:46	08:32 (WEA01)	07:38	08:21
	21:40	39 07:31 (WEA03)	20:57	19:52	32 08:48 (WEA02)	18:45	26 08:58 (WEA01)	16:48	16:24	
13	05:30	06:52 (WEA03)	06:12	07:00	07:00	08:15 (WEA02)	07:47	08:32 (WEA01)	07:40	08:22
	21:39	39 07:31 (WEA03)	20:55	19:50	34 08:49 (WEA02)	18:43	26 08:58 (WEA01)	16:46	16:24	
14	05:31	06:52 (WEA03)	06:14	07:01	07:01	08:14 (WEA02)	07:49	08:32 (WEA01)	07:41	08:23
	21:38	40 07:32 (WEA03)	20:53	19:47	35 08:49 (WEA02)	18:41	26 08:58 (WEA01)	16:45	16:24	
15	05:32	06:52 (WEA03)	06:15	07:03	07:03	08:13 (WEA02)	07:50	08:33 (WEA01)	07:43	08:24
	21:37	40 07:32 (WEA03)	20:51	19:45	37 08:50 (WEA02)	18:39	24 08:57 (WEA01)	16:44	16:24	
16	05:33	06:52 (WEA03)	06:17	07:04	07:04	08:12 (WEA02)	07:52	08:33 (WEA01)	07:45	08:25
	21:36	40 07:32 (WEA03)	20:49	19:43	38 08:50 (WEA02)	18:37	22 08:55 (WEA01)	16:42	16:24	
17	05:34	06:52 (WEA03)	06:18	07:06	07:06	08:12 (WEA02)	07:54	08:34 (WEA01)	07:46	08:26
	21:35	40 07:32 (WEA03)	20:47	19:41	38 08:50 (WEA02)	18:35	21 08:55 (WEA01)	16:41	16:24	
18	05:35	06:52 (WEA03)	06:20	07:08	07:08	08:11 (WEA02)	07:55	08:35 (WEA01)	07:48	08:26
	21:34	40 07:32 (WEA03)	20:45	19:38	39 08:50 (WEA02)	18:33	18 08:53 (WEA01)	16:40	16:24	
19	05:37	06:52 (WEA03)	06:21	07:09	07:09	08:11 (WEA02)	07:57	08:37 (WEA01)	07:50	08:27
	21:33	40 07:32 (WEA03)	20:43	19:36	39 08:50 (WEA02)	18:31	14 08:51 (WEA01)	16:39	16:25	
20	05:38	06:53 (WEA03)	06:23	07:11	07:11	08:10 (WEA02)	07:59	08:40 (WEA01)	07:51	08:28
	21:32	40 07:33 (WEA03)	20:41	19:34	39 08:49 (WEA02)	18:29	7 08:47 (WEA01)	16:37	16:25	
21	05:39	06:52 (WEA03)	06:24	07:12	07:12	08:10 (WEA02)	08:00		07:53	08:28
	21:31	41 07:33 (WEA03)	20:39	19:32	39 08:49 (WEA02)	18:26			16:36	16:25
22	05:40	06:52 (WEA03)	06:26	07:14	07:14	08:10 (WEA02)	08:02		07:54	08:29
	21:30	41 07:33 (WEA03)	20:37	19:29	38 08:48 (WEA02)	18:24			16:35	16:26
23	05:42	06:52 (WEA03)	06:27	07:15	07:15	08:10 (WEA02)	08:04		07:56	08:29
	21:28	41 07:33 (WEA03)	20:35	19:27	37 08:47 (WEA02)	18:23			16:34	16:26
24	05:43	06:52 (WEA03)	06:29	07:17	07:17	08:10 (WEA02)	08:05		07:58	08:30
	21:27	40 07:32 (WEA03)	20:33	19:25	36 08:46 (WEA02)	18:21			16:33	16:27
25	05:44	06:53 (WEA03)	06:31	07:18	07:18	08:11 (WEA02)	07:07		07:59	08:30
	21:26	40 07:33 (WEA03)	20:31	19:23	34 08:45 (WEA02)	17:19			16:32	16:28
26	05:46	06:53 (WEA03)	06:32	07:20	07:20	08:11 (WEA02)	07:09		08:01	08:30
	21:25	40 07:33 (WEA03)	20:29	19:20	32 08:43 (WEA02)	17:17			16:31	16:28
27	05:47	06:53 (WEA03)	06:34	07:22	07:22	08:12 (WEA02)	07:11		08:02	08:31
	21:23	39 07:32 (WEA03)	20:27	19:18	30 08:42 (WEA02)	17:15			16:30	16:29
28	05:49	06:54 (WEA03)	06:35	07:23	07:23	08:14 (WEA02)	07:12		08:04	08:31
	21:22	39 07:33 (WEA03)	20:25	19:16	26 08:40 (WEA02)	17:13			16:30	16:30
29	05:50	06:54 (WEA03)	06:37	07:25	07:25	08:15 (WEA02)	07:14		08:05	08:31
	21:20	38 07:32 (WEA03)	20:23	19:14	23 08:38 (WEA02)	17:11			16:29	16:31
30	05:51	06:54 (WEA03)	06:38	07:26	07:26	08:18 (WEA02)	07:16		08:06	08:31
	21:19	37 07:31 (WEA03)	20:21	19:11	17 08:35 (WEA02)	17:09			16:28	16:31
31	05:53	06:56 (WEA03)	06:40			07:17				08:31
	21:17	35 07:31 (WEA03)	20:18			17:07				16:32
Sonnenscheinstunden		496	450	380	333	270	250			
astr.max.mögl.Beschattung		1189	219	759	362					
Red.Sonnenscheinwahrsch.		0,39	0,41	0,37	0,27					
Reduktion Betriebsdauer		0,95	0,95	0,95	0,95					
Reduktion Windrichtung		0,66	0,66	0,66	0,67					
Gesamte Reduktion		0,24	0,26	0,23	0,17					
Met.wahrsch.Beschattung		291	57	176	62					

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP35 - Peter-Hellinghausen-Straße 31, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Januar		Februar		März		April		Mai		Juni	
1	08:31 16:34	08:06 17:20		07:15 18:09	08:02 (WEA02) 08:29 (WEA02)	07:07 20:00		06:05 20:49		05:22 21:32	06:10 (WEA05) 06:36 (WEA05)
2	08:31 16:35	08:05 17:21		07:13 18:11	08:01 (WEA02) 08:30 (WEA02)	07:05 20:02		06:03 20:50		05:21 21:33	06:10 (WEA05) 06:35 (WEA05)
3	08:31 16:36	08:03 17:23		07:11 18:12	08:01 (WEA02) 08:31 (WEA02)	07:03 20:04		06:01 20:52		05:20 21:34	06:10 (WEA05) 06:35 (WEA05)
4	08:31 16:37	08:02 17:25		07:09 18:14	08:00 (WEA02) 08:31 (WEA02)	07:01 20:05		06:00 20:53		05:20 21:35	06:11 (WEA05) 06:35 (WEA05)
5	08:31 16:38	08:00 17:27		07:07 18:16	08:00 (WEA02) 08:30 (WEA02)	06:58 20:07		05:58 20:55		05:19 21:36	06:11 (WEA05) 06:35 (WEA05)
6	08:30 16:39	07:59 17:28		07:05 18:17	07:59 (WEA02) 08:30 (WEA02)	06:56 20:08	07:52 (WEA03)	05:56 20:57		05:19 21:37	06:12 (WEA05) 06:35 (WEA05)
7	08:30 16:40	07:57 17:30		07:03 18:19	07:59 (WEA02) 08:30 (WEA02)	06:54 20:10	07:46 (WEA03)	05:54 20:58		05:18 21:38	06:12 (WEA05) 06:34 (WEA05)
8	08:30 16:42	07:55 17:32		07:00 18:21	07:59 (WEA02) 08:30 (WEA02)	06:52 20:12	07:43 (WEA03)	05:53 21:00	06:18 (WEA05)	05:18 21:39	06:13 (WEA05) 06:34 (WEA05)
9	08:29 16:43	07:54 17:34		06:58 18:22	07:59 (WEA02) 08:30 (WEA02)	06:50 20:13	07:41 (WEA03)	05:51 21:01	06:15 (WEA05)	05:17 21:40	06:13 (WEA05) 06:33 (WEA05)
10	08:29 16:44	07:52 17:36		06:56 18:24	07:59 (WEA02) 08:28 (WEA02)	06:48 20:15	07:40 (WEA03)	05:49 21:03	06:14 (WEA05)	05:17 21:40	06:14 (WEA05) 06:33 (WEA05)
11	08:28 16:46	07:50 17:37		06:54 18:26	07:59 (WEA02) 08:27 (WEA02)	06:45 20:16	07:38 (WEA03)	05:48 21:04	06:12 (WEA05)	05:16 21:41	06:15 (WEA05) 06:34 (WEA05)
12	08:28 16:47	07:48 17:39		06:52 18:27	08:00 (WEA02) 08:26 (WEA02)	06:43 20:18	07:36 (WEA03)	05:46 21:06	06:11 (WEA05)	05:16 21:42	06:15 (WEA05) 06:34 (WEA05)
13	08:27 16:49	07:47 17:41		06:50 18:29	08:01 (WEA02) 08:25 (WEA02)	06:41 20:20	07:35 (WEA03)	05:45 21:07	06:10 (WEA05)	05:16 21:42	06:16 (WEA05) 06:34 (WEA05)
14	08:26 16:50	07:45 17:43		06:47 18:31	08:03 (WEA02) 08:23 (WEA02)	06:39 20:21	07:35 (WEA03)	05:43 21:09	06:08 (WEA05)	05:16 21:43	06:16 (WEA05) 06:33 (WEA05)
15	08:26 16:51	07:43 17:44		06:45 18:32	08:04 (WEA02) 08:20 (WEA02)	06:37 20:23	07:34 (WEA03)	05:42 21:10	06:08 (WEA05)	05:15 21:44	06:16 (WEA05) 06:33 (WEA05)
16	08:25 16:53	07:41 17:46		06:43 18:34	08:08 (WEA02) 08:16 (WEA02)	06:35 20:25	07:34 (WEA03)	05:40 21:12	06:08 (WEA05)	05:15 21:44	06:17 (WEA05) 06:33 (WEA05)
17	08:24 16:54	07:39 17:48		06:41 18:36		06:33 20:26	07:33 (WEA03)	05:39 21:13	06:07 (WEA05)	05:15 21:45	06:17 (WEA05) 06:33 (WEA05)
18	08:23 16:56	07:37 17:50		06:38 18:37		06:31 20:28	07:33 (WEA03)	05:37 21:15	06:07 (WEA05)	05:15 21:45	06:18 (WEA05) 06:33 (WEA05)
19	08:22 16:58	07:35 17:51		06:36 18:39		06:29 20:29	07:33 (WEA03)	05:36 21:16	06:07 (WEA05)	05:15 21:45	06:18 (WEA05) 06:33 (WEA05)
20	08:21 16:59	07:34 17:53		06:34 18:41		06:26 20:31	07:33 (WEA03)	05:35 21:17	06:07 (WEA05)	05:15 21:46	06:19 (WEA05) 06:34 (WEA05)
21	08:20 17:01	07:32 17:55		06:32 18:42		06:24 20:33	07:33 (WEA03)	05:33 21:19	06:06 (WEA05)	05:16 21:46	06:19 (WEA05) 06:34 (WEA05)
22	08:19 17:02	07:30 17:57		06:30 18:44		06:22 20:34	07:33 (WEA03)	05:32 21:20	06:06 (WEA05)	05:16 21:46	06:19 (WEA05) 06:34 (WEA05)
23	08:18 17:04	07:28 17:58		06:27 18:46		06:20 20:36	07:33 (WEA03)	05:31 21:21	06:06 (WEA05)	05:16 21:46	06:19 (WEA05) 06:34 (WEA05)
24	08:17 17:06	07:26 18:00		06:25 18:47		06:18 20:37	07:34 (WEA03)	05:30 21:23	06:06 (WEA05)	05:16 21:46	06:20 (WEA05) 06:35 (WEA05)
25	08:16 17:07	07:24 18:02	08:10 (WEA02)	06:23 18:49		06:16 20:39	07:34 (WEA03)	05:29 21:24	06:07 (WEA05)	05:17 21:46	06:19 (WEA05) 06:35 (WEA05)
26	08:15 17:09	07:22 18:04	08:08 (WEA02)	06:21 18:51		06:14 20:41	07:36 (WEA03)	05:28 21:25	06:07 (WEA05)	05:17 21:46	06:19 (WEA05) 06:35 (WEA05)
27	08:13 17:11	07:19 18:05	08:05 (WEA02)	06:18 18:52		06:13 20:42	07:37 (WEA03)	05:27 21:26	06:07 (WEA05)	05:17 21:46	06:19 (WEA05) 06:36 (WEA05)
28	08:12 17:13	07:17 18:07	08:27 (WEA02)	06:16 18:54		06:11 20:44	08:00 (WEA03)	05:26 21:28	06:08 (WEA05)	05:18 21:46	06:19 (WEA05) 06:36 (WEA05)
29	08:11 17:14		08:03 (WEA02)	06:14 19:15		06:09 20:45	07:40 (WEA03)	05:25 21:29	06:08 (WEA05)	05:18 21:48	06:19 (WEA05) 06:37 (WEA05)
30	08:09 17:16		08:28 (WEA02)	06:12 19:57		06:07 20:47	07:55 (WEA03)	05:24 21:30	06:08 (WEA05)	05:19 21:46	06:19 (WEA05) 06:37 (WEA05)
31	08:08 17:18			07:09 19:59		07:51 (WEA03)		05:23 21:31	06:09 (WEA05)		
Sonneneinstrahlung		264	280	367	423	414	480	492	558		
astr.max.mögl.Beschattung					0,29		0,37		0,40		0,32
Red.Sonneneinstrahlung					0,95		0,95		0,95		0,95
Reduktion Betriebsdauer					0,67		0,68		0,67		0,67
Reduktion Windrichtung					0,19		0,24		0,25		0,21
Gesamte Reduktion					15		158		153		115
Met.wahrsch.Beschattung					77						

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP35 - Peter-Hellinghausen-Straße 31, 57518 Steinerath

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember
1	05:20	06:19 (WEA05)	05:54	06:22 (WEA05)	06:41	07:37 (WEA03)	07:28	08:39 (WEA02)	07:19	08:08
	21:46	19 06:38 (WEA05)	21:16	20 06:42 (WEA05)	20:16	29 08:06 (WEA03)	19:09	26 09:05 (WEA02)	17:06	16:27
2	05:20	06:19 (WEA05)	05:56	06:23 (WEA05)	06:43	07:38 (WEA03)	07:29	08:38 (WEA02)	07:21	08:09
	21:45	20 06:39 (WEA05)	21:14	17 06:40 (WEA05)	20:14	26 08:04 (WEA03)	19:07	28 09:06 (WEA02)	17:04	16:27
3	05:21	06:18 (WEA05)	05:57	06:25 (WEA05)	06:44	07:39 (WEA03)	07:31	08:38 (WEA02)	07:23	08:11
	21:45	20 06:38 (WEA05)	21:13	15 06:40 (WEA05)	20:12	24 08:03 (WEA03)	19:05	29 09:07 (WEA02)	17:02	16:26
4	05:22	06:18 (WEA05)	05:59	06:26 (WEA05)	06:46	07:40 (WEA03)	07:33	08:36 (WEA02)	07:24	08:12
	21:45	21 06:39 (WEA05)	21:11	11 06:37 (WEA05)	20:10	20 08:00 (WEA03)	19:03	30 09:06 (WEA02)	17:00	16:26
5	05:22	06:18 (WEA05)	06:00	06:31 (WEA05)	06:48	07:43 (WEA03)	07:34	08:36 (WEA02)	07:26	08:13
	21:44	22 06:40 (WEA05)	21:09	2 06:33 (WEA05)	20:08	15 07:58 (WEA03)	19:00	31 09:07 (WEA02)	16:59	16:25
6	05:23	06:18 (WEA05)	06:02		06:49	07:47 (WEA03)	07:36	08:35 (WEA02)	07:28	08:14
	21:44	23 06:41 (WEA05)	21:08		20:05	5 07:52 (WEA03)	18:58	31 09:06 (WEA02)	16:57	16:25
7	05:24	06:17 (WEA05)	06:03		06:51		07:37	08:35 (WEA02)	07:29	08:16
	21:43	24 06:41 (WEA05)	21:06		20:03		18:56	31 09:06 (WEA02)	16:55	16:25
8	05:25	06:17 (WEA05)	06:05		06:52		07:39	08:35 (WEA02)	07:31	08:17
	21:43	24 06:41 (WEA05)	21:04		20:01		18:54	31 09:06 (WEA02)	16:54	16:24
9	05:26	06:17 (WEA05)	06:06		06:54		07:41	08:34 (WEA02)	07:33	08:18
	21:42	25 06:42 (WEA05)	21:02		19:59		18:52	31 09:05 (WEA02)	16:52	16:24
10	05:27	06:17 (WEA05)	06:08		06:55		07:42	08:35 (WEA02)	07:35	08:19
	21:41	26 06:43 (WEA05)	21:01		19:56		18:49	30 09:05 (WEA02)	16:51	16:24
11	05:28	06:17 (WEA05)	06:09		06:57		07:44	08:35 (WEA02)	07:36	08:20
	21:41	26 06:43 (WEA05)	20:59		19:54		18:47	30 09:05 (WEA02)	16:49	16:24
12	05:29	06:17 (WEA05)	06:11		06:58		07:46	08:35 (WEA02)	07:38	08:21
	21:40	27 06:44 (WEA05)	20:57		19:52		18:45	28 09:03 (WEA02)	16:48	16:24
13	05:30	06:17 (WEA05)	06:12	07:51 (WEA03)	07:00		07:47	08:36 (WEA02)	07:40	08:22
	21:39	27 06:44 (WEA05)	20:55	10 08:01 (WEA03)	19:50		18:43	26 09:02 (WEA02)	16:46	16:24
14	05:31	06:17 (WEA05)	06:14	07:47 (WEA03)	07:01		07:49	08:37 (WEA02)	07:41	08:23
	21:38	27 06:44 (WEA05)	20:53	16 08:03 (WEA03)	19:47		18:41	24 09:01 (WEA02)	16:45	16:24
15	05:32	06:17 (WEA05)	06:15	07:45 (WEA03)	07:03		07:50	08:39 (WEA02)	07:43	08:24
	21:37	28 06:45 (WEA05)	20:51	21 08:06 (WEA03)	19:45		18:39	20 08:59 (WEA02)	16:44	16:24
16	05:33	06:16 (WEA05)	06:17	07:43 (WEA03)	07:04		07:52	08:40 (WEA02)	07:45	08:25
	21:36	29 06:45 (WEA05)	20:49	24 08:07 (WEA03)	19:43		18:37	17 08:57 (WEA02)	16:42	16:24
17	05:34	06:16 (WEA05)	06:18	07:42 (WEA03)	07:06		07:54	08:43 (WEA02)	07:46	08:26
	21:35	29 06:45 (WEA05)	20:47	26 08:08 (WEA03)	19:41		18:35	10 08:53 (WEA02)	16:41	16:24
18	05:35	06:16 (WEA05)	06:20	07:41 (WEA03)	07:08		07:55		07:48	08:26
	21:34	29 06:45 (WEA05)	20:45	28 08:09 (WEA03)	19:38		18:33		16:40	16:24
19	05:37	06:16 (WEA05)	06:21	07:40 (WEA03)	07:09		07:57		07:50	08:27
	21:33	29 06:45 (WEA05)	20:43	30 08:10 (WEA03)	19:36		18:31		16:39	16:25
20	05:38	06:17 (WEA05)	06:23	07:39 (WEA03)	07:11		07:59		07:51	08:28
	21:32	29 06:46 (WEA05)	20:41	31 08:10 (WEA03)	19:34		18:29		16:37	16:25
21	05:39	06:17 (WEA05)	06:24	07:39 (WEA03)	07:12		08:00		07:53	08:28
	21:31	29 06:46 (WEA05)	20:39	32 08:11 (WEA03)	19:32		18:27		16:36	16:25
22	05:40	06:17 (WEA05)	06:26	07:37 (WEA03)	07:14		08:02		07:54	08:29
	21:30	29 06:46 (WEA05)	20:37	34 08:11 (WEA03)	19:29		18:25		16:35	16:26
23	05:42	06:17 (WEA05)	06:27	07:36 (WEA03)	07:15		08:04		07:56	08:29
	21:28	29 06:46 (WEA05)	20:35	34 08:10 (WEA03)	19:27		18:23		16:34	16:26
24	05:43	06:16 (WEA05)	06:29	07:37 (WEA03)	07:17		08:05		07:58	08:30
	21:27	30 06:46 (WEA05)	20:33	34 08:11 (WEA03)	19:25		18:21		16:33	16:27
25	05:44	06:17 (WEA05)	06:31	07:36 (WEA03)	07:18		07:07		07:59	08:30
	21:26	29 06:46 (WEA05)	20:31	34 08:10 (WEA03)	19:23		17:19		16:32	16:28
26	05:46	06:17 (WEA05)	06:32	07:36 (WEA03)	07:20		07:09		08:01	08:30
	21:25	29 06:46 (WEA05)	20:29	34 08:10 (WEA03)	19:20		17:17		16:31	16:28
27	05:47	06:17 (WEA05)	06:34	07:35 (WEA03)	07:22	08:53 (WEA02)	07:11		08:02	08:31
	21:23	28 06:45 (WEA05)	20:27	35 08:10 (WEA03)	19:18	1 08:54 (WEA02)	17:15		16:30	16:29
28	05:49	06:19 (WEA05)	06:35	07:36 (WEA03)	07:23	08:47 (WEA02)	07:12		08:04	08:31
	21:22	26 06:45 (WEA05)	20:25	34 08:10 (WEA03)	19:16	13 09:00 (WEA02)	17:13		16:30	16:30
29	05:50	06:19 (WEA05)	06:37	07:36 (WEA03)	07:25	08:43 (WEA02)	07:14		08:05	08:31
	21:20	25 06:44 (WEA05)	20:23	32 08:08 (WEA03)	19:14	19 09:02 (WEA02)	17:11		16:29	16:31
30	05:51	06:19 (WEA05)	06:38	07:36 (WEA03)	07:26	08:42 (WEA02)	07:16		08:06	08:31
	21:19	25 06:44 (WEA05)	20:21	32 08:08 (WEA03)	19:11	22 09:04 (WEA02)	17:09		16:28	16:31
31	05:53	06:21 (WEA05)	06:40	07:36 (WEA03)			07:17			08:31
	21:17	22 06:43 (WEA05)	20:18	31 08:07 (WEA03)			17:07			16:32
Sonnenscheinstunden	496		450		380		333		270	250
astr.max.mögl.Beschattung	805		617		174		453			
Red.Sonnenscheinwahrsch.	0,39		0,41		0,37		0,27			
Reduktion Betriebsdauer	0,95		0,95		0,95		0,95			
Reduktion Windrichtung	0,67		0,68		0,68		0,67			
Gesamte Reduktion	0,25		0,27		0,24		0,17			
Met.wahrsch.Beschattung	198		165		41		78			

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP36 - Peter-Hellinghausen-Straße 17, 57518 Steinerath

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31 16:34	08:06 17:20	07:15 18:09	08:08 (WEA02) 07:07 18:09	07:55 (WEA03) 06:05 20:49	06:29 (WEA05) 05:22 21:32
2	08:31 16:35	08:05 17:21	07:13 18:11	08:08 (WEA02) 07:05 18:11	07:54 (WEA03) 06:03 20:50	06:28 (WEA05) 05:21 21:33
3	08:31 16:36	08:03 17:23	07:11 18:12	08:09 (WEA02) 07:03 18:12	07:54 (WEA03) 06:01 20:52	06:27 (WEA05) 05:20 21:34
4	08:31 16:37	08:02 17:25	07:09 18:14	08:09 (WEA02) 07:01 18:14	07:53 (WEA03) 06:00 20:53	06:26 (WEA05) 05:20 21:35
5	08:31 16:38	08:00 17:27	07:07 18:16	08:10 (WEA02) 06:58 18:16	07:52 (WEA03) 05:58 20:55	06:25 (WEA05) 05:19 21:36
6	08:30 16:39	07:59 17:28	07:05 18:17	08:11 (WEA02) 06:56 18:17	07:52 (WEA03) 05:56 20:57	06:24 (WEA05) 05:19 21:37
7	08:30 16:40	07:57 17:30	07:03 18:19	08:13 (WEA02) 06:54 18:19	07:52 (WEA03) 05:54 20:58	06:23 (WEA05) 05:18 21:38
8	08:30 16:42	07:55 17:32	07:00 18:21	08:16 (WEA02) 06:52 18:21	07:52 (WEA03) 05:53 21:00	06:22 (WEA05) 05:18 21:39
9	08:29 16:43	07:54 17:34	06:58 18:22	08:25 (WEA02) 06:50 18:22	08:22 (WEA03) 05:51 21:01	06:21 (WEA05) 05:17 21:40
10	08:29 16:44	07:52 17:36	06:56 18:24	06:48 18:24	07:53 (WEA03) 05:49 21:03	06:20 (WEA05) 05:17 21:41
11	08:28 16:46	07:50 17:37	06:54 18:26	06:45 18:26	07:54 (WEA03) 05:48 21:04	06:19 (WEA05) 05:16 21:42
12	08:28 16:47	07:48 17:39	06:52 18:27	06:43 18:27	07:54 (WEA03) 05:46 21:06	06:18 (WEA05) 05:16 21:43
13	08:27 16:49	07:47 17:41	06:50 18:29	06:41 18:29	07:55 (WEA03) 05:45 21:07	06:17 (WEA05) 05:16 21:44
14	08:26 16:50	07:45 17:43	06:47 18:31	06:39 18:31	07:57 (WEA03) 05:43 21:09	06:16 (WEA05) 05:16 21:45
15	08:26 16:51	07:43 17:44	06:45 18:32	06:37 18:32	08:00 (WEA03) 05:42 21:10	06:15 (WEA05) 05:15 21:46
16	08:25 16:53	07:41 17:46	06:43 18:34	06:35 18:34	08:09 (WEA03) 05:40 21:12	06:14 (WEA05) 05:15 21:47
17	08:24 16:54	07:39 17:48	06:41 18:36	06:33 18:36	05:39 21:13	06:13 (WEA05) 05:15 21:48
18	08:23 16:56	07:37 17:50	06:38 18:37	06:31 18:37	05:37 21:15	06:12 (WEA05) 05:15 21:49
19	08:22 16:58	07:35 17:51	06:36 18:39	06:29 18:39	05:36 21:16	06:11 (WEA05) 05:15 21:50
20	08:21 16:59	07:34 17:53	06:34 18:41	06:26 18:41	05:35 21:17	06:10 (WEA05) 05:15 21:51
21	08:20 17:01	07:32 17:55	06:32 18:42	06:24 18:42	05:33 21:19	06:09 (WEA05) 05:15 21:52
22	08:19 17:02	07:30 17:57	06:30 18:44	06:22 18:44	05:32 21:20	06:08 (WEA05) 05:15 21:53
23	08:18 17:04	07:28 17:58	06:27 18:46	06:20 18:46	05:31 21:21	06:07 (WEA05) 05:15 21:54
24	08:17 17:06	07:26 18:00	06:25 18:47	06:18 18:47	05:30 21:23	06:06 (WEA05) 05:15 21:55
25	08:16 17:07	07:24 18:02	06:23 18:49	06:16 18:49	05:29 21:24	06:05 (WEA05) 05:15 21:56
26	08:15 17:09	07:22 18:04	06:21 18:51	06:14 18:51	05:28 21:25	06:04 (WEA05) 05:15 21:57
27	08:13 17:11	07:19 18:05	06:18 18:52	06:13 18:52	05:27 21:26	06:03 (WEA05) 05:15 21:58
28	08:12 17:13	07:17 18:07	06:16 18:54	06:11 18:54	05:26 21:28	06:02 (WEA05) 05:15 21:59
29	08:11 17:14		06:14 18:55	06:09 18:55	05:25 21:29	06:01 (WEA05) 05:15 22:00
30	08:09 17:16		06:12 18:57	06:07 18:57	05:24 21:30	06:00 (WEA05) 05:15 22:01
31	08:08 17:18		06:10 18:59	06:05 18:59	05:23 21:31	05:59 (WEA05) 05:15 22:02
Sonnenscheinstunden	264	280	367	414	480	492
astr.max.mögl.Beschattung		252	281	485	414	
Red.Sonnenscheinwahrsch.		0,30	0,29	0,37	0,40	
Reduktion Betriebsdauer		0,95	0,95	0,95	0,95	
Reduktion Windrichtung		0,67	0,67	0,68	0,67	
Gesamte Reduktion		0,19	0,18	0,24	0,25	
Met.wahrsch.Beschattung		49	51	115	104	

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP36 - Peter-Hellinghausen-Straße 17, 57518 Steinerath

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember	
1	05:20	05:54	06:38 (WEA05)	06:41	07:53 (WEA03)	07:28		07:19	08:08		
	21:46	21:16	24 07:02 (WEA05)	20:16	25 08:18 (WEA03)	19:09		17:06	16:27		
2	05:20	05:56	06:37 (WEA05)	06:43	07:51 (WEA03)	07:29		07:21	08:09		
	21:45	21:14	25 07:02 (WEA05)	20:14	27 08:18 (WEA03)	19:07		17:04	16:27		
3	05:21	05:57	06:37 (WEA05)	06:44	07:51 (WEA03)	07:31		07:23	08:11		
	21:45	21:13	26 07:03 (WEA05)	20:12	28 08:19 (WEA03)	19:05		17:02	16:26		
4	05:22	05:59	06:37 (WEA05)	06:46	07:49 (WEA03)	07:33		07:24	08:12		
	21:45	21:11	26 07:03 (WEA05)	20:10	30 08:19 (WEA03)	19:03		17:00	16:26		
5	05:22	06:00	06:37 (WEA05)	06:48	07:49 (WEA03)	07:34		07:26	08:13		
	21:44	21:09	27 07:04 (WEA05)	20:08	31 08:20 (WEA03)	19:00		16:59	16:25		
6	05:23	06:02	06:36 (WEA05)	06:49	07:48 (WEA03)	07:36		07:28	08:14		
	21:44	21:08	28 07:04 (WEA05)	20:05	31 08:19 (WEA03)	18:58	13 08:50 (WEA02)	16:57	16:25		
7	05:24	06:03	06:36 (WEA05)	06:51	07:48 (WEA03)	07:37		08:48 (WEA02)	07:29	08:16	
	21:43	21:06	27 07:03 (WEA05)	20:03	31 08:19 (WEA03)	18:56	17 09:05 (WEA02)	16:55	16:25		
8	05:25	06:05	06:36 (WEA05)	06:52	07:48 (WEA03)	07:39		08:46 (WEA02)	07:31	08:17	
	21:43	21:04	28 07:04 (WEA05)	20:01	31 08:19 (WEA03)	18:54	21 09:07 (WEA02)	16:54	16:24		
9	05:26	06:06	06:36 (WEA05)	06:54	07:48 (WEA03)	07:41		08:44 (WEA02)	07:33	08:18	
	21:42	21:02	27 07:03 (WEA05)	19:59	31 08:19 (WEA03)	18:52	23 09:07 (WEA02)	16:52	16:24		
10	05:27	06:08	06:36 (WEA05)	06:55	07:47 (WEA03)	07:42		08:43 (WEA02)	07:35	08:19	
	21:41	21:01	27 07:03 (WEA05)	19:56	30 08:17 (WEA03)	18:49	25 09:08 (WEA02)	16:51	16:24		
11	05:28	06:09	06:36 (WEA05)	06:57	07:48 (WEA03)	07:44		08:43 (WEA02)	07:36	08:20	
	21:41	20:59	27 07:03 (WEA05)	19:54	29 08:17 (WEA03)	18:47	26 09:09 (WEA02)	16:49	16:24		
12	05:29	06:11	06:37 (WEA05)	06:58	07:48 (WEA03)	07:46		08:41 (WEA02)	07:38	08:21	
	21:40	20:57	24 07:01 (WEA05)	19:52	27 08:15 (WEA03)	18:45	28 09:09 (WEA02)	16:48	16:24		
13	05:30	06:12	06:39 (WEA05)	07:00	07:49 (WEA03)	07:47		08:41 (WEA02)	07:40	08:22	
	21:39	20:55	22 07:01 (WEA05)	19:50	26 08:15 (WEA03)	18:43	28 09:09 (WEA02)	16:46	16:24		
14	05:31	06:14	06:40 (WEA05)	07:01	07:50 (WEA03)	07:49		08:41 (WEA02)	07:41	08:23	
	21:38	20:53	20 07:00 (WEA05)	19:47	22 08:12 (WEA03)	18:41	28 09:09 (WEA02)	16:45	16:24		
15	05:32	06:15	06:42 (WEA05)	07:03	07:51 (WEA03)	07:50		08:41 (WEA02)	07:43	08:24	
	21:37	20:51	17 06:59 (WEA05)	19:45	20 08:11 (WEA03)	18:39	28 09:09 (WEA02)	16:44	16:24		
16	05:33	06:17	06:43 (WEA05)	07:04	07:53 (WEA03)	07:52		08:40 (WEA02)	07:45	08:25	
	21:36	20:49	14 06:57 (WEA05)	19:43	15 08:08 (WEA03)	18:37	28 09:08 (WEA02)	16:42	16:24		
17	05:34	06:18	06:45 (WEA05)	07:06	07:57 (WEA03)	07:54		08:41 (WEA02)	07:46	08:26	
	21:35	20:47	10 06:55 (WEA05)	19:41	7 08:04 (WEA03)	18:35	27 09:08 (WEA02)	16:41	16:24		
18	05:35	06:20	06:46 (WEA05)	07:08		07:55		08:41 (WEA02)	07:48	08:26	
	21:34	20:45	5 06:51 (WEA05)	19:38		18:33	27 09:08 (WEA02)	16:40	16:24		
19	05:37	06:21		07:09		07:57		08:42 (WEA02)	07:50	08:27	
	21:33	20:43		19:36		18:31	25 09:07 (WEA02)	16:39	16:25		
20	05:38	06:23		07:11		07:59		08:42 (WEA02)	07:51	08:28	
	21:32	20:41		19:34		18:29	23 09:05 (WEA02)	16:37	16:25		
21	05:39	06:24		07:12		08:00		08:43 (WEA02)	07:53	08:28	
	21:31	20:39		19:32		18:27	21 09:04 (WEA02)	16:36	16:25		
22	05:40	06:26		07:14		08:02		08:45 (WEA02)	07:54	08:29	
	21:30	20:37		19:29		18:25	17 09:02 (WEA02)	16:35	16:26		
23	05:42	06:27		07:15		08:04		08:47 (WEA02)	07:56	08:29	
	21:28	20:35		19:27		18:23	13 09:00 (WEA02)	16:34	16:26		
24	05:43	06:29		07:17		08:05		08:51 (WEA02)	07:58	08:30	
	21:27	20:33		19:25		18:21	4 08:55 (WEA02)	16:33	16:27		
25	05:44	06:31		07:18		07:07		07:59	08:30		
	21:26	20:31		19:23		17:19		16:32	16:28		
26	05:46	06:32		07:20		07:09		08:01	08:30		
	21:25	20:29		19:20		17:17		16:31	16:28		
27	05:47	06:34		07:22		07:11		08:02	08:31		
	21:23	20:27		19:18		17:15		16:30	16:29		
28	05:49	06:35	08:02 (WEA03)	07:23		07:12		08:04	08:31		
	21:22	20:25	9 08:11 (WEA03)	19:16		17:13		16:30	16:30		
29	05:50	06:37	07:58 (WEA03)	07:25		07:14		08:05	08:31		
	21:20	20:23	16 08:14 (WEA03)	19:14		17:11		16:29	16:31		
30	05:51	06:38	07:56 (WEA03)	07:26		07:16		08:07	08:31		
	21:19	20:21	20 08:16 (WEA03)	19:11		17:09		16:28	16:31		
31	05:53	06:40	07:54 (WEA03)			07:17			08:31		
	21:17	20:18	23 08:17 (WEA03)			17:07			16:32		
Sonnenscheinstunden	496	450		380		333		270	250		
astr.max.mögl.Beschattung	103	472		441		422					
Red.Sonnenscheinwahrsch.	0,39	0,41		0,37		0,27					
Reduktion Betriebsdauer	0,95	0,95		0,95		0,95					
Reduktion Windrichtung	0,67	0,67		0,68		0,67					
Gesamte Reduktion	0,24	0,26		0,24		0,17					
Met.wahrsch.Beschattung	25	123		105		72					

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP37 - Weiherstraße 6, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31	08:06	07:15	07:07	08:20 (WEA03)	06:05
	16:34	17:20	18:09	20:00	12 08:32 (WEA03)	20:49
2	08:31	08:05	07:13	07:05		06:03
	16:35	17:21	18:11	20:02		20:50
3	08:31	08:03	07:11	07:03		06:01
	16:36	17:23	18:12	20:04		20:52
4	08:31	08:02	07:09	07:01		06:00
	16:37	17:25	18:14	20:05		20:53
5	08:31	08:00	07:07	06:58		05:58
	16:38	17:27	18:16	20:07		20:55
6	08:31	07:59	07:05	06:56		05:56
	16:39	17:28	18:17	20:08		20:57
7	08:30	07:57	07:03	06:54		05:54
	16:40	17:30	18:19	20:10		20:58
8	08:30	07:55	07:00	06:52		05:53
	16:42	17:32	18:21	20:12		21:00
9	08:29	07:54	06:58	06:50		05:51
	16:43	17:34	18:22	20:13		21:01
10	08:29	07:52	08:30 (WEA02)	06:56		05:49
	16:44	17:36	7 08:37 (WEA02)	18:24		21:03
11	08:28	07:50	08:26 (WEA02)	06:54		05:48
	16:46	17:37	14 08:40 (WEA02)	18:26		21:04
12	08:28	07:49	08:25 (WEA02)	06:52		05:46
	16:47	17:39	18 08:43 (WEA02)	18:27		21:06
13	08:27	07:47	08:24 (WEA02)	06:50		05:45
	16:49	17:41	20 08:44 (WEA02)	18:29		21:07
14	08:26	07:45	08:23 (WEA02)	06:47		05:43
	16:50	17:43	22 08:45 (WEA02)	18:31		21:09
15	08:26	07:43	08:22 (WEA02)	06:45		05:42
	16:51	17:44	24 08:46 (WEA02)	18:32	7 07:28 (WEA03)	21:10
16	08:25	07:41	08:21 (WEA02)	06:43	7 07:35 (WEA03)	21:11
	16:53	17:46	25 08:46 (WEA02)	18:34	15 07:24 (WEA03)	21:12
17	08:24	07:39	08:21 (WEA02)	06:41	15 07:39 (WEA03)	21:13
	16:54	17:48	25 08:21 (WEA02)	06:41	18 07:22 (WEA03)	21:13
18	08:23	07:37	08:21 (WEA02)	06:38	19 07:41 (WEA03)	21:13
	16:56	17:50	25 08:21 (WEA02)	06:38	20 07:20 (WEA03)	21:13
19	08:22	07:35	08:20 (WEA02)	06:36	22 07:42 (WEA03)	21:15
	16:58	17:51	26 08:46 (WEA02)	18:39	23 07:18 (WEA03)	21:16
20	08:21	07:34	08:20 (WEA02)	06:34	24 07:42 (WEA03)	21:16
	16:59	17:53	26 08:20 (WEA02)	06:34	25 07:17 (WEA03)	21:17
21	08:20	07:32	08:21 (WEA02)	06:32	26 07:43 (WEA03)	21:17
	17:01	17:55	25 08:46 (WEA02)	18:42	26 07:16 (WEA03)	21:19
22	08:19	07:30	08:21 (WEA02)	06:30	27 07:44 (WEA03)	21:19
	17:02	17:57	24 08:21 (WEA02)	06:30	27 07:16 (WEA03)	21:20
23	08:18	07:28	08:22 (WEA02)	06:27	27 07:44 (WEA03)	21:20
	17:04	17:58	23 08:45 (WEA02)	18:46	27 07:15 (WEA03)	21:21
24	08:17	07:26	08:23 (WEA02)	06:25	26 07:43 (WEA03)	21:21
	17:06	18:00	21 08:44 (WEA02)	18:47	26 07:14 (WEA03)	21:23
25	08:16	07:24	08:24 (WEA02)	06:23	25 07:43 (WEA03)	21:23
	17:07	18:02	18 08:42 (WEA02)	18:49	25 07:15 (WEA03)	21:24
26	08:15	07:22	08:25 (WEA02)	06:21	25 07:43 (WEA03)	21:24
	17:09	18:04	16 08:41 (WEA02)	18:51	25 07:15 (WEA03)	21:25
27	08:13	07:19	08:27 (WEA02)	06:18	23 07:43 (WEA03)	21:25
	17:11	18:05	10 08:37 (WEA02)	18:52	23 07:14 (WEA03)	21:27
28	08:12	07:17		06:16	21 07:41 (WEA03)	21:26
	17:13	18:07		18:54	21 07:15 (WEA03)	21:26
29	08:11			07:14	19 07:40 (WEA03)	21:28
	17:14			19:55	19 08:16 (WEA03)	21:28
30	08:09			07:12	16 08:39 (WEA03)	21:29
	17:16			19:57	16 08:17 (WEA03)	21:29
31	08:08			07:09	12 08:38 (WEA03)	21:30
	17:18			19:59	12 08:17 (WEA03)	21:31
Sonnenscheinstunden	264	280	367	414	480	492
astr.max.mögl.Beschattung		369	396	380	5	
Red.Sonnenscheinwahrsch.		0,30	0,29	0,37	0,40	
Reduktion Betriebsdauer		0,95	0,95	0,95	0,95	
Reduktion Windrichtung		0,67	0,67	0,67	0,67	
Gesamte Reduktion		0,19	0,18	0,23	0,25	
Met.wahrsch.Beschattung		72	72	89	1	

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

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

Projekt:

Alter Bornskopf
ABO Wind AG**Unter den Eichen 7**
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP37 - Weiherstraße 6, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:20 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:06	08:00 (WEA02) 16:27
2	05:20 21:45	05:56 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:06 (WEA02) 16:27
3	05:21 21:45	05:57 21:13	06:44 20:12	07:31 19:05	07:23 17:02	08:11 16:26
4	05:22 21:45	05:59 21:11	06:46 20:10	07:33 19:03	07:24 17:00	08:12 16:26
5	05:22 21:44	06:00 21:09	06:48 20:08	07:34 19:00	07:26 16:59	08:13 16:25
6	05:23 21:44	06:02 21:08	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	05:24 21:43	06:03 21:06	06:51 20:03	07:37 18:56	07:29 16:55	08:16 16:25
8	05:25 21:43	06:05 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	07:33 16:52	08:18 16:24
10	05:27 21:41	06:08 21:01	06:55 19:56	07:42 18:49	07:35 16:51	08:19 16:24
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	07:36 16:49	08:20 16:24
12	05:29 21:40	06:11 20:57	06:58 19:52	07:46 18:45	07:38 16:48	08:21 16:24
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	07:40 16:46	08:22 16:24
14	05:31 21:38	06:14 20:53	07:01 19:47	07:49 18:41	07:41 16:45	08:23 16:24
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	07:43 16:44	08:24 16:24
16	05:33 21:36	06:17 20:49	07:05 19:43	07:52 18:37	07:45 16:42	08:25 16:24
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	07:46 16:41	08:26 16:24
18	05:35 21:34	06:20 20:45	07:08 19:38	07:55 18:33	07:48 16:40	08:26 16:24
19	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:31	07:50 16:39	08:27 16:25
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:29	07:51 16:37	08:28 16:25
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:27	07:53 16:36	08:28 16:25
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:25	07:54 16:35	08:29 16:26
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:23	07:56 16:34	08:29 16:26
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:21	07:58 16:33	08:30 16:27
25	05:44 21:26	06:31 20:31	07:18 19:23	08:07 18:19	07:59 16:32	08:30 16:28
26	05:46 21:25	06:32 20:29	07:20 19:20	08:09 18:17	08:01 16:31	08:30 16:28
27	05:47 21:23	06:34 20:27	07:22 19:18	08:11 18:15	08:02 16:30	08:31 16:29
28	05:49 21:22	06:35 20:25	07:23 19:16	08:12 18:13	08:04 16:30	08:31 16:30
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 18:11	08:05 16:29	08:31 16:31
30	05:51 21:19	06:38 20:21	07:26 19:11	08:16 18:09	08:07 16:28	08:31 16:31
31	05:53 21:17	06:40 20:18	19:11	07:17 17:07	07:56 (WEA02) 08:09 (WEA02)	08:31 16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung		375	416	366	6	
Red.Sonnenscheinwahrsch.		0,41	0,37	0,27	0,25	
Reduktion Betriebsdauer		0,95	0,95	0,95	0,95	
Reduktion Windrichtung		0,67	0,67	0,67	0,67	
Gesamte Reduktion		0,26	0,23	0,17	0,16	
Met.wahrsch.Beschattung		99	98	63	1	

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:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:
17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP38 - Betzdorfer Str. 1, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31	08:06	08:43 (WEA02)	07:15	07:07	07:29 (WEA05)
	16:34	17:20	08:57 (WEA02)	18:09	20:00	7 07:36 (WEA05)
2	08:31	08:05	08:42 (WEA02)	07:13	07:05	07:27 (WEA05)
	16:35	17:21	08:58 (WEA02)	18:11	20:02	12 07:39 (WEA05)
3	08:31	08:03	08:40 (WEA02)	07:11	07:03	07:25 (WEA05)
	16:36	17:23	08:59 (WEA02)	18:12	20:04	15 07:40 (WEA05)
4	08:31	08:02	08:40 (WEA02)	07:09	07:01	07:23 (WEA05)
	16:37	17:25	09:01 (WEA02)	18:14	20:05	19 07:42 (WEA05)
5	08:31	08:00	08:39 (WEA02)	07:07	06:58	07:20 (WEA05)
	16:38	17:27	09:01 (WEA02)	18:16	20:07	21 07:41 (WEA05)
6	08:31	07:59	08:38 (WEA02)	07:05	06:56	07:18 (WEA05)
	16:39	17:28	09:02 (WEA02)	18:17	20:08	24 07:42 (WEA05)
7	08:30	07:57	08:39 (WEA02)	07:03	06:54	07:16 (WEA05)
	16:40	17:30	09:03 (WEA02)	18:19	20:10	26 07:42 (WEA05)
8	08:30	07:55	08:39 (WEA02)	07:00	06:52	07:16 (WEA05)
	16:42	17:32	09:03 (WEA02)	18:21	20:12	26 07:42 (WEA05)
9	08:29	07:54	08:38 (WEA02)	06:58	06:50	07:16 (WEA05)
	16:43	17:34	09:03 (WEA02)	18:22	20:13	26 07:42 (WEA05)
10	08:29	07:52	08:38 (WEA02)	06:56	06:48	07:16 (WEA05)
	16:44	17:36	09:03 (WEA02)	18:24	20:15	26 07:42 (WEA05)
11	08:28	07:50	08:38 (WEA02)	06:54	06:45	07:16 (WEA05)
	16:46	17:37	09:02 (WEA02)	18:26	20:16	25 07:41 (WEA05)
12	08:28	07:49	08:40 (WEA02)	06:52	06:43	07:15 (WEA05)
	16:47	17:39	09:03 (WEA02)	18:27	20:18	25 07:40 (WEA05)
13	08:27	07:47	08:40 (WEA02)	06:50	06:41	07:16 (WEA05)
	16:48	17:41	09:02 (WEA02)	18:29	20:20	23 07:39 (WEA05)
14	08:26	07:45	08:41 (WEA02)	06:47	06:39	07:16 (WEA05)
	16:50	17:43	09:01 (WEA02)	18:31	20:21	21 07:37 (WEA05)
15	08:26	07:43	08:42 (WEA02)	06:45	06:37	07:17 (WEA05)
	16:51	17:44	09:00 (WEA02)	18:32	20:23	19 07:36 (WEA05)
16	08:25	07:41	08:43 (WEA02)	06:43	06:35	07:19 (WEA05)
	16:53	17:46	08:58 (WEA02)	18:34	20:25	15 07:34 (WEA05)
17	08:24	07:39	08:45 (WEA02)	06:41	06:33	07:21 (WEA05)
	16:54	17:48	08:56 (WEA02)	18:36	20:26	10 07:31 (WEA05)
18	08:23	07:37		06:38	06:31	
	16:56	17:50		18:37	20:28	
19	08:22	07:35		06:36	06:29	
	16:58	17:51		18:39	20:29	
20	08:21	07:34		06:34	06:26	
	16:59	17:53		18:41	20:31	
21	08:20	07:32		06:32	06:24	
	17:01	17:55		18:42	20:33	
22	08:19	07:30		06:30	06:22	
	17:02	17:57		18:44	20:34	
23	08:18	07:28		06:27	06:20	
	17:04	17:58		18:46	20:36	
24	08:17	07:26		06:25	06:18	
	17:06	18:00		18:47	20:37	
25	08:16	07:24		06:23	06:16	
	17:07	18:02		18:49	20:39	
26	08:15	07:22		06:21	06:14	
	17:09	18:04		18:51	20:41	
27	08:13	07:19		06:18	06:13	
	17:11	18:05		18:52	20:42	
28	08:12	07:17		06:16	06:11	
	17:13	18:07		18:54	20:44	
29	08:11			07:14	06:09	
	17:14			19:55	20:46	
30	08:09			07:12	06:07	
	17:16			19:57	20:47	
31	08:08	08:45 (WEA02)		07:09		
	17:18	08:54 (WEA02)		19:59		
Sonnenscheinstunden	264	280	367	414	480	492
astr.max.mögl.Beschattung	9	347	371	340		
Red.Sonnenscheinwahrsch.	0,21	0,30	0,29	0,37		
Reduktion Betriebsdauer	0,95	0,95	0,95	0,95		
Reduktion Windrichtung	0,66	0,66	0,66	0,68		
Gesamte Reduktion	0,13	0,19	0,18	0,24		
Met.wahrsch.Beschattung	1	66	67	81		

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361

SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP38 - Betzdorfer Str. 1, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli	August	September		Oktober		November		Dezember
1	05:20	05:54	06:41	07:15 (WEA05)	07:28	08:20 (WEA03)	07:19	08:08 (WEA02)	08:08
	21:46	21:16	20:16	25 07:40 (WEA05)	19:09	27 08:47 (WEA03)	17:06	24 08:32 (WEA02)	16:27
2	05:20	05:56	06:43	07:14 (WEA05)	07:29	08:20 (WEA03)	07:21	08:08 (WEA02)	08:09
	21:45	21:14	20:14	26 07:40 (WEA05)	19:07	27 08:47 (WEA03)	17:04	25 08:33 (WEA02)	16:27
3	05:21	05:57	06:44	07:14 (WEA05)	07:31	08:20 (WEA03)	07:23	08:08 (WEA02)	08:11
	21:45	21:13	20:12	26 07:40 (WEA05)	19:05	27 08:47 (WEA03)	17:02	25 08:33 (WEA02)	16:26
4	05:22	05:59	06:46	07:13 (WEA05)	07:33	08:19 (WEA03)	07:24	08:09 (WEA02)	08:12
	21:45	21:11	20:10	26 07:39 (WEA05)	19:03	27 08:46 (WEA03)	17:00	23 08:32 (WEA02)	16:26
5	05:22	06:00	06:48	07:14 (WEA05)	07:34	08:20 (WEA03)	07:26	08:08 (WEA02)	08:13
	21:44	21:09	20:08	25 07:39 (WEA05)	19:00	26 08:46 (WEA03)	16:59	23 08:31 (WEA02)	16:25
6	05:23	06:02	06:49	07:14 (WEA05)	07:36	08:20 (WEA03)	07:28	08:09 (WEA02)	08:14
	21:44	21:08	20:05	24 07:38 (WEA05)	18:58	24 08:44 (WEA03)	16:57	22 08:31 (WEA02)	16:25
7	05:24	06:03	06:51	07:16 (WEA05)	07:37	08:21 (WEA03)	07:29	08:10 (WEA02)	08:16
	21:43	21:06	20:03	21 07:37 (WEA05)	18:56	22 08:43 (WEA03)	16:55	20 08:30 (WEA02)	16:25
8	05:25	06:05	06:52	07:17 (WEA05)	07:39	08:22 (WEA03)	07:31	08:11 (WEA02)	08:17
	21:43	21:04	20:01	19 07:36 (WEA05)	18:54	20 08:42 (WEA03)	16:54	19 08:30 (WEA02)	16:24
9	05:26	06:06	06:54	07:19 (WEA05)	07:41	08:23 (WEA03)	07:33	08:13 (WEA02)	08:18
	21:42	21:02	19:59	16 07:35 (WEA05)	18:52	16 08:39 (WEA03)	16:52	16 08:29 (WEA02)	16:24
10	05:27	06:08	06:55	07:20 (WEA05)	07:42	08:26 (WEA03)	07:35	08:14 (WEA02)	08:19
	21:41	21:01	19:56	12 07:32 (WEA05)	18:49	10 08:36 (WEA03)	16:51	13 08:27 (WEA02)	16:24
11	05:28	06:09	06:57	07:22 (WEA05)	07:44		07:36		08:20
	21:41	20:59	19:54	8 07:30 (WEA05)	18:47		16:49	8 08:25 (WEA02)	16:24
12	05:29	06:11	06:58		07:46		07:38		08:21
	21:40	20:57	19:52		18:45		16:48		16:24
13	05:30	06:12	07:00		07:47		07:40		08:22
	21:39	20:55	19:50		18:43		16:46		16:24
14	05:31	06:14	07:01		07:49		07:41		08:23
	21:38	20:53	19:47		18:41		16:45		16:24
15	05:32	06:15	07:03		07:50		07:43		08:24
	21:37	20:51	19:45		18:39		16:44		16:24
16	05:33	06:17	07:05		07:52		07:45		08:25
	21:36	20:49	19:43		18:37		16:42		16:24
17	05:34	06:18	07:06		07:54		07:46		08:26
	21:35	20:47	19:41		18:35		16:41		16:24
18	05:35	06:20	07:08		07:55		07:48		08:26
	21:34	20:45	19:38		18:33		16:40		16:24
19	05:37	06:21	07:09		07:57		07:50		08:27
	21:33	20:43	19:36		18:31		16:39		16:25
20	05:38	06:23	07:11		07:59		07:51		08:28
	21:32	20:41	19:34		18:29		16:37		16:25
21	05:39	06:24	07:12		08:00		07:53		08:28
	21:31	20:39	19:32		18:27		16:36		16:25
22	05:40	06:26	07:14		08:02		07:54		08:29
	21:30	20:37	19:29		18:25		16:35		16:26
23	05:42	06:27	07:15	08:34 (WEA03)	08:04		07:56		08:29
	21:28	20:35	19:27	5 08:39 (WEA03)	18:23		16:34		16:26
24	05:43	06:29	07:17	08:29 (WEA03)	08:05	09:17 (WEA02)	07:58		08:30
	21:27	20:33	19:25	13 08:42 (WEA03)	18:21	6 09:23 (WEA02)	16:33		16:27
25	05:44	06:31	07:18	08:27 (WEA03)	07:07	08:14 (WEA02)	07:59		08:30
	21:26	20:31	19:23	18 08:45 (WEA03)	17:19	12 08:26 (WEA02)	16:32		16:28
26	05:46	06:32	07:24 (WEA05)	08:25 (WEA03)	07:09	08:12 (WEA02)	08:01		08:30
	21:25	20:29	10 07:34 (WEA05)	19:20	20 08:45 (WEA03)	16 08:28 (WEA02)	16:31		16:28
27	05:47	06:34	07:21 (WEA05)	07:22		08:11 (WEA02)	08:02		08:31
	21:23	20:27	15 07:36 (WEA05)	19:18	23 08:47 (WEA03)	19 08:30 (WEA02)	16:30		16:29
28	05:48	06:35	07:19 (WEA05)	07:23		08:10 (WEA02)	08:04		08:31
	21:22	20:25	19 07:38 (WEA05)	19:16	25 08:48 (WEA03)	21 08:31 (WEA02)	16:30		16:30
29	05:50	06:37	07:17 (WEA05)	07:25		08:09 (WEA02)	08:05		08:31
	21:20	20:23	21 07:38 (WEA05)	19:14	26 08:47 (WEA03)	23 08:32 (WEA02)	16:29		16:31
30	05:51	06:38	07:17 (WEA05)	07:26		08:08 (WEA02)	08:07		08:31
	21:19	20:21	23 07:40 (WEA05)	19:11	27 08:48 (WEA03)	24 08:32 (WEA02)	16:28		16:31
31	05:53	06:40	07:15 (WEA05)			07:17			08:31
	21:17	20:18	24 07:39 (WEA05)			17:07	24 08:32 (WEA02)		16:32
Sonnenscheinstunden	496	450	380		333		270		250
astr.max.mögl.Beschattung		112	385		371		218		
Red.Sonnenscheinwahrsch.		0,41	0,37		0,27		0,25		
Reduktion Betriebsdauer		0,95	0,95		0,95		0,95		
Reduktion Windrichtung		0,68	0,67		0,66		0,66		
Gesamte Reduktion		0,27	0,24		0,17		0,15		
Met.wahrsch.Beschattung		30	91		63		34		

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP39 - Betzdorfer Str. 2, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31 16:34	08:06 17:20	09:16 (WEA02) 17:20	07:15 18:09	08:21 (WEA03) 20:00	07:51 (WEA05) 20:49
2	08:31 16:35	08:05 17:21	09:19 (WEA02) 18:11	07:13 18:11	08:23 (WEA03) 20:02	07:53 (WEA05) 20:50
3	08:31 16:36	08:03 17:23	09:25 (WEA02) 18:11	07:11 18:12	08:25 (WEA03) 20:04	07:56 (WEA05) 20:52
4	08:31 16:37	08:02 17:25	09:25 (WEA02) 18:14	07:09 18:14	08:40 (WEA03) 20:05	08:04 (WEA05) 20:53
5	08:31 16:38	08:00 17:27	09:25 (WEA02) 18:16	07:07 18:16	08:37 (WEA03) 20:05	08:04 (WEA05) 20:53
6	08:31 16:39	09:13 (WEA02) 17:28	09:16 (WEA02) 18:17	07:05 18:17	08:44 (WEA03) 20:06	08:10 (WEA05) 20:56
7	08:30 16:40	09:10 (WEA02) 17:30	09:18 (WEA02) 18:19	07:03 18:19	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
8	08:30 16:42	09:10 (WEA02) 17:32	09:18 (WEA02) 18:21	07:03 18:21	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
9	08:29 16:43	09:09 (WEA02) 17:34	09:18 (WEA02) 18:22	07:03 18:22	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
10	08:29 16:44	09:08 (WEA02) 17:35	09:18 (WEA02) 18:24	07:03 18:24	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
11	08:28 16:46	09:08 (WEA02) 17:37	09:18 (WEA02) 18:26	07:03 18:26	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
12	08:28 16:47	09:07 (WEA02) 17:39	09:18 (WEA02) 18:27	07:03 18:27	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
13	08:27 16:48	09:07 (WEA02) 17:41	09:18 (WEA02) 18:29	07:03 18:29	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
14	08:26 16:50	09:07 (WEA02) 17:43	09:18 (WEA02) 18:31	07:03 18:31	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
15	08:26 16:51	09:06 (WEA02) 17:44	09:18 (WEA02) 18:32	07:03 18:32	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
16	08:25 16:53	09:07 (WEA02) 17:46	09:18 (WEA02) 18:34	07:03 18:34	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
17	08:24 16:54	09:07 (WEA02) 17:48	09:18 (WEA02) 18:36	07:03 18:36	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
18	08:23 16:56	09:06 (WEA02) 17:50	09:18 (WEA02) 18:38	07:03 18:38	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
19	08:22 16:58	09:06 (WEA02) 17:51	09:18 (WEA02) 18:39	07:03 18:39	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
20	08:21 16:59	09:07 (WEA02) 17:53	09:18 (WEA02) 18:41	07:03 18:41	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
21	08:20 17:01	09:07 (WEA02) 17:55	09:18 (WEA02) 18:42	07:03 18:42	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
22	08:19 17:02	09:07 (WEA02) 17:57	09:18 (WEA02) 18:44	07:03 18:44	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
23	08:18 17:04	09:08 (WEA02) 17:58	09:18 (WEA02) 18:46	07:03 18:46	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
24	08:17 17:06	09:08 (WEA02) 18:00	09:18 (WEA02) 18:47	07:03 18:47	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
25	08:16 17:07	09:08 (WEA02) 18:02	09:18 (WEA02) 18:49	07:03 18:49	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
26	08:15 17:09	09:09 (WEA02) 18:04	09:18 (WEA02) 18:51	07:03 18:51	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
27	08:13 17:11	09:09 (WEA02) 18:05	09:18 (WEA02) 18:52	07:03 18:52	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
28	08:12 17:13	09:11 (WEA02) 18:07	09:18 (WEA02) 18:54	07:03 18:54	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
29	08:11 17:14	09:11 (WEA02) 18:09	09:18 (WEA02) 18:55	07:03 18:55	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
30	08:09 17:16	09:13 (WEA02) 18:11	09:18 (WEA02) 18:57	07:03 18:57	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
31	08:08 17:18	09:14 (WEA02) 18:13	09:18 (WEA02) 18:59	07:03 18:59	08:42 (WEA03) 20:07	08:08 (WEA05) 20:57
Sonnenscheinstunden	264	280	367	414	480	492
astr.max.mögl.Beschattung	503	381	412	42		
Red.Sonnenscheinwahrsch.	0,21	0,30	0,29	0,37		
Reduktion Betriebsdauer	0,95	0,95	0,95	0,95		
Reduktion Windrichtung	0,63	0,67	0,68	0,68		
Gesamte Reduktion	0,12	0,19	0,18	0,24		
Met.wahrsch.Beschattung	62	73	75	10		

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361

SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP39 - Betzdorfer Str. 2, 57518 Steineroth

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	07:19 17:06	08:08 16:27
2	05:20 21:45	05:56 21:14	06:43 20:14	07:29 19:07	07:21 17:04	08:09 16:27
3	05:21 21:45	05:57 21:13	06:44 20:12	07:31 19:05	07:23 17:02	08:11 16:26
4	05:22 21:45	05:59 21:11	06:46 20:10	07:33 19:03	07:24 17:00	08:12 16:26
5	05:22 21:44	06:00 21:09	06:48 20:08	07:34 19:00	07:26 16:59	08:13 16:25
6	05:23 21:44	06:02 21:08	06:49 20:05	07:36 18:58	07:28 16:57	08:14 16:25
7	05:24 21:43	06:03 21:06	06:51 20:03	07:37 18:56	07:29 16:55	08:16 16:25
8	05:25 21:43	06:05 21:04	06:52 20:01	07:39 18:54	07:31 16:54	08:17 16:24
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	07:33 16:52	08:18 16:24
10	05:27 21:41	06:08 21:01	06:55 19:56	07:42 18:49	09:00 (WEA03) 09:13 (WEA03)	08:49 (WEA02) 08:59 (WEA02)
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	08:58 (WEA03) 09:15 (WEA03)	08:45 (WEA02) 09:01 (WEA02)
12	05:29 21:40	06:11 20:57	06:58 19:52	07:46 18:45	08:55 (WEA03) 09:16 (WEA03)	08:44 (WEA02) 09:02 (WEA02)
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	08:54 (WEA03) 09:17 (WEA03)	08:43 (WEA02) 09:03 (WEA02)
14	05:31 21:38	06:14 20:53	07:01 19:47	07:49 18:41	08:53 (WEA03) 09:18 (WEA03)	08:43 (WEA02) 09:04 (WEA02)
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	08:53 (WEA03) 09:19 (WEA03)	08:42 (WEA02) 09:05 (WEA02)
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	08:51 (WEA03) 09:19 (WEA03)	08:42 (WEA02) 09:06 (WEA02)
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	08:51 (WEA03) 09:19 (WEA03)	08:42 (WEA02) 09:06 (WEA02)
18	05:35 21:34	06:20 20:45	07:08 19:38	07:55 18:33	08:51 (WEA03) 09:19 (WEA03)	08:42 (WEA02) 09:06 (WEA02)
19	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:31	08:51 (WEA03) 09:20 (WEA03)	08:42 (WEA02) 09:07 (WEA02)
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:29	08:50 (WEA03) 09:18 (WEA03)	08:42 (WEA02) 09:07 (WEA02)
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	08:51 (WEA03) 09:18 (WEA03)	08:43 (WEA02) 09:08 (WEA02)
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	08:51 (WEA03) 09:18 (WEA03)	08:43 (WEA02) 09:07 (WEA02)
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:23	08:52 (WEA03) 09:17 (WEA03)	08:43 (WEA02) 09:07 (WEA02)
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:21	08:52 (WEA03) 09:16 (WEA03)	08:44 (WEA02) 09:08 (WEA02)
25	05:44 21:26	06:31 20:31	07:18 19:23	08:07 18:19	07:53 (WEA03) 08:15 (WEA03)	08:44 (WEA02) 09:07 (WEA02)
26	05:46 21:25	06:32 20:29	07:20 19:20	08:09 18:17	07:54 (WEA03) 08:13 (WEA03)	08:45 (WEA02) 09:07 (WEA02)
27	05:47 21:23	06:34 20:27	07:22 19:18	08:11 18:15	07:56 (WEA03) 08:11 (WEA03)	08:46 (WEA02) 09:08 (WEA02)
28	05:48 21:22	06:35 20:25	07:23 19:16	08:12 18:13	08:00 (WEA03) 08:09 (WEA03)	08:47 (WEA02) 09:07 (WEA02)
29	05:50 21:20	06:37 20:23	07:25 19:14	08:14 18:11	08:05 16:29	08:48 (WEA02) 09:07 (WEA02)
30	05:51 21:19	06:38 20:21	07:26 19:11	08:16 18:09	08:07 16:28	08:48 (WEA02) 09:06 (WEA02)
31	05:53 21:17	06:40 20:18		08:17 17:07		08:31 16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung			399	434	460	66
Red.Sonnenscheinwahrsch.			0,37	0,27	0,25	0,17
Reduktion Betriebsdauer			0,95	0,95	0,95	0,95
Reduktion Windrichtung			0,68	0,67	0,63	0,63
Gesamte Reduktion			0,24	0,17	0,15	0,10
Met.wahrsch.Beschattung			95	74	68	7

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP40 - Gewerbepark-Betzdorf 2A, 57518 Betzdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31	08:06	09:09 (WEA03)	07:15	07:39 (WEA05)	07:07
	16:34	17:20	09:38 (WEA03)	18:09	08:10 (WEA05)	20:00
2	08:31	08:05	09:09 (WEA03)	07:13	07:39 (WEA05)	07:05
	16:35	17:21	09:37 (WEA03)	18:11	08:10 (WEA05)	20:02
3	08:31	08:03	09:09 (WEA03)	07:11	07:39 (WEA05)	07:03
	16:36	17:23	09:37 (WEA03)	18:12	08:10 (WEA05)	20:04
4	08:31	08:02	09:10 (WEA03)	07:09	07:39 (WEA05)	07:01
	16:37	17:25	09:37 (WEA03)	18:14	08:11 (WEA05)	20:05
5	08:31	08:00	09:10 (WEA03)	07:07	07:38 (WEA05)	06:58
	16:38	17:27	09:36 (WEA03)	18:16	08:09 (WEA05)	20:07
6	08:31	07:59	09:11 (WEA03)	07:05	07:38 (WEA05)	06:56
	16:39	17:28	09:35 (WEA03)	18:17	08:09 (WEA05)	20:08
7	08:30	07:57	09:13 (WEA03)	07:03	07:38 (WEA05)	06:54
	16:40	17:30	09:35 (WEA03)	18:19	08:09 (WEA05)	20:10
8	08:30	07:55	09:14 (WEA03)	07:00	07:39 (WEA05)	06:52
	16:42	17:32	09:34 (WEA03)	18:21	08:08 (WEA05)	20:12
9	08:29	07:54	09:15 (WEA03)	06:58	07:39 (WEA05)	06:50
	16:43	17:34	09:32 (WEA03)	18:22	08:07 (WEA05)	20:13
10	08:29	07:52	09:18 (WEA03)	06:56	07:39 (WEA05)	06:48
	16:44	17:35	09:29 (WEA03)	18:24	08:05 (WEA05)	20:15
11	08:28	07:50		06:54	07:41 (WEA05)	06:45
	16:46	17:37		18:26	08:04 (WEA05)	20:16
12	08:28	07:49		06:52	07:42 (WEA05)	06:43
	16:47	17:39		18:27	08:02 (WEA05)	20:18
13	08:27	07:47		06:50	07:45 (WEA05)	06:41
	16:48	17:41		18:29	07:59 (WEA05)	20:20
14	08:26	07:45		06:47	07:49 (WEA05)	06:39
	16:50	17:43		18:31	07:55 (WEA05)	20:21
15	08:26	07:43		06:45		06:37
	16:51	17:44		18:32		20:23
16	08:25	09:16 (WEA03)	07:41	06:43	06:35	05:40
	16:53	09:23 (WEA03)	17:46	18:34	20:25	21:12
17	08:24	09:14 (WEA03)	07:39	06:41	06:33	05:39
	16:54	09:26 (WEA03)	17:48	18:36	20:26	21:13
18	08:23	09:11 (WEA03)	07:37	06:38	06:31	05:37
	16:56	09:27 (WEA03)	17:50	18:37	20:28	21:15
19	08:22	09:10 (WEA03)	07:35	06:36	06:28	05:36
	16:58	09:28 (WEA03)	17:51	18:39	20:29	21:16
20	08:21	09:10 (WEA03)	07:34	06:34	06:26	05:35
	16:59	09:30 (WEA03)	17:53	18:41	20:31	21:17
21	08:20	09:09 (WEA03)	07:32	06:32	06:24	05:33
	17:01	09:31 (WEA03)	17:55	18:42	20:33	21:19
22	08:19	09:09 (WEA03)	07:30		06:22	05:32
	17:02	09:33 (WEA03)	17:57	07:53 (WEA05)	06:30	
23	08:18	09:09 (WEA03)	07:28	08:01 (WEA05)	18:44	20:34
	17:04	09:34 (WEA03)	17:58	07:51 (WEA05)	06:27	06:20
24	08:17	09:08 (WEA03)	07:26	08:04 (WEA05)	18:46	20:36
	17:06	09:34 (WEA03)	18:00	07:49 (WEA05)	06:25	06:18
25	08:16	09:08 (WEA03)	07:24	08:06 (WEA05)	18:47	20:37
	17:07	09:35 (WEA03)	18:02	07:47 (WEA05)	06:23	06:16
26	08:15	09:08 (WEA03)	07:22	08:08 (WEA05)	18:49	20:39
	17:09	09:36 (WEA03)	18:04	07:45 (WEA05)	06:21	06:14
27	08:13	09:07 (WEA03)	07:19	08:09 (WEA05)	18:51	20:41
	17:11	09:36 (WEA03)	18:05	07:42 (WEA05)	06:18	06:12
28	08:12	09:08 (WEA03)	07:17	08:09 (WEA05)	18:52	20:42
	17:13	09:37 (WEA03)	18:07	07:40 (WEA05)	06:16	06:11
29	08:11	09:07 (WEA03)		08:09 (WEA05)	18:54	20:44
	17:14	09:37 (WEA03)		07:14	07:14	06:09
30	08:09	09:08 (WEA03)		19:55		20:46
	17:16	09:37 (WEA03)		07:12		06:07
31	08:08	09:08 (WEA03)		19:57		20:47
	17:18	09:37 (WEA03)		07:09		05:23
Sonnenscheinstunden	264	280	367		414	480
astr.max.mögl.Beschattung	371	371	364			493
Red.Sonnenscheinwahrsch.	0,21	0,30	0,29			
Reduktion Betriebsdauer	0,95	0,95	0,95			
Reduktion Windrichtung	0,64	0,65	0,67			
Gesamte Reduktion	0,13	0,19	0,18			
Met.wahrsch.Beschattung	46	70	66			

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361

SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP40 - Gewerbepark-Betzdorf 2A, 57518 Betzdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 21:46	05:54 21:16	06:41 20:16	07:28 19:09	08:22 (WEA05) 17:06	08:47 (WEA03) 16:27
2	05:20 21:45	05:56 21:14	06:43 20:14	07:29 19:07	08:20 (WEA05) 17:04	08:45 (WEA03) 16:27
3	05:21 21:45	05:57 21:13	06:44 20:12	07:31 19:05	08:19 (WEA05) 17:02	08:43 (WEA03) 16:26
4	05:22 21:45	05:59 21:11	06:46 20:10	07:33 19:03	08:17 (WEA05) 17:00	08:42 (WEA03) 16:26
5	05:22 21:44	06:00 21:09	06:48 20:08	07:34 19:00	08:16 (WEA05) 16:59	08:40 (WEA03) 16:25
6	05:23 21:44	06:02 21:08	06:49 20:05	07:36 18:58	08:14 (WEA05) 16:57	08:40 (WEA03) 16:25
7	05:24 21:43	06:03 21:06	06:51 20:03	07:37 18:56	08:14 (WEA05) 16:55	08:40 (WEA03) 16:25
8	05:25 21:43	06:04 21:04	06:52 20:01	07:39 18:54	08:14 (WEA05) 16:54	08:39 (WEA03) 16:24
9	05:26 21:42	06:06 21:02	06:54 19:59	07:41 18:52	08:13 (WEA05) 16:52	08:39 (WEA03) 16:24
10	05:27 21:41	06:08 21:01	06:55 19:56	07:42 18:49	08:13 (WEA05) 16:51	08:39 (WEA03) 16:24
11	05:28 21:41	06:09 20:59	06:57 19:54	07:44 18:47	08:13 (WEA05) 16:49	08:40 (WEA03) 16:24
12	05:29 21:40	06:11 20:57	06:58 19:52	07:46 18:45	08:12 (WEA05) 16:48	08:39 (WEA03) 16:24
13	05:30 21:39	06:12 20:55	07:00 19:50	07:47 18:43	08:13 (WEA05) 16:46	08:39 (WEA03) 16:24
14	05:31 21:38	06:14 20:53	07:01 19:47	07:49 18:41	08:14 (WEA05) 16:45	08:40 (WEA03) 16:24
15	05:32 21:37	06:15 20:51	07:03 19:45	07:50 18:39	08:16 (WEA05) 16:44	08:40 (WEA03) 16:24
16	05:33 21:36	06:17 20:49	07:04 19:43	07:52 18:37	08:17 (WEA05) 16:42	08:41 (WEA03) 16:24
17	05:34 21:35	06:18 20:47	07:06 19:41	07:54 18:35	08:19 (WEA05) 16:41	08:42 (WEA03) 16:24
18	05:35 21:34	06:20 20:45	07:08 19:38	07:55 18:33	08:21 (WEA05) 16:40	08:42 (WEA03) 16:24
19	05:37 21:33	06:21 20:43	07:09 19:36	07:57 18:31	08:23 (WEA05) 16:38	08:43 (WEA03) 16:25
20	05:38 21:32	06:23 20:41	07:11 19:34	07:59 18:28	08:24 (WEA05) 16:37	08:44 (WEA03) 16:25
21	05:39 21:31	06:24 20:39	07:12 19:32	08:00 18:26	08:29 (WEA05) 16:36	09:08 (WEA03) 16:25
22	05:40 21:30	06:26 20:37	07:14 19:29	08:02 18:24	08:00 16:35	09:07 (WEA03) 16:26
23	05:42 21:28	06:27 20:35	07:15 19:27	08:04 18:23	07:56 16:34	08:47 (WEA03) 16:26
24	05:43 21:27	06:29 20:33	07:17 19:25	08:05 18:21	07:58 16:33	09:05 (WEA03) 16:27
25	05:44 21:26	06:31 20:31	07:18 19:23	07:07 17:19	07:59 16:32	08:51 (WEA03) 16:28
26	05:46 21:25	06:32 20:29	07:20 19:20	07:09 17:17	08:01 16:31	08:54 (WEA03) 16:28
27	05:47 21:23	06:34 20:27	07:22 19:18	07:11 17:15	08:02 16:30	09:01 (WEA03) 16:29
28	05:48 21:22	06:35 20:25	07:23 19:16	07:12 17:13	08:04 16:30	08:31 16:30
29	05:50 21:20	06:37 20:23	07:25 19:14	07:14 17:11	08:05 16:29	08:31 16:31
30	05:51 21:19	06:38 20:21	07:26 19:11	07:16 17:09	08:07 16:28	08:31 16:31
31	05:53 21:17	06:40 20:18		07:17 17:07	08:51 (WEA03) 08:54 (WEA03)	08:31 16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung			12	500	610	
Red.Sonnenscheinwahrsch.			0,37	0,27	0,25	
Reduktion Betriebsdauer			0,95	0,95	0,95	
Reduktion Windrichtung			0,67	0,67	0,64	
Gesamte Reduktion			0,23	0,17	0,15	
Met.wahrsch.Beschattung			3	85	91	

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP41 - Franz-Josef-Magnus-Straße 12, 57518 Betzdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar		Februar			März	April	Mai	Juni	
1	08:31		08:06		10	09:23 (WEA06)	07:15	07:07	06:05	05:22
	16:34		17:19			09:33 (WEA06)	18:09	20:00	20:49	21:32
2	08:31		08:05				07:13	07:05	06:03	05:21
	16:35		17:21				18:10	20:02	20:50	21:33
3	08:31	09:16 (WEA06)	08:03				07:11	07:03	06:01	05:20
	16:36	6	09:22 (WEA06)	17:23			18:12	20:03	20:52	21:34
4	08:31	09:15 (WEA06)	08:02				07:09	07:01	05:59	05:20
	16:37	9	09:24 (WEA06)	17:25			18:14	20:05	20:53	21:35
5	08:31	09:14 (WEA06)	08:00				07:07	06:58	05:58	05:19
	16:38	11	09:25 (WEA06)	17:27			18:16	20:07	20:55	21:36
6	08:30	09:13 (WEA06)	07:59				07:05	06:56	05:56	05:18
	16:39	14	09:27 (WEA06)	17:28			18:17	20:08	20:57	21:37
7	08:30	09:13 (WEA06)	07:57				07:03	06:54	05:54	05:18
	16:40	14	09:27 (WEA06)	17:30			18:19	20:10	20:58	21:38
8	08:30	09:13 (WEA06)	07:55				07:00	06:52	05:53	05:17
	16:42	16	09:29 (WEA06)	17:32			18:21	20:12	21:00	21:39
9	08:29	09:12 (WEA06)	07:54				06:58	06:50	05:51	05:17
	16:43	18	09:30 (WEA06)	17:34			18:22	20:13	21:01	21:40
10	08:29	09:12 (WEA06)	07:52				06:56	06:47	05:49	05:17
	16:44	18	09:30 (WEA06)	17:35			18:24	20:15	21:03	21:40
11	08:28	09:12 (WEA06)	07:50				06:54	06:45	05:48	05:16
	16:46	20	09:32 (WEA06)	17:37			18:26	20:16	21:04	21:41
12	08:28	09:12 (WEA06)	07:48				06:52	06:43	05:46	05:16
	16:47	21	09:33 (WEA06)	17:39			18:27	20:18	21:06	21:42
13	08:27	09:11 (WEA06)	07:47				06:49	06:41	05:44	05:16
	16:48	22	09:33 (WEA06)	17:41			18:29	20:20	21:07	21:42
14	08:26	09:11 (WEA06)	07:45				06:47	06:39	05:43	05:15
	16:50	23	09:34 (WEA06)	17:43			18:31	20:21	21:09	21:43
15	08:26	09:11 (WEA06)	07:43				06:45	06:37	05:41	05:15
	16:51	24	09:35 (WEA06)	17:44			18:32	20:23	21:10	21:44
16	08:25	09:11 (WEA06)	07:41				06:43	06:35	05:40	05:15
	16:53	24	09:35 (WEA06)	17:46			18:34	20:25	21:12	21:44
17	08:24	09:12 (WEA06)	07:39				06:41	06:33	05:39	05:15
	16:54	25	09:37 (WEA06)	17:48			18:36	20:26	21:13	21:45
18	08:23	09:11 (WEA06)	07:37				06:38	06:30	05:37	05:15
	16:56	25	09:36 (WEA06)	17:50			18:37	20:28	21:15	21:45
19	08:22	09:12 (WEA06)	07:35				06:36	06:28	05:36	05:15
	16:57	25	09:37 (WEA06)	17:51			18:39	20:29	21:16	21:45
20	08:21	09:12 (WEA06)	07:34				06:34	06:26	05:35	05:15
	16:59	26	09:38 (WEA06)	17:53			18:41	20:31	21:17	21:46
21	08:20	09:12 (WEA06)	07:32				06:32	06:24	05:33	05:15
	17:01	26	09:38 (WEA06)	17:55			18:42	20:33	21:19	21:46
22	08:19	09:13 (WEA06)	07:30				06:29	06:22	05:32	05:16
	17:02	25	09:38 (WEA06)	17:57			18:44	20:34	21:20	21:46
23	08:18	09:13 (WEA06)	07:28				06:27	06:20	05:31	05:16
	17:04	26	09:39 (WEA06)	17:58			18:46	20:36	21:21	21:46
24	08:17	09:13 (WEA06)	07:26				06:25	06:18	05:30	05:16
	17:06	25	09:38 (WEA06)	18:00			18:47	20:37	21:23	21:46
25	08:16	09:14 (WEA06)	07:24				06:23	06:16	05:29	05:16
	17:07	24	09:38 (WEA06)	18:02			18:49	20:39	21:24	21:46
26	08:15	09:15 (WEA06)	07:21				06:21	06:14	05:27	05:17
	17:09	24	09:39 (WEA06)	18:04			18:50	20:41	21:25	21:46
27	08:13	09:15 (WEA06)	07:19				06:18	06:12	05:26	05:17
	17:11	23	09:38 (WEA06)	18:05			18:52	20:42	21:26	21:46
28	08:12	09:17 (WEA06)	07:17				06:16	06:11	05:25	05:18
	17:12	21	09:38 (WEA06)	18:07			18:54	20:44	21:28	21:46
29	08:11	09:17 (WEA06)					07:14	06:09	05:24	05:18
	17:14	20	09:37 (WEA06)				19:55	20:45	21:29	21:46
30	08:09	09:19 (WEA06)					07:12	06:07	05:24	05:19
	17:16	17	09:36 (WEA06)				19:57	20:47	21:30	21:46
31	08:08	09:20 (WEA06)					07:09		05:23	
	17:18	14	09:34 (WEA06)				19:59		21:31	
Sonnenscheinstunden	264		280				367	414	480	493
astr.max.mögl.Beschattung	586		10							
Red.Sonnenscheinwahrsch.	0,21		0,30							
Reduktion Betriebsdauer	0,95		0,95							
Reduktion Windrichtung	0,63		0,63							
Gesamte Reduktion	0,12		0,18							
Met.wahrsch.Beschattung	73		2							

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **Schattenrezeptor:** IP41 - Franz-Josef-Magnus-Straße 12, 57518 Betzdorf

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19	05:54	06:41	07:28	07:19	08:08
	21:46	21:16	20:16	19:09	17:06	16:27
2	05:20	05:56	06:43	07:29	07:21	08:09
	21:45	21:14	20:14	19:07	17:04	16:27
3	05:21	05:57	06:44	07:31	07:23	08:11
	21:45	21:13	20:12	19:05	17:02	16:26
4	05:21	05:58	06:46	07:33	07:24	08:12
	21:45	21:11	20:10	19:03	17:00	16:26
5	05:22	06:00	06:47	07:34	07:26	08:13
	21:44	21:09	20:07	19:00	16:59	16:25
6	05:23	06:01	06:49	07:36	07:28	08:14
	21:44	21:08	20:05	18:58	16:57	16:25
7	05:24	06:03	06:51	07:37	07:29	08:16
	21:43	21:06	20:03	18:56	16:55	16:24
8	05:25	06:04	06:52	07:39	07:31	08:17
	21:43	21:04	20:01	18:54	16:54	16:24
9	05:26	06:06	06:54	07:41	07:33	08:18
	21:42	21:02	19:59	18:52	16:52	16:24
10	05:27	06:07	06:55	07:42	07:35	08:19
	21:41	21:01	19:56	18:49	16:51	16:24
11	05:28	06:09	06:57	07:44	07:36	08:20
	21:41	20:59	19:54	18:47	16:49	16:24
12	05:29	06:10	06:58	07:46	07:38	08:21
	21:40	20:57	19:52	18:45	16:48	16:23
13	05:30	06:12	07:00	07:47	07:40	08:22
	21:39	20:55	19:50	18:43	16:46	16:23
14	05:31	06:14	07:01	07:49	07:41	08:23
	21:38	20:53	19:47	18:41	16:45	16:23
15	05:32	06:15	07:03	07:50	07:43	08:24
	21:37	20:51	19:45	18:39	16:43	16:24
16	05:33	06:17	07:04	07:52	07:45	08:25
	21:36	20:49	19:43	18:37	16:42	16:24
17	05:34	06:18	07:06	07:54	07:46	08:26
	21:35	20:47	19:41	18:35	16:41	16:24
18	05:35	06:20	07:08	07:55	07:48	08:26
	21:34	20:45	19:38	18:33	16:40	16:24
19	05:37	06:21	07:09	07:57	07:50	08:27
	21:33	20:43	19:36	18:30	16:38	16:24
20	05:38	06:23	07:11	07:59	07:51	08:28
	21:32	20:41	19:34	18:28	16:37	16:25
21	05:39	06:24	07:12	08:00	07:53	08:28
	21:31	20:39	19:32	18:26	16:36	16:25
22	05:40	06:26	07:14	08:02	07:54	08:29
	21:30	20:37	19:29	18:24	16:35	16:26
23	05:42	06:27	07:15	08:04	07:56	08:29
	21:28	20:35	19:27	18:22	16:34	16:26
24	05:43	06:29	07:17	08:05	07:58	08:30
	21:27	20:33	19:25	18:20	16:33	16:27
25	05:44	06:30	07:18	08:07	07:59	08:30
	21:26	20:31	19:23	17:19	16:32	16:27
26	05:46	06:32	07:20	08:09	08:01	08:30
	21:25	20:29	19:20	17:17	16:31	16:28
27	05:47	06:34	07:22	08:11	08:02	08:31
	21:23	20:27	19:18	17:15	16:30	16:29
28	05:48	06:35	07:23	08:12	08:04	08:31
	21:22	20:25	19:16	17:13	16:29	16:30
29	05:50	06:37	07:25	08:14	08:05	08:31
	21:20	20:23	19:14	17:11	16:29	16:30
30	05:51	06:38	07:26	08:16	08:07	08:31
	21:19	20:21	19:11	17:09	16:28	16:31
31	05:53	06:40		07:17		08:31
	21:17	20:18		17:07		16:32
Sonnenscheinstunden	496	450	380	333	270	250
astr.max.mögl.Beschattung					469	130
Red.Sonnenscheinwahrsch.					0,25	0,17
Reduktion Betriebsdauer					0,95	0,95
Reduktion Windrichtung					0,63	0,63
Gesamte Reduktion					0,15	0,10
Met.wahrsch.Beschattung					69	13

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierte Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

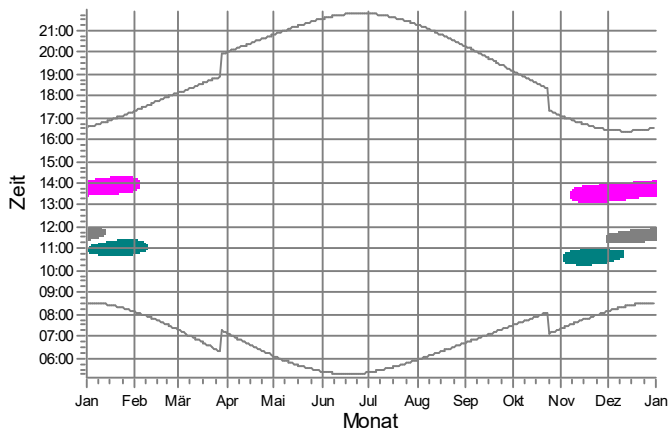
17.10.2023 09:23/3.6.361



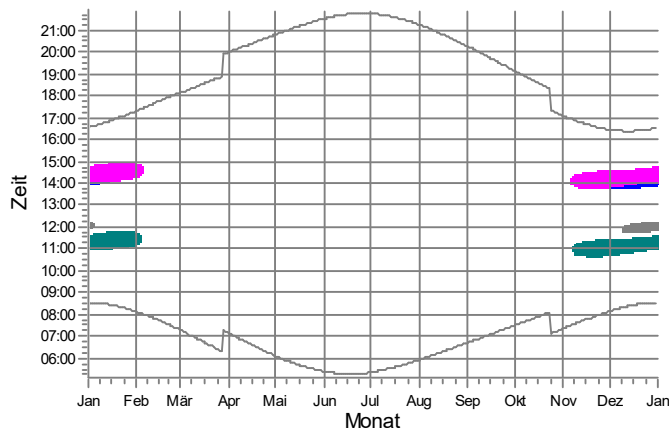
SHADOW - Grafischer Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

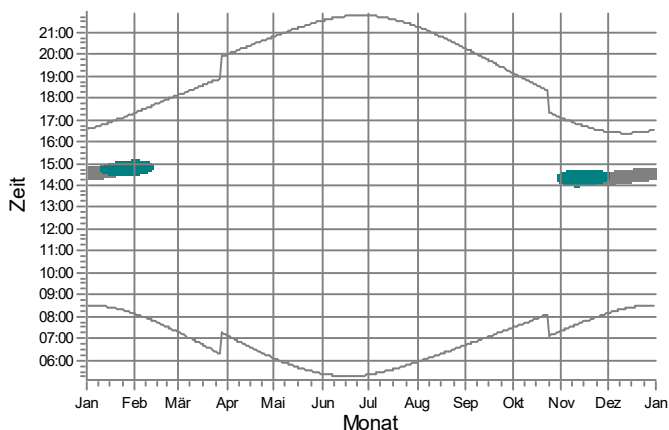
IP01: Lindenstraße 35, 57518 Alsdorf



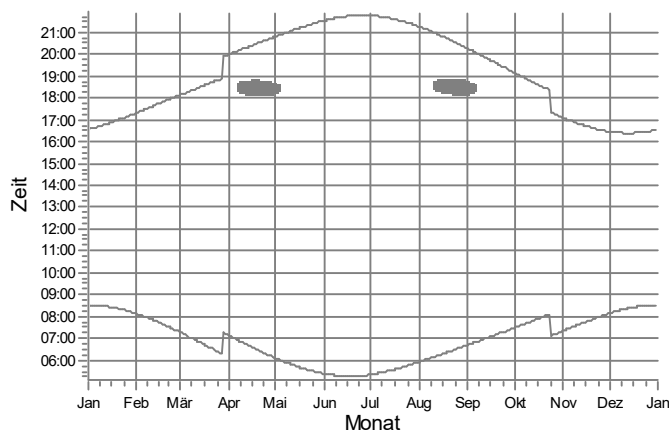
IP02: Am Arsberg 62, 57518 Alsdorf



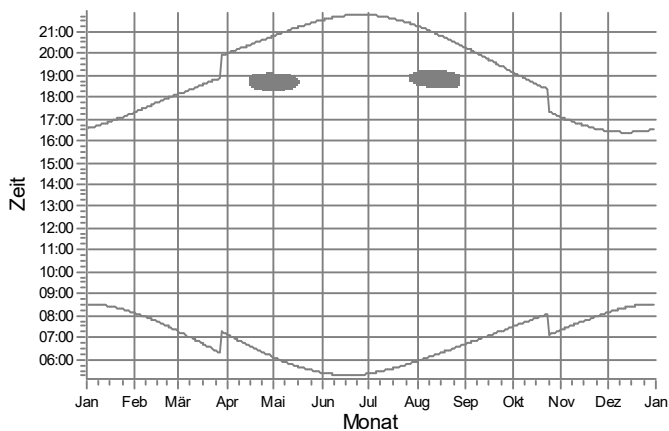
IP03: Schutzbacher Weg 81, 57518 Alsdorf



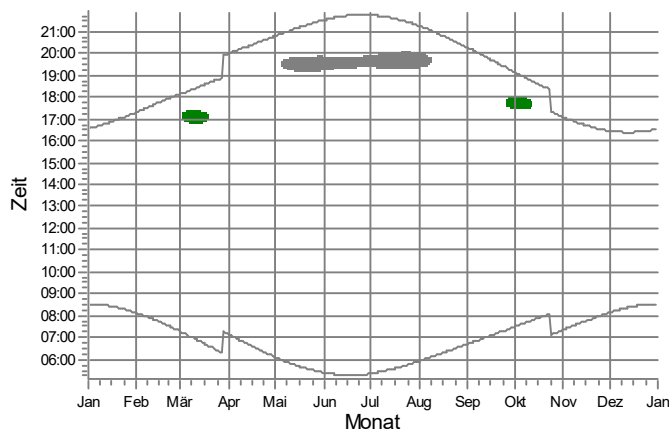
IP04: Auf dem Ebenhahn 1, 57520 Schutzbach



IP05: Auf dem Ebenhahn 25, 57520 Schutzbach



IP06: Im Stangenwald 3, 57520 Schutzbach



WEA

	WEA01: E-175 EP5; 162 m		WEA04: E-175 EP5; 162 m		WEA06: E-175 EP5; 162 m
	WEA03: E-175 EP5; 162 m		WEA05: E-175 EP5; 162 m		

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziertes Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

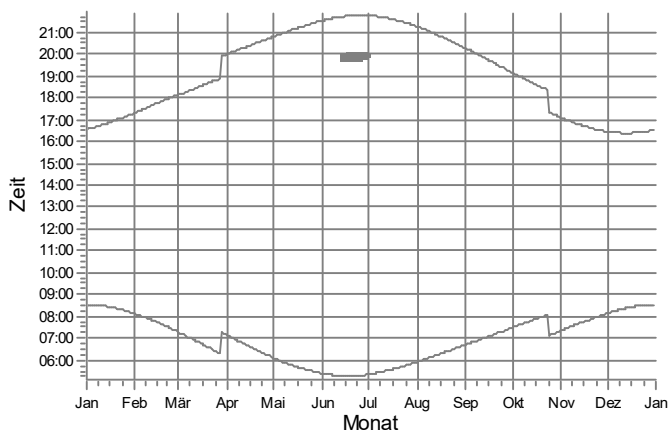
17.10.2023 09:23/3.6.361



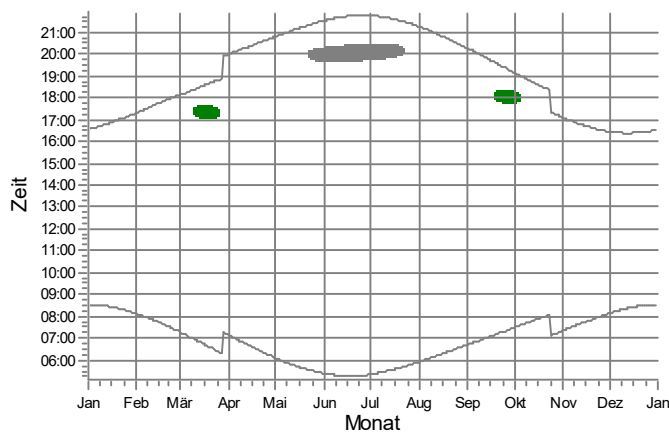
SHADOW - Grafischer Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

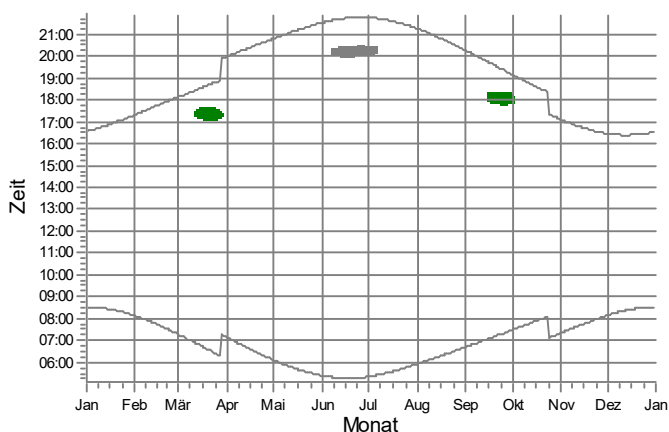
IP07: Zur Grünen Au 7, 57520 Schutzbach



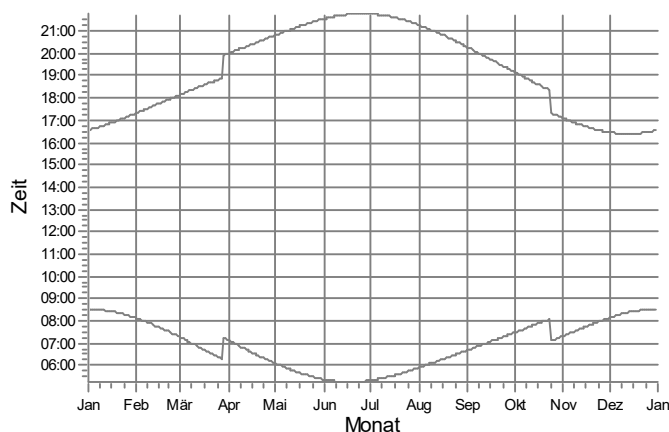
IP08: Auf d. Bühnhardt 6, 57520 Schutzbach



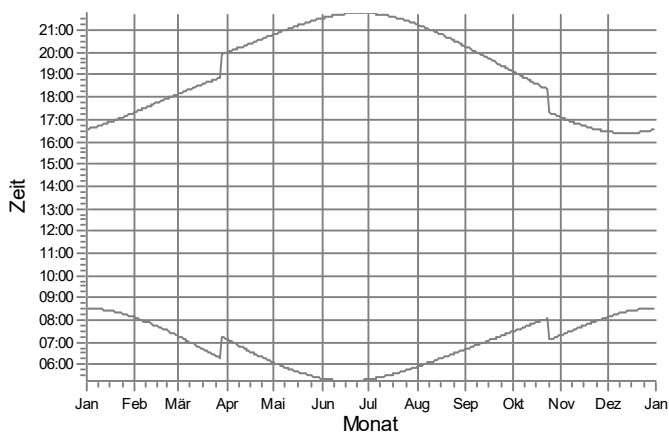
IP09: Auf d. Bühnhardt 2, 57520 Schutzbach



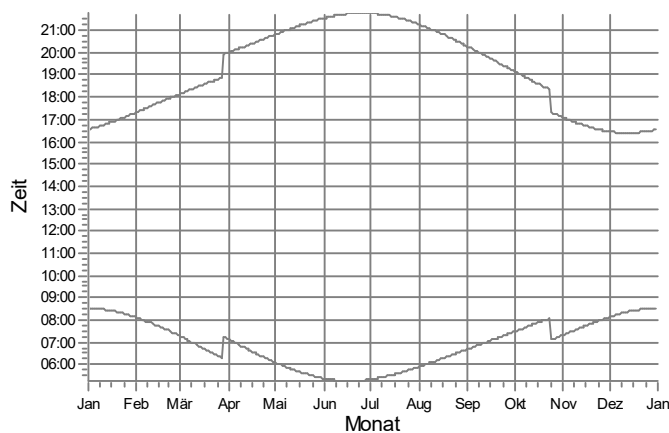
IP10: In d. Eichwies 2, 57520 Schutzbach



IP11: In d. Eichwies 27, 57520 Schutzbach



IP12: In d. Eichwies 23, 57520 Schutzbach



WEA



WEA01: E-175 EP5; 162 m



WEA04: E-175 EP5; 162 m

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

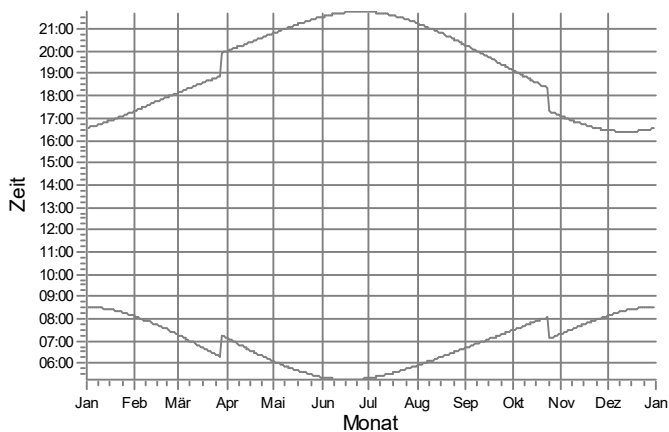
windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:
17.10.2023 09:23/3.6.361



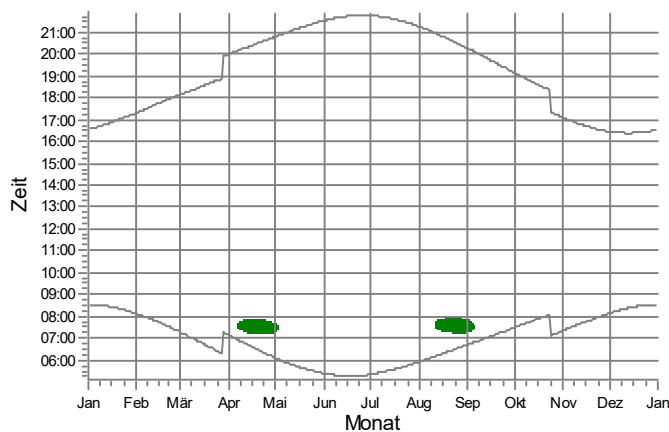
SHADOW - Grafischer Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

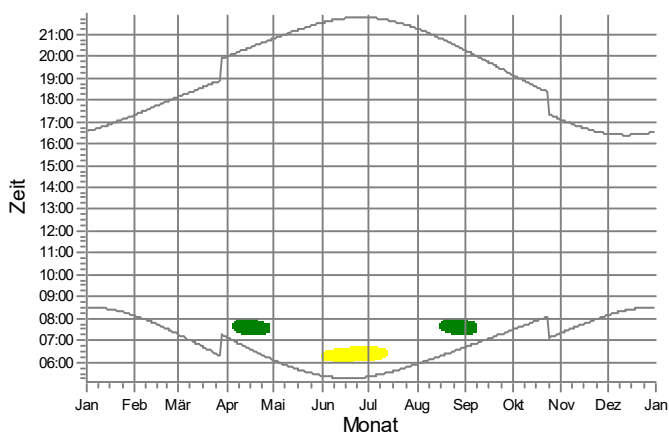
IP13: Neue Str. 63, 57520 Kausen



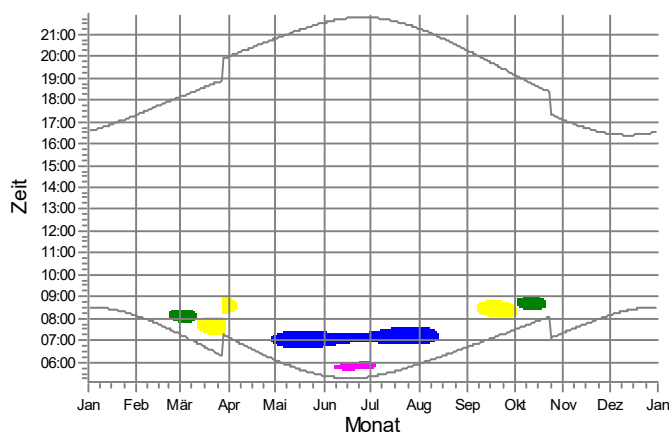
IP14: Lärchenweg 13, 57520 Molzhain



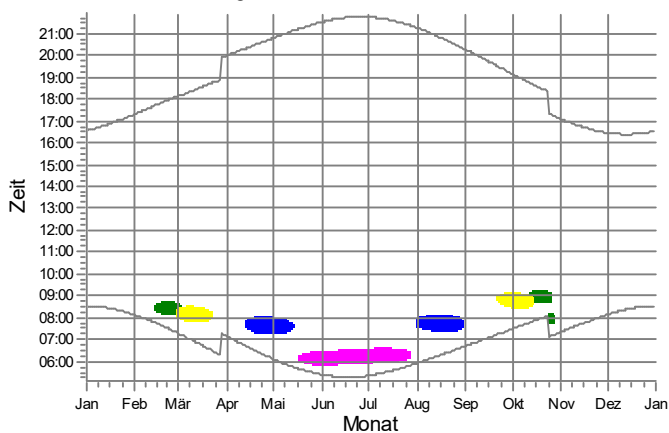
IP15: Auf d. Höhe 25, 57520 Molzhain



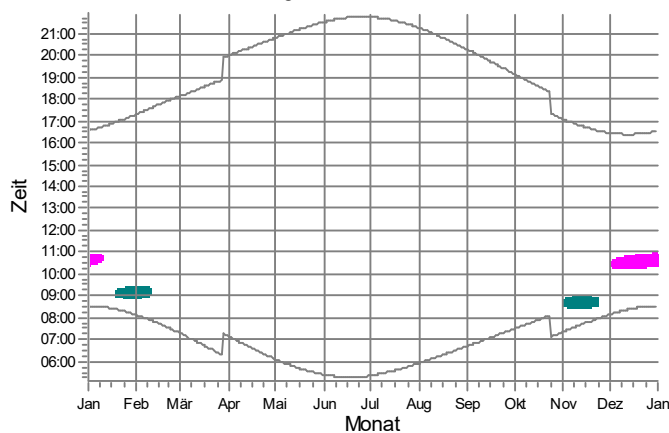
IP16: Lindentalstraße 42, 57518 Steineroth



IP17: Peter-Hellinghausen-Straße 41, 57518 Steineroth



IP18: Franz-Josef-Magnus-Straße 26, 57518 Betzdorf



WEA

	WEA01: E-175 EP5; 162 m		WEA03: E-175 EP5; 162 m		WEA06: E-175 EP5; 162 m
	WEA02: E-175 EP5; 162 m		WEA05: E-175 EP5; 162 m		

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

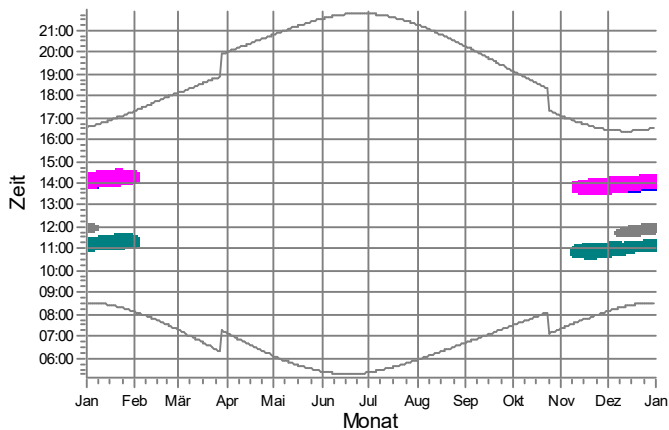
17.10.2023 09:23/3.6.361



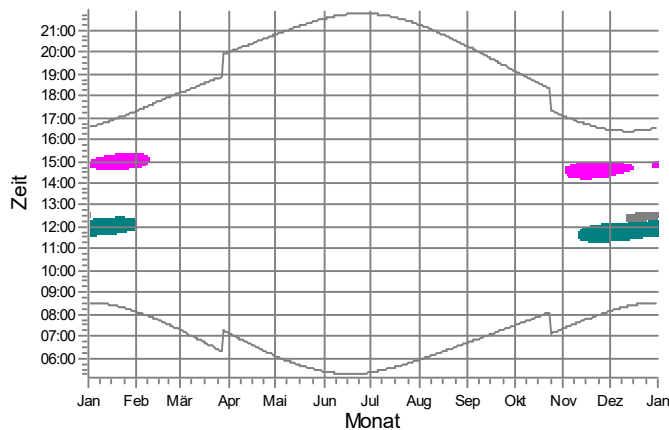
SHADOW - Grafischer Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

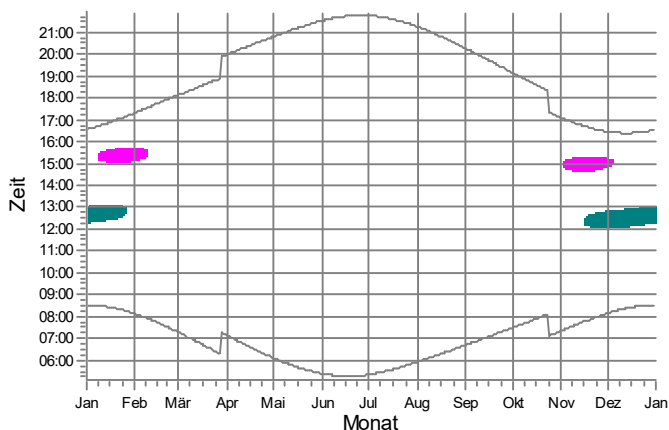
IP19: Lerchenweg 12, 57518 Alsdorf



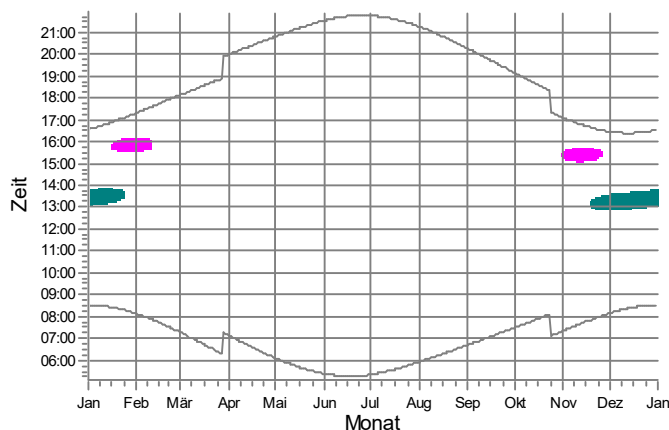
IP20: Am Arsberg 46, 57518 Alsdorf



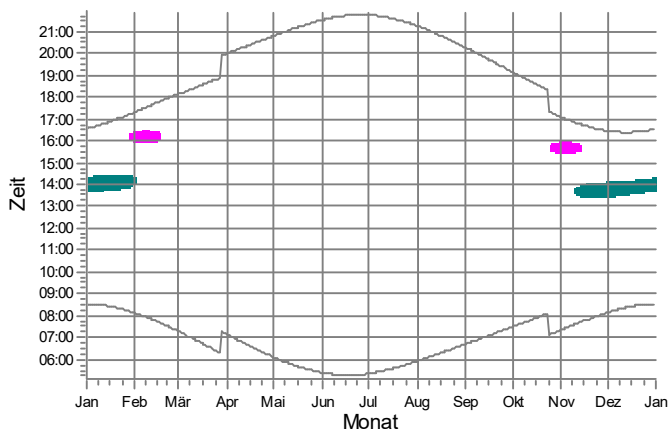
IP21: Am Arsberg 26, 57518 Alsdorf



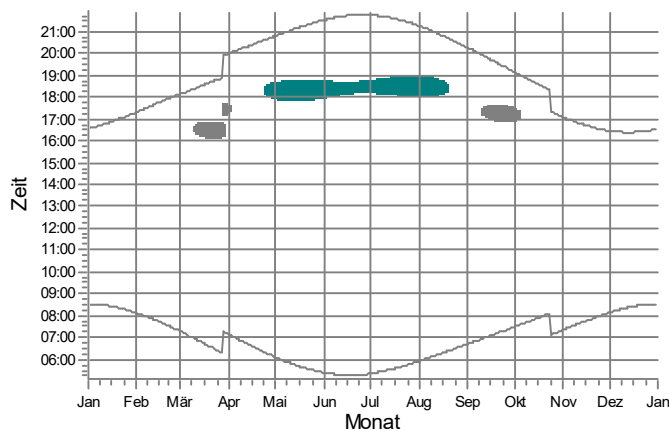
IP22: Am Krahstück 31, 57518 Alsdorf



IP23: Rehzugstraße 5, 57518 Alsdorf



IP24: Am bhf Schutzbach 2, 57518 Alsdorf



WEA



WEA03: E-175 EP5; 162 m

WEA04: E-175 EP5; 162 m



WEA05: E-175 EP5; 162 m

WEA06: E-175 EP5; 162 m

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

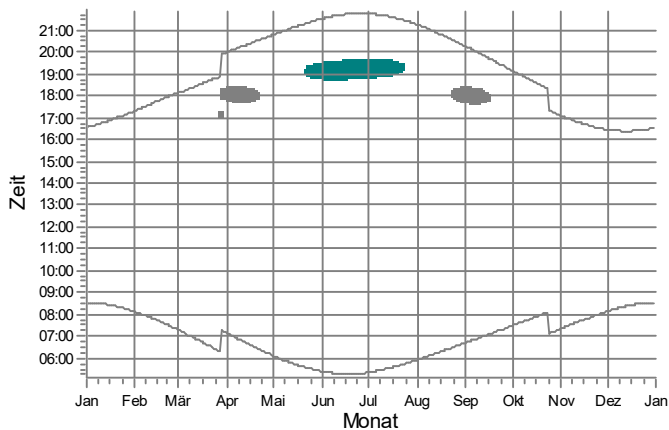
17.10.2023 09:23/3.6.361



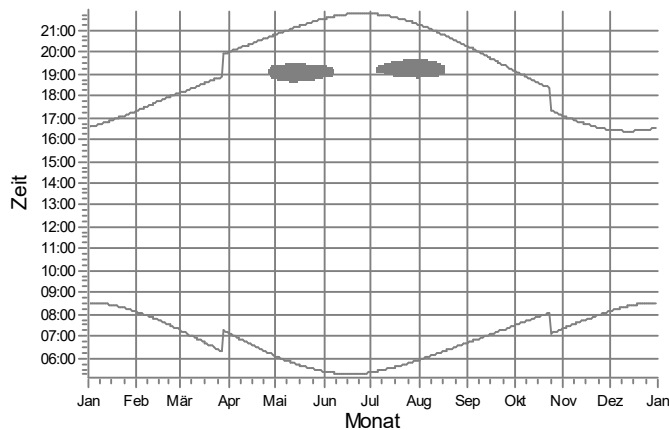
SHADOW - Grafischer Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

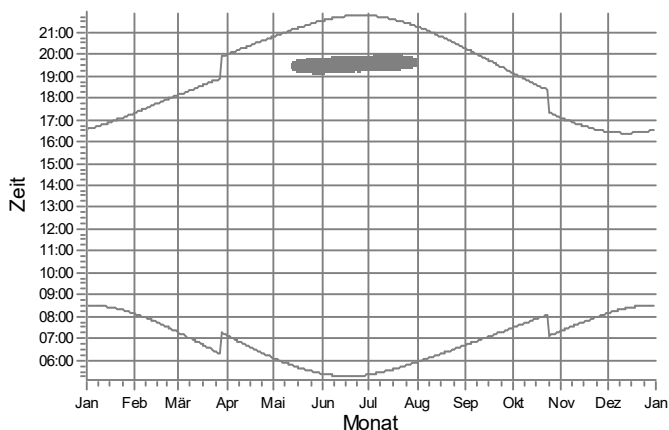
IP25: Bahnhofsweg 1, 57520 Schutzbach



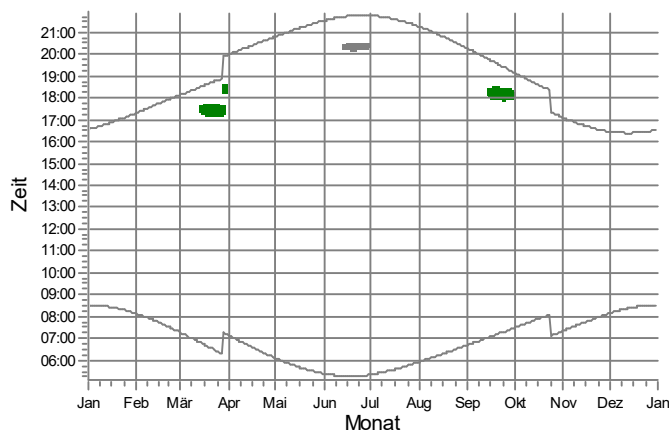
IP26: Auf dem Ebenhahn 17, 57520 Schutzbach



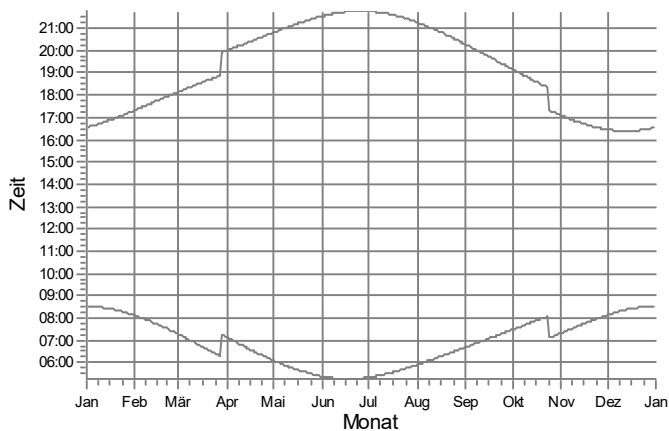
IP27: Schulstraße 22, 57520 Schutzbach



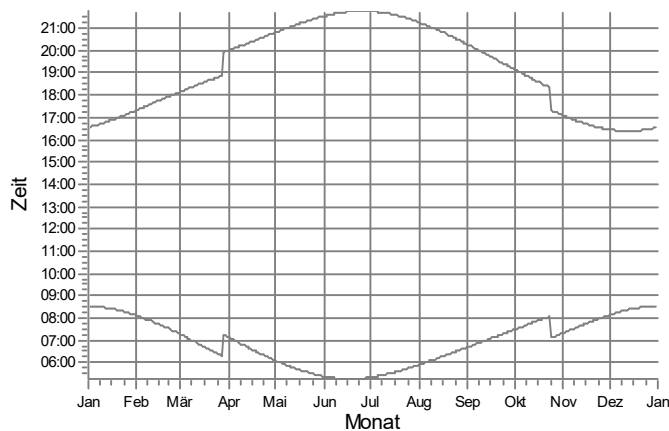
IP28: Auf d. Bühnhardt 23, 57520 Schutzbach



IP29: Zur Grünen Au 9, 57520 Schutzbach



IP30: In d. Eichwies 6, 57520 Schutzbach



WEA



WEA01: E-175 EP5; 162 m



WEA04: E-175 EP5; 162 m



WEA06: E-175 EP5; 162 m

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenziierter Anwender:

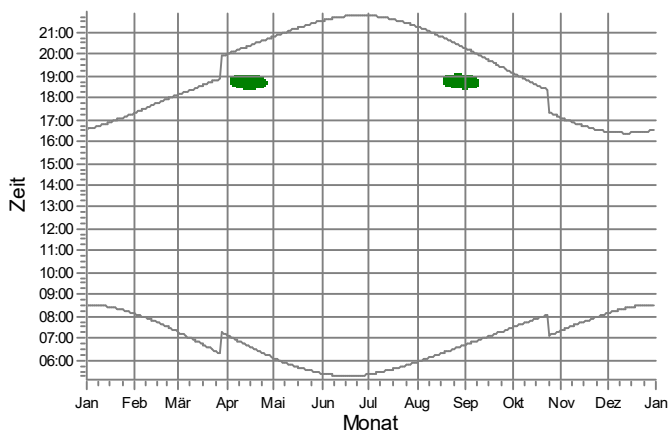
windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:
17.10.2023 09:23/3.6.361



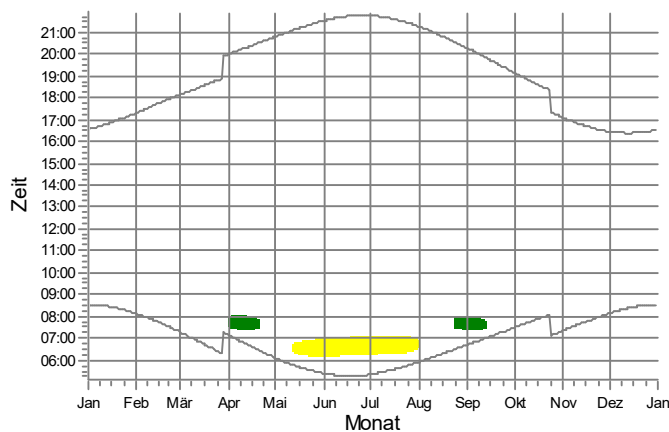
SHADOW - Grafischer Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

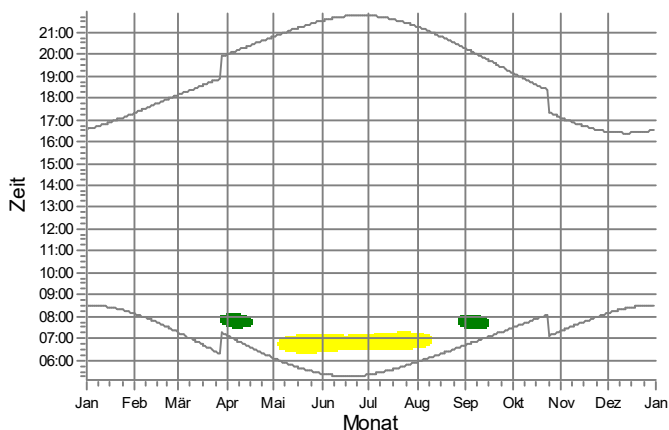
IP31: In d. Eichwies 11, 57520 Schutzbach



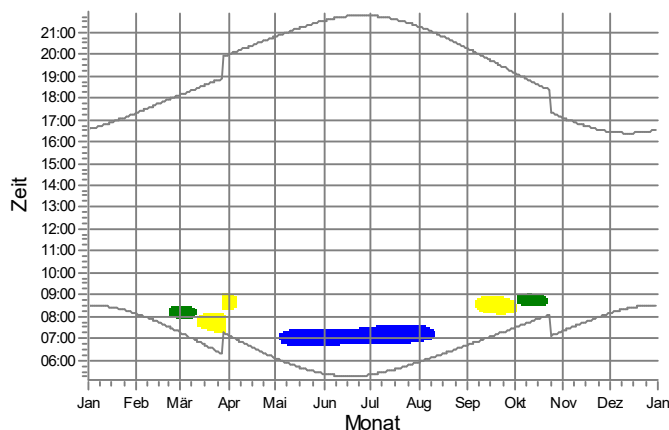
IP32: Auf d. Höhe 13, 57520 Molzhain



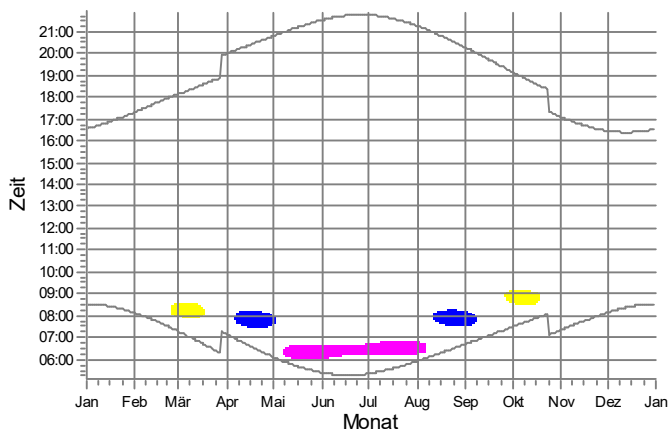
IP33: Oberbergstraße 29, 57520 Molzhain



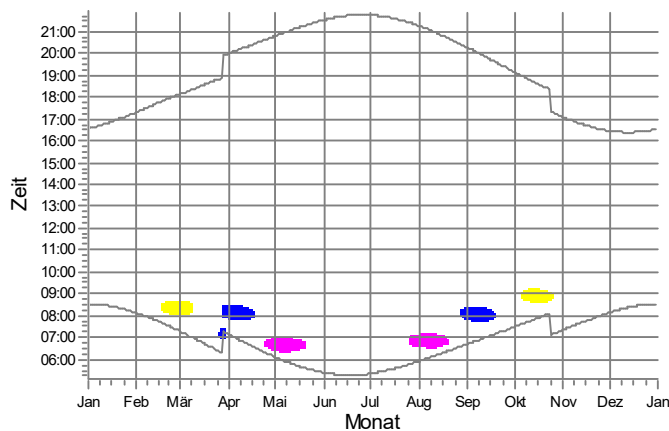
IP34: Lindentalstraße, 57518 Steineroth



IP35: Peter-Hellinghausen-Straße 31, 57518 Steineroth



IP36: Peter-Hellinghausen-Straße 17, 57518 Steineroth



WEA

 WEA01: E-175 EP5; 162 m
 WEA02: E-175 EP5; 162 m

 WEA03: E-175 EP5; 162 m
 WEA05: E-175 EP5; 162 m

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierte Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

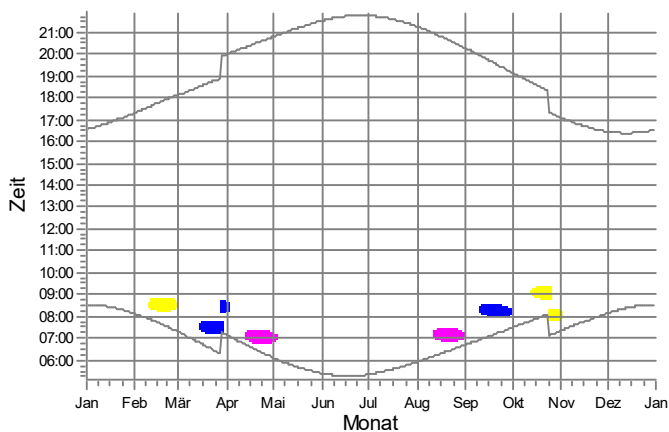
17.10.2023 09:23/3.6.361



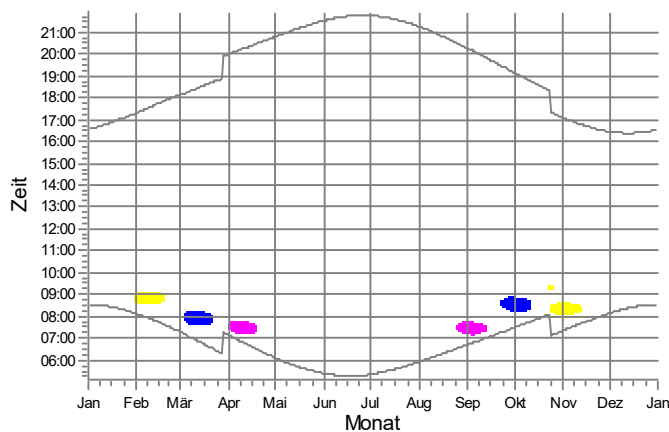
SHADOW - Grafischer Kalender

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

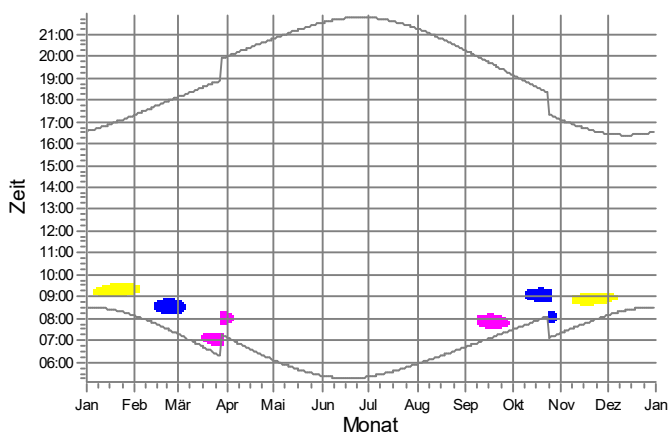
IP37: Weiherstraße 6, 57518 Steineroth



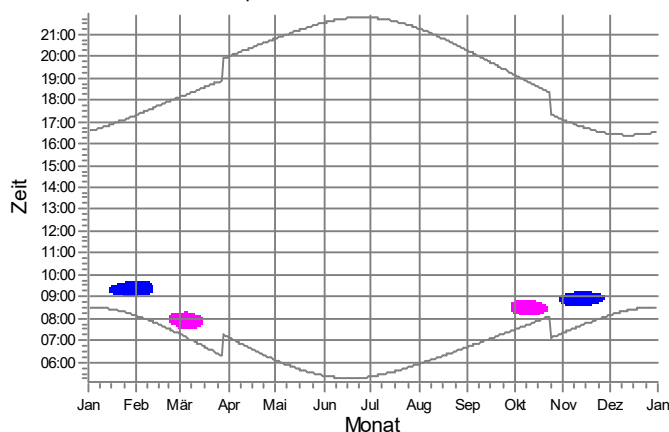
IP38: Betzdorfer Str. 1, 57518 Steineroth



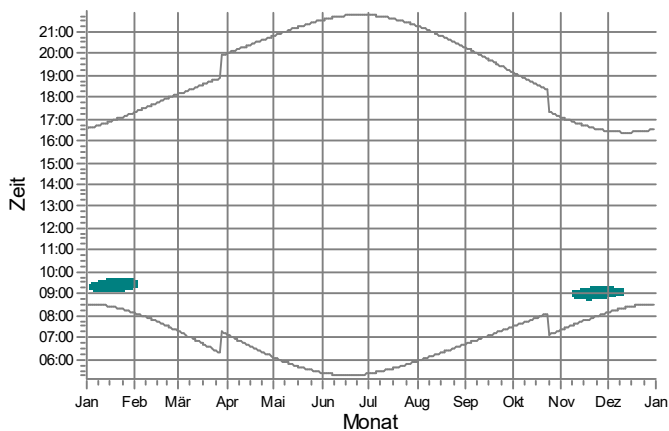
IP39: Betzdorfer Str. 2, 57518 Steineroth



IP40: Gew erbpark-Betzdorf 2A, 57518 Betzdorf



IP41: Franz-Josef-Magnus-Straße 12, 57518 Betzdorf



WEA



WEA02: E-175 EP5; 162 m

WEA03: E-175 EP5; 162 m



WEA05: E-175 EP5; 162 m

WEA06: E-175 EP5; 162 m

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA01 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31 16:34	08:06 17:19	07:15 07:55-08:31/36 18:09	07:07 07:38-08:01/23 20:00	06:05 07:25-07:31/6 20:49	05:22 21:32
2	08:31 16:35	08:05 17:21	07:13 07:55-08:25/30 18:10	07:05 07:36-08:01/25 20:02	06:03 20:50	05:21 21:33
3	08:31 16:36	08:03 17:23	07:11 07:55-08:25/30 18:12 17:03-17:12/9	07:03 07:34-08:02/28 20:03	06:01 20:52	05:20 21:34
4	08:31 16:37	08:02 17:25	07:09 07:55-08:24/29 18:14 17:00-17:14/14	07:01 07:33-08:02/29 20:05 18:44-18:51/7	05:59 20:53	05:20 21:35
5	08:31 16:38	08:00 17:27	07:07 07:55-08:23/28 18:16 16:58-17:16/18	06:58 07:30-08:02/32 20:07 18:39-18:54/15	05:58 20:55	05:19 21:36
6	08:30 16:39	07:59 17:28	07:05 07:55-08:22/27 18:17 16:57-17:17/20	06:56 07:30-08:02/32 20:08 18:37-18:56/19	05:56 20:56	05:19 21:37
7	08:30 16:40	07:57 17:30	07:02 07:56-08:21/25 18:19 16:56-17:17/21	06:54 07:28-08:01/33 20:10 18:35-18:58/23	05:54 20:58	05:18 21:38
8	08:30 16:42	07:55 17:32	07:00 07:58-08:19/21 18:21 16:55-17:18/23	06:52 07:26-08:01/35 20:12 18:34-18:59/25	05:53 21:00	05:17 21:39
9	08:29 16:43	07:54 17:34	06:58 08:00-08:17/17 18:22 16:54-17:17/23	06:50 07:25-08:00/35 20:13 18:32-19:00/28	05:51 21:01	05:17 21:40
10	08:29 16:44	07:52 17:35	06:56 08:02-08:13/11 16:54-17:17/23 18:24 17:18-17:27/9	06:47 07:24-08:00/36 20:15 18:32-19:00/28	05:49 21:03	05:17 21:40
11	08:28 16:46	07:50 17:37	06:54 16:54-17:30/36 18:26	06:45 07:22-07:59/37 20:16 18:30-19:00/30	05:48 21:04	05:16 21:41
12	08:28 16:47	07:48 17:39	06:52 16:55-17:31/36 18:27	06:43 07:19-07:56/37 20:18 18:29-19:00/31	05:46 21:06	05:16 21:42
13	08:27 16:48	07:47 17:41	06:49 16:55-17:33/38 18:29	06:41 07:18-07:55/37 20:20 18:29-19:00/31	05:45 21:07	05:16 21:42
14	08:26 16:50	07:45 08:25-08:30/5 17:43	06:47 16:55-17:33/38 18:31	06:39 07:17-07:53/36 20:21 18:29-19:00/31	05:43 21:09	05:16 21:43
15	08:26 16:51	07:43 08:21-08:33/12 17:44	06:45 16:56-17:36/40 18:32	06:37 07:16-07:52/36 20:23 18:29-19:00/31	05:42 21:10	05:15 21:43
16	08:25 16:53	07:41 08:19-08:35/16 17:46	06:43 16:58-17:38/40 18:34	06:35 07:16-07:51/35 20:24 18:29-18:59/30	05:40 21:12	05:15 21:44
17	08:24 16:54	07:39 08:18-08:36/18 17:48	06:41 17:09-17:39/30 18:36 17:02-17:08/6	06:33 07:15-07:51/36 20:26 18:29-18:59/30	05:39 21:13	05:15 21:44
18	08:23 16:56	07:37 08:17-08:37/20 17:50	06:38 17:08-17:39/31 18:37	06:30 07:15-07:50/35 20:28 18:29-18:58/29	05:37 21:14	05:15 21:45
19	08:22 16:58	07:35 08:16-08:38/22 17:51	06:36 17:08-17:39/31 18:39	06:28 07:14-07:50/36 20:29 18:30-18:57/27	05:36 21:16	05:15 21:45
20	08:21 16:59	07:33 08:15-08:38/23 17:53	06:34 17:09-17:40/31 18:41	06:26 18:31-18:56/25 20:31 07:14-07:49/35	05:35 21:17	05:15 21:45
21	08:20 17:01	07:31 08:15-08:39/24 17:55	06:32 17:09-17:40/31 18:42	06:24 18:31-18:55/24 20:33 07:14-07:48/34	05:33 21:19	05:15 21:46
22	08:19 17:02	07:29 08:07-08:39/32 17:57	06:29 17:08-17:39/31 18:44	06:22 18:33-18:53/20 20:34 07:14-07:47/33	05:32 21:20	05:16 21:46
23	08:18 17:04	07:27 08:03-08:39/36 17:58	06:27 17:09-17:39/30 18:46	06:20 18:34-18:52/18 20:36 07:14-07:45/31	05:31 21:21	05:16 21:46
24	08:17 17:06	07:25 08:01-08:38/37 18:00	06:25 17:09-17:38/29 18:47	06:18 18:36-18:49/13 20:37 07:14-07:44/30	05:30 21:23	05:16 21:46
25	08:16 17:07	07:23 07:59-08:38/39 18:02	06:23 17:10-17:37/27 18:49	06:16 18:42-18:43/1 20:39 07:15-07:43/28	05:29 21:24	05:17 21:46
26	08:14 17:09	07:21 07:58-08:37/39 18:04	06:21 17:11-17:36/25 18:50	06:14 07:16-07:43/27 20:41	05:28 21:25	05:17 21:46
27	08:13 17:11	07:19 07:56-08:35/39 18:05	06:18 17:13-17:34/21 18:52	06:12 07:17-07:41/24 20:42	05:27 21:26	05:17 21:46
28	08:12 17:13	07:17 07:56-08:33/37 18:07	06:16 17:17-17:33/16 18:54	06:11 07:18-07:39/21 20:44	05:26 21:28	05:18 21:46
29	08:10 17:14		07:14 07:46-07:56/10 19:55 18:19-18:30/11	06:09 07:19-07:37/18 20:45	05:25 21:29	05:18 21:46
30	08:09 17:16		07:12 07:43-07:59/16 19:57	06:07 07:21-07:35/14 20:47	05:24 21:30	05:19 21:46
31	08:08 17:18		07:09 07:40-07:59/19 19:59		05:23 21:31	
Sonnenscheinstunden	264	280	367	414	480	492
Anzahl Minuten mit Schatten	0	399	1037	1444	6	0

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA01 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Juli		August		September		Oktober		November		Dezember
1	05:19	05:54	05:19	05:54	06:41	07:21-07:58/37	07:28	17:34-18:11/37	07:19	07:19	08:08
	21:46	21:16	21:46	21:16	20:16	18:30-19:00/30	19:09		17:06	17:06	16:27
2	05:20	05:56	05:20	05:56	06:43	07:22-07:58/36	07:29	17:33-18:09/36	07:21	07:21	08:09
	21:45	21:14	21:45	21:14	20:14	18:30-18:58/28	19:07		17:04	17:04	16:27
3	05:21	05:57	05:21	05:57	06:44	07:23-07:58/35	07:31	17:32-18:06/34	07:22	07:22	08:10
	21:45	21:12	21:45	21:12	20:12	18:30-18:58/28	19:05		17:02	17:02	16:26
4	05:22	05:59	05:22	05:59	06:46	07:23-07:58/35	07:33	08:38-08:53/15	07:24	07:24	08:12
	21:45	21:11	21:45	21:11	20:10	18:31-18:56/25	19:02	17:32-17:55/23	17:00	17:00	16:26
5	05:22	06:00	05:22	06:00	06:47	07:25-07:58/33	07:34	08:35-08:56/21	07:26	07:26	08:13
	21:44	21:09	21:44	21:09	20:07	18:31-18:54/23	19:00	17:32-17:55/23	16:59	16:59	16:25
6	05:23	06:01	05:23	06:01	06:49	07:26-07:58/32	07:36	08:33-08:56/23	07:28	07:28	08:14
	21:44	21:07	21:44	21:07	20:05	18:33-18:52/19	18:58	17:32-17:54/22	16:57	16:57	16:25
7	05:24	06:03	05:24	06:03	06:51	07:27-07:58/31	07:37	08:32-08:57/25	07:29	07:29	08:16
	21:43	21:06	21:43	21:06	20:03	18:34-18:49/15	18:56	17:32-17:53/21	16:55	16:55	16:25
8	05:25	06:04	05:25	06:04	06:52	07:27-07:57/30	07:39	08:31-08:58/27	07:31	07:31	08:17
	21:43	21:04	21:43	21:04	20:01	18:38-18:46/8	18:54	17:33-17:52/19	16:54	16:54	16:24
9	05:26	06:06	05:26	06:06	06:54	07:28-07:56/28	07:41	08:30-08:58/28	07:33	07:33	08:18
	21:42	21:02	21:42	21:02	19:59		18:52	17:34-17:50/16	16:52	16:52	16:24
10	05:27	06:07	05:27	06:07	06:55	07:29-07:55/26	07:42	08:29-08:59/30	07:34	07:34	08:19
	21:41	21:00	21:41	21:00	19:56		18:49	17:36-17:48/12	16:51	16:51	16:24
11	05:28	06:09	05:28	06:09	06:57	07:31-07:54/23	07:44	08:29-08:59/30	07:36	07:36	08:20
	21:40	20:59	21:40	20:59	19:54		18:47	17:40-17:44/4	16:49	16:49	16:24
12	05:29	06:11	05:29	06:11	06:58	07:32-07:52/20	07:45	08:28-09:02/34	07:38	07:38	08:21
	21:40	20:57	21:40	20:57	19:52		18:45		16:48	16:48	16:24
13	05:30	06:12	05:30	06:12	07:00	07:34-07:50/16	07:47	08:29-09:05/36	07:40	07:40	08:22
	21:39	20:55	21:39	20:55	19:50		18:43		16:46	16:46	16:24
14	05:31	06:14	05:31	06:14	07:01	07:35-07:47/12	07:49	08:29-09:07/38	07:41	07:41	08:23
	21:38	20:53	21:38	20:53	19:47	18:10-18:20/10	18:41		16:45	16:45	16:24
15	05:32	06:15	05:32	06:15	07:03	18:07-18:22/15	07:50	08:30-09:09/39	07:43	07:43	08:24
	21:37	20:51	21:37	20:51	19:45		18:39		16:44	16:44	16:24
16	05:33	06:17	05:33	06:17	07:04	18:03-18:23/20	07:52	08:30-09:09/39	07:45	07:45	08:25
	21:36	20:49	21:36	20:49	19:43		18:37		16:42	16:42	16:24
17	05:34	06:18	05:34	06:18	07:06	18:00-18:24/24	07:54	08:31-09:09/38	07:46	07:46	08:25
	21:35	20:47	21:35	20:47	19:41		18:35		16:41	16:41	16:24
18	05:35	06:20	05:35	06:20	07:07	17:58-18:25/27	07:55	08:33-09:10/37	07:48	07:48	08:26
	21:34	20:45	21:34	20:45	19:38		18:33		16:40	16:40	16:24
19	05:37	06:21	05:37	06:21	07:09	17:56-18:24/28	07:57	08:35-09:10/35	07:49	07:49	08:27
	21:33	20:43	21:33	20:43	19:36		18:30		16:38	16:38	16:25
20	05:38	06:23	05:38	06:23	07:11	17:55-18:25/30	07:59	08:40-09:09/29	07:51	07:51	08:27
	21:32	20:41	21:32	20:41	19:34		18:28		16:37	16:37	16:25
21	05:39	06:24	05:39	06:24	07:12	17:54-18:24/30	08:00	08:46-09:09/23	07:53	07:53	08:28
	21:31	20:39	21:31	20:39	19:32		18:26		16:36	16:36	16:25
22	05:40	06:26	05:40	06:26	07:14	17:53-18:24/31	08:02	08:46-09:09/23	07:54	07:54	08:29
	21:30	20:37	21:30	20:37	19:29		18:24		16:35	16:35	16:26
23	05:42	06:27	05:42	06:27	07:15	17:53-18:24/31	08:04	08:47-09:08/21	07:56	07:56	08:29
	21:28	20:35	21:28	20:35	19:27		18:22		16:34	16:34	16:26
24	05:43	06:29	05:43	06:29	07:17	17:52-18:23/31	08:05	08:46-09:07/21	07:57	07:57	08:30
	21:27	20:33	21:27	20:33	19:25		18:20		16:33	16:33	16:27
25	05:44	06:30	05:44	06:30	07:18	17:52-18:23/31	07:07	07:48-08:06/18	07:59	07:59	08:30
	21:26	20:31	21:26	20:31	19:23		17:19		16:32	16:32	16:28
26	05:46	06:32	05:46	06:32	07:20	17:51-18:21/30	07:09	07:49-08:04/15	08:01	08:01	08:30
	21:24	20:29	21:24	20:29	19:20		17:17		16:31	16:31	16:28
27	05:47	06:34	05:47	06:34	07:21	17:41-18:20/39	07:10	07:51-08:02/11	08:02	08:02	08:31
	21:23	20:27	21:23	20:27	19:18		17:15		16:30	16:30	16:29
28	05:48	06:35	05:48	06:35	07:23	17:38-18:17/39	07:12		08:03	08:03	08:31
	21:22	20:25	21:22	20:25	19:16		17:13		16:30	16:30	16:30
29	05:50	06:37	05:50	06:37	07:25	17:36-18:15/39	07:14		08:05	08:05	08:31
	21:20	20:23	21:20	20:23	19:14		17:11		16:29	16:29	16:31
30	05:51	06:38	05:51	06:38	07:26	17:35-18:13/38	07:16		08:06	08:06	08:31
	21:19	20:20	21:19	20:20	19:11		17:09		16:28	16:28	16:31
31	05:53	06:40	05:53	06:40	07:19	07:56/37	07:17				08:31
	21:17	20:18	21:17	20:18	18:29-19:00/31		17:07				16:32
Sonnenscheinstunden	496	450	496	450	380		333		270	250	
Anzahl Minuten mit Schatten	0	946	0	946	1063		903		0	0	

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA02 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31 16:34	08:06 09:16-09:28/12 17:19 08:43-08:57/14	07:15 08:02-08:36/34 18:09	07:07 08:22-08:55/33 20:00	06:05 20:49	05:22 06:15-07:04/49 21:32
2	08:31 16:35	08:05 09:19-09:25/6 17:21 08:42-08:58/16	07:13 08:01-08:35/34 18:10	07:05 08:24-08:53/29 20:02	06:03 20:50	05:21 06:12-07:03/51 21:33
3	08:31 16:36	08:03 08:40-08:59/19 17:23	07:11 07:59-08:35/36 18:12	07:03 08:26-08:52/26 20:03	06:01 20:52	05:20 06:10-07:03/53 21:34
4	08:31 16:37	08:02 08:40-09:01/21 17:25	07:09 07:58-08:34/36 18:14	07:01 08:29-08:49/20 20:05	05:59 06:42-06:47/5 20:53	05:20 06:10-07:03/53 21:35
5	08:31 16:38	08:00 08:39-09:01/22 17:27	07:07 07:56-08:32/36 18:16	06:58 08:31-08:45/14 20:07	05:58 06:38-06:52/14 20:55	05:19 06:08-07:03/55 21:36
6	08:30 09:13-09:16/3 16:39	07:59 08:38-09:02/24 17:28	07:05 07:55-08:30/35 18:17	06:56 20:08	05:56 06:35-06:54/19 20:56	05:19 06:08-07:03/55 21:37
7	08:30 09:10-09:18/8 16:40	07:57 08:39-09:03/24 17:30	07:03 07:54-08:30/36 18:19	06:54 20:10	05:54 06:34-06:56/22 20:58	05:18 06:07-07:03/56 21:38
8	08:30 09:10-09:20/10 16:42	07:55 08:39-09:03/24 17:32	07:00 07:54-08:30/36 18:21	06:52 20:12	05:53 06:32-06:57/25 21:00	05:17 06:07-07:03/56 21:39
9	08:29 09:09-09:21/12 16:43	07:54 08:38-09:03/25 17:34	06:58 07:53-08:30/37 18:22	06:50 20:13	05:51 06:30-06:58/28 21:01	05:17 06:05-07:02/57 21:40
10	08:29 09:08-09:22/14 16:44	07:52 08:38-09:03/25 17:35	06:56 07:52-08:28/36 18:24	06:47 20:15	05:49 06:30-07:00/30 21:03	05:17 06:05-07:02/57 21:40
11	08:28 09:08-09:24/16 16:46	07:50 08:26-09:02/36 17:37	06:54 07:52-08:27/35 18:26	06:45 20:16	05:48 06:28-07:00/32 21:04	05:16 06:05-07:03/58 21:41
12	08:28 09:07-09:25/18 16:47	07:48 08:25-09:03/38 17:39	06:52 07:52-08:26/34 18:27	06:43 20:18	05:46 06:28-07:01/33 21:06	05:16 06:06-07:03/57 21:42
13	08:27 09:07-09:26/19 16:48	07:47 08:24-09:02/38 17:41	06:49 07:35-08:26/51 18:29	06:41 20:20	05:45 06:28-07:02/34 21:07	05:16 06:06-07:03/57 21:42
14	08:26 09:07-09:27/20 16:50	07:45 08:23-09:01/38 17:43	06:47 07:32-08:25/53 18:31	06:39 20:21	05:43 06:24-07:02/38 21:09	05:16 06:05-07:02/57 21:43
15	08:26 09:06-09:28/22 16:51	07:43 08:22-09:00/38 17:44	06:45 07:29-08:23/54 18:32	06:37 20:23	05:42 06:23-07:02/39 21:10	05:15 06:05-07:02/57 21:43
16	08:25 09:07-09:29/22 16:53	07:41 08:21-08:58/37 17:46	06:43 07:27-08:23/56 18:34	06:35 20:24	05:40 06:22-07:03/41 21:12	05:15 06:05-07:02/57 21:44
17	08:24 09:07-09:30/23 16:54	07:39 08:21-08:56/35 17:48	06:41 07:26-08:21/55 18:36	06:33 20:26	05:39 06:20-07:03/43 21:13	05:15 06:05-07:02/57 21:44
18	08:23 09:06-09:30/24 16:56	07:37 08:20-08:46/26 17:50	06:38 07:25-08:20/55 18:37	06:31 20:28	05:37 06:19-07:03/44 21:14	05:15 06:05-07:02/57 21:45
19	08:22 09:06-09:30/24 16:58	07:35 08:16-08:46/30 17:51	06:36 07:23-08:17/54 18:39	06:28 20:29	05:36 06:18-07:04/46 21:16	05:15 06:05-07:03/58 21:45
20	08:21 09:07-09:31/24 16:59	07:33 08:14-08:46/32 17:53	06:34 07:22-08:15/53 18:41	06:26 20:31	05:35 06:18-07:04/46 21:17	05:15 06:06-07:04/58 21:45
21	08:20 09:07-09:32/25 17:01	07:32 08:12-08:46/34 17:55	06:32 07:22-08:11/49 18:42	06:24 20:33	05:33 06:16-07:03/47 21:19	05:15 06:06-07:04/58 21:46
22	08:19 09:07-09:32/25 17:02	07:30 08:11-08:45/34 17:57	06:29 07:21-08:03/42 18:44	06:22 20:34	05:32 06:16-07:03/47 21:20	05:16 06:06-07:04/58 21:46
23	08:18 09:08-09:33/25 17:04	07:28 08:10-08:45/35 17:58	06:27 07:20-08:02/42 18:46	06:20 20:36	05:31 06:15-07:03/48 21:21	05:16 06:06-07:04/58 21:46
24	08:17 09:08-09:32/24 17:06	07:26 08:10-08:44/34 18:00	06:25 07:20-08:02/42 18:47	06:18 20:37	05:30 06:15-07:04/49 21:23	05:16 06:07-07:04/57 21:46
25	08:16 09:08-09:32/24 17:07	07:23 08:09-08:42/33 18:02	06:23 07:20-08:02/42 18:49	06:16 20:39	05:29 06:15-07:04/49 21:24	05:17 06:07-07:04/57 21:46
26	08:14 09:09-09:33/24 17:09	07:21 08:08-08:41/33 18:04	06:21 07:20-08:02/42 18:50	06:14 20:41	05:28 06:14-07:03/49 21:25	05:17 06:07-07:04/57 21:46
27	08:13 09:09-09:32/23 17:11	07:19 08:05-08:37/32 18:05	06:18 07:19-08:01/42 18:52	06:12 20:42	05:27 06:14-07:03/49 21:26	05:17 06:08-07:05/57 21:46
28	08:12 09:11-09:32/21 17:13	07:17 08:03-08:36/33 18:07	06:16 07:20-08:00/40 18:54	06:11 20:44	05:26 06:15-07:04/49 21:28	05:18 06:08-07:05/57 21:46
29	08:11 09:11-09:31/20 17:14		07:14 08:20-08:59/39 19:55	06:09 20:45	05:25 06:15-07:04/49 21:29	05:18 06:09-07:06/57 21:46
30	08:09 09:13-09:31/18 17:16		07:12 08:21-08:58/37 19:57	06:07 20:47	05:24 06:14-07:04/50 21:30	05:19 06:09-07:06/57 21:46
31	08:08 09:14-09:29/15 17:18	08:45-08:54/9	07:09 08:21-08:56/35 19:59		05:23 06:14-07:03/49 21:31	
Sonneneinstunden	264	280	367	414	480	492
Anzahl Minuten mit Schatten	512	855	1308	122	1074	1688

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA02 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 06:09-07:07/58 21:46	05:54 06:39-07:11/32 21:16	06:41 20:16	07:28 08:31-09:05/34 19:09 08:16-08:29/13	07:19 08:08-08:32/24 17:06 08:00-08:06/6	08:08 08:50-09:06/16 16:27
2	05:20 06:10-07:08/58 21:45	05:56 06:39-07:10/31 21:14	06:43 20:14	07:29 08:31-09:06/35 19:07	07:21 08:08-08:33/25 17:04	08:09 08:51-09:06/15 16:27
3	05:21 06:10-07:07/57 21:45	05:57 06:41-07:10/29 21:12	06:44 20:12	07:31 08:31-09:07/36 19:05	07:22 08:08-08:33/25 17:02	08:11 08:53-09:06/13 16:26
4	05:22 06:12-07:08/56 21:45	05:59 06:41-07:08/27 21:11	06:46 20:10	07:33 08:30-09:06/36 19:03	07:24 08:09-08:32/23 17:00	08:12 08:54-09:04/10 16:26
5	05:22 06:13-07:09/56 21:44	06:00 06:43-07:07/24 21:09	06:47 20:07	07:34 08:31-09:07/36 19:00	07:26 08:08-08:31/23 16:59	08:13 08:55-09:03/8 16:25
6	05:23 06:14-07:09/55 21:44	06:01 06:44-07:05/21 21:07	06:49 20:05	07:36 08:30-09:06/36 18:58	07:28 08:09-08:31/22 16:57	08:14 08:58-09:02/4 16:25
7	05:24 06:14-07:09/55 21:43	06:03 06:45-07:03/18 21:06	06:51 08:27-08:41/14 20:03	07:37 08:31-09:06/35 18:56	07:29 08:10-08:30/20 16:55	08:16 16:25
8	05:25 06:15-07:10/55 21:43	06:04 06:49-07:01/12 21:04	06:52 08:23-08:43/20 20:01	07:39 08:31-09:07/36 18:54	07:31 08:11-08:30/19 16:54	08:17 16:24
9	05:26 06:17-07:10/53 21:42	06:06 21:02	06:54 08:20-08:46/26 19:59	07:41 08:31-09:07/36 18:52	07:33 08:49-08:56/7 16:52	08:18 16:24
10	05:27 06:19-07:11/52 21:41	06:07 21:00	06:55 08:17-08:46/29 19:56	07:42 08:33-09:08/35 18:49	07:34 08:47-08:59/12 16:51	08:19 16:24
11	05:28 06:21-07:11/50 21:41	06:09 20:59	06:57 08:16-08:48/32 19:54	07:44 08:34-09:09/35 18:47	07:36 08:45-09:01/16 16:49	08:20 16:24
12	05:29 06:22-07:12/50 21:40	06:11 20:57	06:58 08:13-08:48/35 19:52	07:45 08:35-09:09/34 18:45	07:38 08:44-09:02/18 16:48	08:21 16:24
13	05:30 06:23-07:12/49 21:39	06:12 20:55	07:00 08:12-08:49/37 19:50	07:47 08:36-09:09/33 18:43	07:40 08:43-09:03/20 16:46	08:22 16:24
14	05:31 06:23-07:12/49 21:38	06:14 20:53	07:01 08:11-08:49/38 19:47	07:49 08:37-09:09/32 18:41	07:41 08:43-09:04/21 16:45	08:23 16:24
15	05:32 06:23-07:13/50 21:37	06:15 20:51	07:03 08:10-08:50/40 19:45	07:50 08:39-09:11/32 18:39	07:43 08:42-09:05/23 16:44	08:24 16:24
16	05:33 06:23-07:13/50 21:36	06:17 20:49	07:04 08:09-08:50/41 19:43	07:52 08:40-09:13/33 18:37	07:45 08:42-09:06/24 16:42	08:25 16:24
17	05:34 06:24-07:13/49 21:35	06:18 20:47	07:06 08:08-08:50/42 19:41	07:54 08:41-09:14/33 18:35	07:46 08:42-09:06/24 16:41	08:25 16:24
18	05:35 06:24-07:13/49 21:34	06:20 20:45	07:08 08:07-08:50/43 19:38	07:55 08:41-09:15/34 18:33	07:48 08:42-09:06/24 16:40	08:26 16:24
19	05:37 06:24-07:13/49 21:33	06:21 20:43	07:09 08:07-08:50/43 19:36	07:57 08:42-09:16/34 18:30	07:50 08:42-09:07/25 16:38	08:27 16:25
20	05:38 06:26-07:14/48 21:32	06:23 20:41	07:11 08:06-08:49/43 19:34	07:59 08:42-09:16/34 18:28	07:51 08:42-09:07/25 16:37	08:28 16:25
21	05:39 06:26-07:14/48 21:31	06:24 20:39	07:12 08:07-08:49/42 19:32	08:00 08:43-09:16/33 18:26	07:53 08:43-09:08/25 16:36	08:28 16:25
22	05:40 06:26-07:14/48 21:30	06:26 20:37	07:14 08:06-08:53/47 19:29	08:02 08:45-09:17/32 18:24	07:54 08:43-09:07/24 16:35	08:29 16:26
23	05:42 06:27-07:14/47 21:28	06:27 20:35	07:15 08:06-08:58/52 19:27	08:04 08:47-09:17/30 18:22	07:56 08:43-09:07/24 16:34	08:29 16:26
24	05:43 06:28-07:14/46 21:27	06:29 20:33	07:17 08:06-09:00/54 19:25	08:05 09:17-09:23/6 18:21	07:57 08:44-09:08/24 16:33	08:30 16:27
25	05:44 06:29-07:14/45 21:26	06:30 20:31	07:18 08:07-09:02/55 19:23	07:07 07:50-08:26/36 17:19	07:59 08:44-09:07/23 16:32	08:30 16:28
26	05:46 06:30-07:14/44 21:24	06:32 20:29	07:20 08:07-09:03/56 19:20	07:09 07:51-08:28/37 17:17	08:01 08:45-09:07/22 16:31	08:30 16:28
27	05:47 06:31-07:13/42 21:23	06:34 20:27	07:22 08:08-09:04/56 19:18	07:10 07:52-08:30/38 17:15	08:02 08:46-09:08/22 16:30	08:31 16:29
28	05:48 06:33-07:13/40 21:22	06:35 20:25	07:23 08:10-09:05/55 19:16	07:12 07:53-08:31/38 17:13	08:04 08:47-09:07/20 16:30	08:31 16:30
29	05:50 06:34-07:13/39 21:20	06:37 20:23	07:25 08:11-09:05/54 19:14	07:14 07:54-08:32/38 17:11	08:05 08:48-09:07/19 16:29	08:31 16:31
30	05:51 06:36-07:12/36 21:19	06:38 20:20	07:26 08:13-09:05/52 19:11	07:16 07:54-08:32/38 17:09	08:06 08:48-09:06/18 16:28	08:31 16:31
31	05:53 06:39-07:12/33 21:17	06:40 20:18		07:17 07:56-08:32/36 17:07		08:31 16:32
Sonnenscheinstunden		496	450	380	333	270
Anzahl Minuten mit Schatten		1516	194	1006	1090	684
						66

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA03 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	June
1	08:31 13:33-14:23/50 16:34	08:06 09:09-09:38/29 17:19	07:15 08:21-08:44/23 18:09	07:07 07:55-08:32/37 20:00	06:05 07:20-07:55/35 20:49 06:57-07:11/14	05:22 06:44-07:22/38 21:32
2	08:31 13:34-14:24/50 16:35	08:05 09:09-09:37/28 17:21	07:13 08:23-08:42/19 18:10	07:05 07:54-08:24/30 20:02	06:03 07:20-07:54/34 20:50 06:54-07:13/19	05:21 06:45-07:23/38 21:33
3	08:31 13:35-14:25/50 16:36	08:03 09:09-09:37/28 17:23	07:11 08:25-08:40/15 18:12	07:03 07:54-08:24/30 20:03	06:01 07:20-07:53/33 20:52 06:52-07:15/23	05:20 06:45-07:22/37 21:34
4	08:31 13:35-14:24/49 16:37	08:02 09:10-09:37/27 17:25	07:09 08:28-08:37/9 18:14	07:01 07:53-08:24/31 20:05	05:59 06:50-07:16/26 20:53 07:20-07:52/32	05:20 06:46-07:23/37 21:35
5	08:31 13:36-14:25/49 16:38	08:00 09:10-09:36/26 17:27	07:07 07:47-08:05/18 18:16	06:58 07:52-08:23/31 20:07	05:58 06:49-07:18/29 20:55 07:21-07:52/31	05:19 06:45-07:22/37 21:36
6	08:30 13:37-14:25/48 16:39	07:59 09:11-09:35/24 17:28	07:05 07:46-08:06/20 18:17	06:56 07:52-08:23/31 20:08	05:56 06:48-07:18/30 20:56 07:22-07:50/28	05:19 06:46-07:23/37 21:37
7	08:30 13:37-14:25/48 16:40	07:57 09:13-09:35/22 17:30	07:03 07:44-08:07/23 18:19	06:54 07:46-08:23/37 20:10	05:54 06:47-07:19/32 20:58 07:23-07:50/27	05:18 06:46-07:22/36 21:38
8	08:30 13:38-14:26/48 16:42	07:55 09:14-09:34/20 17:32	07:00 07:44-08:08/24 18:21	06:52 07:43-08:22/39 20:12	05:53 06:46-07:20/34 21:00 07:24-07:48/24	05:17 06:47-07:23/36 21:39
9	08:29 13:39-14:25/46 16:43	07:54 09:15-09:32/17 17:34	06:58 07:43-08:09/26 18:22	06:50 07:41-08:21/40 20:13	05:51 06:45-07:20/35 21:01 07:25-07:46/21	05:17 06:47-07:22/35 21:40
10	08:29 13:39-14:25/46 16:44	07:52 09:18-09:29/11 17:35	06:56 07:41-08:08/27 18:24	06:47 07:40-08:20/40 20:15	05:49 06:45-07:21/36 21:03 07:27-07:44/17	05:17 06:47-07:22/35 21:40
11	08:28 13:41-14:26/45 16:46	07:50 09:18-09:29/11 17:37	06:54 07:41-08:08/27 18:26	06:45 07:38-08:19/41 20:16	05:48 06:44-07:20/36 21:04 07:29-07:41/12	05:16 06:48-07:22/34 21:41
12	08:28 13:42-14:25/43 16:47	07:48 09:18-09:29/11 17:39	06:52 07:41-08:08/27 18:27	06:43 07:36-08:17/41 20:18	05:46 06:44-07:21/37 21:06 07:35-07:36/1	05:16 06:49-07:23/34 21:42
13	08:27 13:43-14:24/41 16:48	07:47 09:18-09:29/11 17:41	06:49 07:41-08:08/27 18:29	06:41 07:35-08:15/40 20:20	05:45 06:44-07:22/38 21:07	05:16 06:49-07:23/34 21:42
14	08:26 13:59-14:24/25 16:50	07:45 08:29-08:40/11 17:43	06:47 07:41-08:08/27 18:31	06:39 07:35-08:13/38 20:21	05:43 06:43-07:21/38 21:09	05:16 06:49-07:22/33 21:43
15	08:26 14:01-14:09/8 13:46-13:57/11 16:51	07:43 08:26-08:42/16 17:44	06:45 07:41-08:06/25 18:32	06:37 07:31-08:09/38 20:23	05:42 06:44-07:22/38 21:10	05:15 06:49-07:22/33 21:44
16	08:25 09:16-09:23/7 13:49-13:55/6 16:53	07:41 08:25-08:44/19 17:46	06:43 07:41-08:05/24 18:34	06:35 07:29-08:08/39 20:24	05:40 06:44-07:22/38 21:12	05:15 06:49-07:22/33 21:44
17	08:24 09:14-09:26/12 16:54	07:39 08:23-08:45/22 17:48	06:41 07:42-08:04/22 18:36	06:33 07:27-08:08/41 20:26	05:39 06:43-07:22/39 21:13	05:15 06:50-07:22/32 21:44
18	08:23 09:11-09:27/16 16:56	07:37 08:22-08:46/24 17:50	06:38 07:44-08:03/19 18:37	06:31 07:25-08:07/42 20:28	05:37 06:43-07:22/39 21:14	05:15 06:50-07:22/32 21:45
19	08:22 09:10-09:28/18 16:58	07:35 08:21-08:47/26 17:51	06:36 07:45-08:00/15 18:39	06:28 07:24-08:07/43 20:29	05:36 06:43-07:23/40 21:16	05:15 06:50-07:22/32 21:45
20	08:21 09:10-09:30/20 16:59	07:33 08:21-08:48/27 17:53	06:34 07:48-07:56/8 18:41	06:26 07:23-08:06/43 20:31	05:35 06:43-07:23/40 21:17	05:15 06:51-07:23/32 21:46
21	08:20 09:09-09:31/22 17:01	07:32 08:20-08:48/28 17:55	06:32 07:16-07:44/28 18:42	06:24 07:22-08:06/44 20:33	05:33 06:42-07:22/40 21:19	05:15 06:51-07:23/32 21:46
22	08:19 09:09-09:33/24 17:02	07:30 08:20-08:48/28 17:57	06:29 07:16-07:44/28 18:44	06:22 07:21-08:05/44 20:34	05:32 06:42-07:23/41 21:20	05:16 06:51-07:23/32 21:46
23	08:18 09:09-09:34/25 17:04	07:28 08:20-08:48/28 17:58	06:27 07:15-07:43/28 18:46	06:20 07:20-08:04/44 20:36	05:31 06:42-07:23/41 21:21	05:16 06:51-07:23/32 21:46
24	08:17 09:08-09:34/26 17:06	07:26 08:20-08:48/28 18:00	06:25 07:14-07:43/29 18:47	06:18 07:20-08:03/43 20:37	05:30 06:42-07:23/41 21:23	05:16 06:52-07:24/32 21:46
25	08:16 09:08-09:35/27 17:07	07:23 08:20-08:48/28 18:02	06:23 07:15-07:43/28 18:49	06:16 07:19-08:02/43 20:39	05:29 06:42-07:23/41 21:24	05:16 06:52-07:24/32 21:46
26	08:14 09:08-09:36/28 17:09	07:21 08:20-08:47/27 18:04	06:21 07:15-07:43/28 18:50	06:14 07:20-08:01/41 20:41	05:28 06:42-07:23/41 21:25	05:17 06:51-07:24/33 21:46
27	08:13 09:07-09:36/29 17:11	07:19 08:20-08:46/26 18:05	06:18 07:11-07:13/2 18:52	06:12 07:20-08:00/40 20:42	05:26 06:42-07:23/41 21:26	05:17 06:52-07:25/33 21:46
28	08:12 09:08-09:37/29 17:13	07:17 08:20-08:45/25 18:07	06:16 07:01-07:40/39 18:54	06:11 07:19-07:57/38 20:44	05:26 06:43-07:23/40 21:28	05:18 06:52-07:25/33 21:46
29	08:11 09:07-09:37/30 17:14		07:14 07:59-08:39/40 19:55	06:09 07:19-07:56/37 20:45	05:25 06:44-07:23/39 21:29	05:18 06:52-07:26/34 21:46
30	08:09 09:08-09:37/29 17:16		07:12 07:58-08:38/40 19:57	06:07 07:19-07:55/36 20:47	05:24 06:44-07:23/39 21:30	05:19 06:52-07:26/34 21:46
31	08:08 09:08-09:37/29 17:18		07:09 07:56-08:35/39 19:59	06:05 07:19-07:55/36 20:49	05:23 06:44-07:23/39 21:31	
Sonnenscheinstunden	264	280	367	414	480	492
Anzahl Minuten mit Schatten	1069	595	916	1164	1399	1022

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA03 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 06:52-07:26/34 21:46	05:54 06:55-07:32/37 21:16 07:42-07:50/8	06:41 07:37-08:18/41 20:16	07:28 08:20-08:47/27 19:09	07:19 08:47-08:59/12 17:06	08:08 13:23-14:08/45 16:27
2	05:20 06:53-07:27/34 21:45	05:56 06:55-07:31/36 21:14 07:38-07:53/15	06:43 07:38-08:18/40 20:14	07:29 08:20-08:47/27 19:07	07:21 08:45-09:02/17 17:04	08:09 13:22-14:08/46 16:27
3	05:21 06:52-07:27/35 21:45	05:57 06:56-07:31/35 21:12 07:37-07:56/19	06:44 07:39-08:19/40 20:12	07:31 08:20-08:47/27 19:05	07:22 08:43-09:04/21 17:02	08:11 13:23-14:09/46 16:26
4	05:22 06:52-07:28/36 21:45	05:59 06:56-07:30/34 21:11 07:35-07:57/22	06:46 07:40-08:19/39 20:10	07:33 08:19-08:46/27 19:03	07:24 08:42-09:05/23 17:00	08:12 13:22-14:10/48 16:26
5	05:22 06:52-07:28/36 21:44	06:00 06:57-07:30/33 21:09 07:34-07:59/25	06:47 07:43-08:20/37 20:07	07:34 08:20-08:46/26 19:00	07:26 08:40-09:05/25 16:59	08:13 13:22-14:10/48 16:25
6	05:23 06:53-07:29/36 21:44	06:01 06:57-07:29/32 21:07 07:33-08:00/27	06:49 07:47-08:19/32 20:05	07:36 08:20-08:44/24 18:58	07:28 08:40-09:06/26 16:57	08:14 13:23-14:12/49 16:25
7	05:24 06:52-07:29/37 21:43	06:03 06:58-07:27/29 21:06 07:31-08:00/29	06:51 07:48-08:19/31 20:03	07:37 08:21-08:43/22 18:56	07:29 08:40-09:07/27 16:55	08:16 13:23-14:12/49 16:25
8	05:25 06:52-07:29/37 21:43	06:04 06:59-07:27/28 21:04 07:31-08:01/30	06:52 07:48-08:19/31 20:01	07:39 08:22-08:42/20 18:54	07:31 08:39-09:08/29 16:54	08:17 13:23-14:12/49 16:24
9	05:26 06:52-07:30/38 21:42	06:06 07:00-07:25/25 21:02 07:29-08:02/33	06:54 07:48-08:19/31 19:59	07:41 08:23-08:39/16 18:52	07:33 08:39-09:08/29 16:52	08:18 13:23-14:13/50 16:24
10	05:27 06:52-07:30/38 21:41	06:07 07:29-08:03/34 21:00 07:02-07:24/22	06:55 07:47-08:17/30 19:56	07:42 09:00-09:13/13 18:49	07:34 08:39-09:09/30 16:51	08:19 13:23-14:13/50 16:24
11	05:28 06:52-07:31/39 21:41	06:09 07:28-08:03/35 20:59 07:03-07:21/18	06:57 07:48-08:25/37 19:54	07:44 08:58-09:15/17 18:47	07:36 08:40-09:09/29 16:49	08:20 13:23-14:14/51 16:24
12	05:29 06:52-07:31/39 21:40	06:11 07:27-08:03/36 20:57 07:06-07:18/12	06:58 07:48-08:27/39 19:52	07:45 08:55-09:16/21 18:45	07:38 08:39-09:08/29 16:48	08:21 13:23-14:14/51 16:24
13	05:30 06:52-07:31/39 21:39	06:12 07:27-08:04/37 20:55	07:00 07:49-08:29/40 19:50	07:47 08:54-09:17/23 18:43	07:40 08:39-09:09/30 16:46	08:22 13:24-14:15/51 16:24
14	05:31 06:52-07:32/40 21:38	06:14 07:27-08:03/36 20:53	07:01 07:50-08:29/39 19:47	07:49 08:53-09:18/25 18:41	07:41 08:40-09:09/29 16:45	08:23 13:24-14:15/51 16:24
15	05:32 06:52-07:32/40 21:37	06:15 07:27-08:06/39 20:51	07:03 07:51-08:30/39 19:45	07:50 08:53-09:19/26 18:39	07:43 08:40-09:09/29 16:44	08:24 13:25-14:16/51 16:24
16	05:33 06:52-07:32/40 21:36	06:17 07:26-08:07/41 20:49	07:04 07:53-08:30/37 19:43	07:52 08:51-09:19/28 18:37	07:45 08:41-09:09/28 16:42	08:25 13:25-14:16/51 16:24
17	05:34 06:52-07:32/40 21:35	06:18 07:27-08:08/41 20:47	07:06 07:57-08:31/34 19:41	07:54 08:51-09:19/28 18:35	07:46 08:42-09:09/27 16:41	08:25 13:26-14:17/51 16:24
18	05:35 06:52-07:32/40 21:34	06:20 07:26-08:09/43 20:45	07:08 08:02-08:30/28 19:38	07:55 08:51-09:19/28 18:33	07:48 08:42-09:08/26 16:40	08:26 13:27-14:18/51 16:24
19	05:37 06:52-07:32/40 21:33	06:21 07:27-08:10/43 20:43	07:09 08:02-08:31/29 19:36	07:57 08:51-09:20/29 18:30	07:50 08:43-09:08/25 16:38	08:27 13:27-14:18/51 16:25
20	05:38 06:53-07:33/40 21:32	06:23 07:26-08:10/44 20:41	07:11 08:01-08:30/29 19:34	07:59 08:50-09:18/28 18:28	07:51 08:44-09:08/24 16:37	08:28 13:27-14:19/52 16:25
21	05:39 06:52-07:33/41 21:31	06:24 07:27-08:11/44 20:39	07:12 08:01-08:30/29 19:32	08:00 08:51-09:18/27 18:26	07:53 08:45-09:07/22 16:36	08:28 13:27-14:19/52 16:25
22	05:40 06:52-07:33/41 21:30	06:26 07:27-08:11/44 20:37	07:14 08:01-08:28/27 19:29	08:02 08:51-09:18/27 18:24	07:54 08:46-09:06/20 16:35	08:29 13:28-14:20/52 16:26
23	05:42 06:52-07:33/41 21:28	06:27 07:27-08:10/43 20:35	07:15 08:34-08:39/5 19:27	08:04 08:52-09:17/25 18:22	07:56 08:47-09:05/18 16:34	08:29 13:28-14:20/52 16:26
24	05:43 06:52-07:32/40 21:27	06:29 07:28-08:11/43 20:33	07:17 08:29-08:42/13 19:25	08:05 08:52-09:16/24 18:20	07:57 08:49-09:05/16 16:33	08:30 13:30-14:21/51 16:27
25	05:44 06:53-07:33/40 21:26	06:30 07:28-08:10/42 20:31	07:18 08:27-08:45/18 19:23	07:07 07:53-08:15/22 17:19	07:59 08:51-09:03/12 16:32	08:30 13:30-14:21/51 16:28
26	05:46 06:53-07:33/40 21:24	06:32 07:30-08:10/40 20:29	07:20 08:25-08:45/20 19:20	07:09 07:54-08:13/19 17:17	08:01 08:54-09:01/7 13:28-13:34/6 16:31	08:30 13:30-14:21/51 16:28
27	05:47 06:53-07:32/39 21:23	06:34 07:31-08:10/39 20:27	07:22 08:24-08:47/23 19:18	07:11 07:56-08:11/15 17:15	08:02 13:41-13:49/8 13:26-13:37/11 16:30	08:31 13:30-14:21/51 16:29
28	05:48 06:54-07:33/39 21:22	06:35 07:33-08:11/38 20:25	07:23 08:23-08:48/25 19:16	07:12 08:00-08:09/9 17:13	08:04 13:39-14:04/25 16:30	08:31 13:31-14:22/51 16:30
29	05:50 06:54-07:32/38 21:20	06:37 07:36-08:14/38 20:23	07:25 08:21-08:47/26 19:14	07:14 17:11	08:05 13:24-14:05/41 16:29	08:31 13:31-14:22/51 16:31
30	05:51 06:54-07:32/38 21:19	06:38 07:36-08:16/40 20:20	07:26 08:21-08:48/27 19:11	07:16 17:09	08:06 13:23-14:06/43 16:28	08:31 13:32-14:22/50 16:31
31	05:53 06:55-07:32/37 21:17	06:40 07:36-08:17/41 20:18		07:17 08:51-08:54/3 17:07		08:31 13:32-14:23/51 16:32
	Sonnenscheinstunden 496	450	380	333	270	250
Anzahl Minuten mit Schatten	1192	1430	1038	663	779	1554

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

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

Projekt:

Alter Bornskopf
ABO Wind AG

Unter den Eichen 7
65195 Wiesbaden

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA04 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31 12:32-12:34/2 14:20-14:45/25 16:34 11:30-12:07/37	08:06 17:19 18:09 08:05 07:13	07:15 18:09 07:13 18:10	07:07 17:51-18:20/29 20:00 17:23-17:34/11	06:05 18:18-19:18/60 20:49 20:49	05:22 18:56-20:14/78 21:32 21:32
2	08:31 11:30-12:07/37 16:35 14:20-14:46/26	08:05 07:13 17:21 18:10	07:13 18:10 07:11 18:12	07:05 17:50-18:21/31 20:02 20:50	06:03 18:22-19:20/58 20:50 20:50	05:21 18:58-20:15/77 21:33 21:33
3	08:31 11:31-12:05/34 16:36 14:21-14:47/26	08:03 07:11 17:23 18:12	07:11 18:12 07:09 18:14	07:03 17:49-18:22/33 20:03 20:52	06:01 18:23-19:20/57 20:52 20:52	05:20 18:59-20:16/77 21:34 21:34
4	08:31 11:32-12:02/30 16:37 14:21-14:47/26	08:02 07:09 17:25 18:14	07:09 18:14 07:07 18:16	07:01 17:48-18:21/33 20:05 20:53	05:59 18:23-19:21/58 20:53 20:53	05:20 19:00-20:16/76 21:35 21:35
5	08:31 11:33-12:01/28 16:38 14:21-14:47/26	08:00 07:07 17:26 18:16	07:07 18:16 07:05 18:17	06:58 17:47-18:22/35 20:07 20:55	05:58 18:24-19:22/58 20:55 20:55	05:19 19:02-20:17/75 21:36 21:36
6	08:30 11:56-12:00/4 11:34-11:53/19 16:39 14:22-14:48/26	07:59 07:05 17:28 18:17	07:05 18:17 07:02 18:19	06:56 17:47-18:22/35 20:08 20:56	05:56 18:24-19:22/58 20:56 19:28-19:36/8	05:18 19:12-20:16/64 21:37 19:04-19:11/7
7	08:30 14:22-14:48/26 16:40 11:35-11:52/17	07:57 07:02 17:30 18:19	07:02 18:19 07:00 18:21	06:54 17:46-18:22/36 20:10 18:26-18:34/8	05:54 18:25-19:22/57 20:58 19:24-19:38/14	05:18 19:13-20:17/64 21:38 21:38
8	08:30 14:23-14:49/26 16:42 11:36-11:53/17	07:55 07:00 17:32 18:21	07:00 18:21 06:58 18:22	06:52 17:46-18:38/52 20:12 21:00	05:53 18:26-19:41/75 21:00 21:00	05:17 19:13-20:18/65 21:39 21:39
9	08:29 14:23-14:49/26 16:43 11:37-11:52/15	07:54 06:58 17:34 18:22	06:58 18:22 06:56 16:30-16:36/6	06:50 17:46-18:41/55 20:13 21:01	05:51 18:26-19:42/76 21:01 21:01	05:17 19:13-20:18/65 21:40 21:40
10	08:29 14:23-14:49/26 16:44 11:39-11:50/11	07:52 06:56 17:35 18:24	06:56 16:30-16:36/6 17:35 18:24	06:47 17:46-18:42/56 20:15 21:03	05:49 18:28-19:44/76 21:03 21:03	05:17 19:13-20:18/65 21:40 21:40
11	08:28 14:25-14:50/25 16:46 11:42-11:50/8	07:50 06:54 17:37 18:26	06:54 16:25-16:41/16 17:37 18:26	06:45 17:46-18:43/57 20:16 21:04	05:48 18:29-19:44/75 21:04 21:04	05:16 19:14-20:19/65 21:41 21:41
12	08:28 14:25-14:50/25 16:47 11:42-11:50/8	07:48 06:52 17:39 18:27	06:52 16:22-16:44/22 17:39 18:27	06:43 17:46-18:44/58 20:18 21:06	05:46 18:30-19:45/75 21:06 21:06	05:16 19:14-20:20/66 21:42 21:42
13	08:27 14:25-14:50/25 16:48 11:42-11:50/8	07:47 06:49 17:41 18:29	06:49 16:20-16:46/26 17:41 18:29	06:41 17:46-18:44/58 20:20 21:07	05:44 18:31-19:45/74 21:07 21:07	05:16 19:14-20:21/67 21:42 21:42
14	08:26 14:26-14:50/24 16:50 11:42-11:50/8	07:45 06:47 17:43 18:31	06:47 16:18-16:46/28 17:43 18:31	06:39 17:47-18:45/58 20:21 21:09	05:43 18:34-19:46/72 21:09 21:09	05:15 19:14-20:23/69 21:43 21:43
15	08:26 14:27-14:50/23 16:51 11:42-11:50/8	07:43 06:45 17:44 18:32	06:45 16:17-16:47/30 17:44 18:32	06:37 17:48-18:45/57 20:23 21:10	05:41 18:36-19:47/71 21:10 21:10	05:15 19:15-20:24/69 21:43 21:43
16	08:25 14:27-14:50/23 16:53 11:42-11:50/8	07:41 06:43 17:46 18:34	06:43 16:16-16:48/32 17:46 18:34	06:35 17:49-18:52/63 20:24 21:12	05:40 18:46-19:47/61 21:12 18:41-18:43/2	05:15 19:15-20:25/70 21:44 21:44
17	08:24 14:28-14:49/21 16:54 11:42-11:50/8	07:39 06:41 17:48 18:36	06:41 16:15-16:49/34 17:48 18:36	06:33 17:50-18:54/64 20:26 21:13	05:39 18:46-19:47/61 21:13 21:13	05:15 19:15-20:25/70 21:44 21:44
18	08:23 14:29-14:49/20 16:56 11:42-11:50/8	07:37 06:38 17:50 18:37	06:38 16:13-16:48/35 17:50 18:37	06:30 17:52-18:56/64 20:28 21:14	05:37 18:47-19:48/61 21:14 21:14	05:15 19:15-20:26/71 21:45 21:45
19	08:22 14:31-14:49/18 16:57 11:42-11:50/8	07:35 06:36 17:51 18:39	06:36 16:13-16:49/36 17:51 18:39	06:28 17:54-18:58/64 20:29 21:16	05:36 18:47-19:48/61 21:16 21:16	05:15 19:15-20:26/71 21:45 21:45
20	08:21 14:32-14:48/16 16:59 11:42-11:50/8	07:33 06:34 17:53 18:41	06:34 16:13-16:49/36 17:53 18:41	06:26 17:58-18:07/9 20:31 18:09-18:59/50	05:35 18:47-19:48/61 21:17 21:17	05:15 19:16-20:26/70 21:45 21:45
21	08:20 14:34-14:47/13 17:01 11:42-11:50/8	07:31 06:32 17:55 18:42	06:32 16:13-16:49/36 17:55 18:42	06:24 18:09-18:59/50 20:33 21:19	05:33 18:48-19:48/60 21:19 21:19	05:15 19:17-20:27/70 21:46 21:46
22	08:19 14:37-14:45/8 17:02 11:42-11:50/8	07:29 06:29 17:57 18:44	06:29 16:12-16:48/36 17:57 18:44	06:22 18:09-19:00/51 20:34 21:20	05:32 18:48-19:48/60 21:20 19:58-20:01/3	05:16 19:17-20:27/70 21:46 21:46
23	08:18 14:37-14:45/8 17:04 11:42-11:50/8	07:27 06:27 17:58 18:46	06:27 16:12-16:48/36 17:58 18:46	06:20 18:10-19:00/50 20:36 21:21	05:31 18:49-19:48/59 21:21 19:54-20:05/11	05:16 19:17-20:27/70 21:46 21:46
24	08:17 14:37-14:45/8 17:06 11:42-11:50/8	07:25 06:25 18:00 18:47	06:25 16:13-16:48/35 18:00 18:47	06:18 18:10-19:01/51 20:37 21:23	05:30 18:50-19:48/58 21:23 19:52-20:07/15	05:16 19:16-20:27/71 21:46 21:46
25	08:16 14:37-14:45/8 17:07 11:42-11:50/8	07:23 06:23 18:02 18:49	06:23 16:13-16:47/34 18:02 18:49	06:16 18:10-19:01/51 20:39 21:24	05:29 18:50-19:48/58 21:24 19:51-20:08/17	05:16 19:17-20:28/71 21:46 21:46
26	08:14 14:37-14:45/8 17:09 11:42-11:50/8	07:21 06:20 18:04 18:50	06:20 16:13-16:45/32 18:04 18:50	06:14 18:11-19:01/50 20:41 21:25	05:27 18:51-19:48/57 21:25 19:50-20:10/20	05:17 19:17-20:27/70 21:46 21:46
27	08:13 14:37-14:45/8 17:11 11:42-11:50/8	07:19 06:18 18:05 18:52	06:18 16:14-16:45/31 18:05 18:52	06:12 18:13-19:09/56 20:42 21:26	05:26 18:52-19:48/56 21:26 19:49-20:11/22	05:17 19:18-20:27/69 21:46 21:46
28	08:12 14:37-14:45/8 17:12 11:42-11:50/8	07:17 06:16 18:07 18:54	06:16 17:02-17:11/9 18:07 18:54	06:10 18:13-19:13/60 20:44 21:28	05:25 18:53-20:11/78 21:28 21:28	05:18 19:17-20:26/69 21:46 21:46
29	08:11 14:37-14:45/8 17:14 11:42-11:50/8	07:14 06:15 19:55 17:16-17:42/26	06:15 16:15-16:44/29 19:55 17:16-17:42/26	06:09 18:15-19:15/60 20:45 21:29	05:24 18:54-20:13/79 21:29 21:29	05:18 19:18-20:26/68 21:46 21:46
30	08:09 14:37-14:45/8 17:16 11:42-11:50/8	07:12 06:14 19:57 17:18-17:41/23	06:14 17:56-18:18/22 19:57 17:18-17:41/23	06:07 18:16-19:17/61 20:47 21:30	05:24 18:55-20:14/79 21:30 21:30	05:19 19:18-20:24/66 21:46 21:46
31	08:08 14:37-14:45/8 17:18 11:42-11:50/8	07:09 06:13 19:59 17:20-17:37/17	07:09 17:53-18:19/26 19:59 17:20-17:37/17	05:23 18:56-20:14/78 21:31 21:31	05:23 18:56-20:14/78 21:31 21:31	05:19 19:18-20:24/66 21:46 21:46
	Sonneneinstrahlung 264 Anzahl Minuten mit Schatten 759	280 0 710 1556 2139 2095	367 710 1556 2139 2095	414 1556 2139 2095	480 2139 2095	492 2095

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA04 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,76	3,05	3,38	5,06	6,16	5,30	6,18	5,97	4,66	2,89	2,21	1,34

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
429	295	501	689	900	798	628	993	773	870	849	616	8.341

Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 19:18-20:24/66 21:46	05:54 18:40-19:55/75 21:16	06:41 17:45-18:43/58 20:16	07:28 17:00-17:23/23 19:09	07:19 17:06	08:08 14:07-14:32/25 16:27 11:24-11:31/7
2	05:20 19:18-20:23/65 21:45	05:56 18:39-19:54/75 21:14	06:43 17:44-18:40/56 20:14	07:29 17:02-17:21/19 19:07	07:21 17:04	08:09 14:07-14:32/25 16:27 11:22-11:33/11
3	05:21 19:18-20:23/65 21:45	05:57 18:38-19:54/76 21:12	06:44 17:44-18:39/55 20:12	07:31 17:05-17:17/12 19:05	07:22 17:02	08:11 14:07-14:33/26 16:26 11:22-11:36/14
4	05:21 19:19-20:23/64 21:45	05:58 18:37-19:52/75 21:11	06:46 17:43-18:35/52 20:10	07:33 19:02	07:24 17:00	08:12 14:07-14:33/26 16:26 11:21-11:37/16
5	05:22 19:19-20:24/65 21:44	06:00 18:35-19:32/57 21:09	06:47 17:42-18:18/36 20:07	07:34 19:00	07:26 16:59	08:13 14:07-14:33/26 16:25 11:20-11:37/17
6	05:23 19:18-20:23/65 21:44	06:01 18:35-19:32/57 21:07	06:49 17:43-18:18/35 20:05	07:36 18:58	07:28 16:57	08:14 11:42-11:45/3 11:20-11:39/19 16:25 14:08-14:34/26
7	05:24 19:09-20:23/74 21:43	06:03 18:34-19:31/57 21:06	06:51 17:42-18:17/35 20:03	07:37 18:56	07:29 16:55	08:16 11:20-11:48/28 16:24 14:09-14:34/25
8	05:25 19:08-20:23/75 21:43	06:04 18:34-19:31/57 21:04	06:52 17:43-18:16/33 20:01	07:39 18:54	07:31 16:54	08:17 11:20-11:50/30 16:24 14:09-14:35/26
9	05:26 19:07-20:23/76 21:42	06:06 18:33-19:30/57 21:02	06:54 17:42-18:15/33 19:59	07:41 18:52	07:33 16:52	08:18 11:20-11:51/31 16:24 14:09-14:35/26
10	05:27 19:06-20:23/77 21:41	06:07 18:32-19:29/57 21:00	06:55 17:43-18:14/31 19:56	07:42 18:49	07:34 16:51	08:19 11:20-11:55/35 16:24 14:09-14:35/26
11	05:28 19:05-20:23/78 21:41	06:09 18:29-19:28/59 20:59	06:57 17:43-18:12/29 19:54	07:44 18:47	07:36 16:49	08:20 11:20-11:57/37 16:24 14:10-14:35/25
12	05:29 19:05-20:23/78 21:40	06:10 18:26-19:26/60 20:57	06:58 17:45-18:11/26 19:52	07:45 18:45	07:38 16:48	08:21 12:20-12:27/7 14:10-14:36/26 16:24 11:20-11:58/38
13	05:30 19:04-20:22/78 21:39	06:12 18:24-19:25/61 20:55	07:00 17:46-18:08/22 19:50	07:47 18:43	07:40 16:46	08:22 12:20-12:28/8 14:11-14:36/25 16:23 11:20-12:00/40
14	05:31 19:03-20:22/79 21:38	06:14 18:22-19:22/60 20:53	07:01 17:48-18:06/18 19:47	07:49 18:41	07:41 16:45	08:23 12:19-12:30/11 14:11-14:36/25 16:24 11:20-12:01/41
15	05:32 19:02-20:21/79 21:37	06:15 18:21-19:20/59 20:51	07:03 17:51-18:02/11 19:45	07:50 18:39	07:43 16:43	08:24 12:19-12:31/12 14:12-14:37/25 16:24 11:21-12:02/41
16	05:33 19:02-20:21/79 21:36	06:17 19:12-19:13/1 20:49	07:04 17:03-17:34/31 19:43	07:52 18:37	07:45 16:42	08:25 12:19-12:32/13 14:13-14:38/25 16:24 11:21-12:03/42
17	05:34 19:01-19:58/57 21:35	06:18 18:19-19:09/50 20:47	07:06 17:02-17:34/32 19:41	07:54 18:35	07:46 16:41	08:25 12:20-12:33/13 14:13-14:38/25 16:24 11:22-12:04/42
18	05:35 19:00-19:58/58 21:34	06:20 18:17-19:08/51 20:45	07:07 17:01-17:34/33 19:38	07:55 18:32	07:48 16:40	08:26 12:20-12:34/14 14:13-14:38/25 16:24 11:23-12:05/42
19	05:37 19:00-19:58/58 21:33	06:21 18:15-19:06/51 20:43	07:09 16:59-17:34/35 19:36	07:57 18:30	07:49 16:38	08:27 12:20-12:34/14 14:14-14:39/25 16:24 11:22-12:05/43
20	05:38 18:59-19:58/59 21:32	06:23 18:15-19:06/51 20:41	07:11 16:59-17:34/35 19:34	07:59 18:28	07:51 14:12-14:20/8 16:37	08:28 12:20-12:35/15 14:15-14:40/25 16:25 11:23-12:06/43
21	05:39 18:59-19:59/60 21:31	06:24 18:14-19:05/51 20:39	07:12 16:59-17:35/36 19:32	08:00 18:26	07:53 14:09-14:22/13 16:36	08:28 12:20-12:35/15 14:15-14:39/24 16:25 11:23-12:06/43
22	05:40 18:59-19:59/60 21:30	06:26 18:14-19:04/50 20:37	07:14 16:57-17:34/37 19:29	08:02 18:24	07:54 14:08-14:24/16 16:35	08:29 12:21-12:36/15 14:16-14:40/24 16:26 11:24-12:07/43
23	05:42 18:58-19:58/60 21:28	06:27 18:01-18:11/10 20:35	07:15 16:57-17:34/37 19:27	08:04 18:22	07:56 14:08-14:26/18 16:34	08:29 12:21-12:36/15 14:16-14:40/24 16:26 11:24-12:07/43
24	05:43 18:57-19:58/61 21:27	06:29 17:58-19:01/63 20:33	07:17 16:57-17:33/36 19:25	08:05 18:20	07:57 14:08-14:27/19 16:33	08:30 12:23-12:37/14 14:17-14:42/25 16:27 11:25-12:08/43
25	05:44 18:58-19:59/61 21:26	06:30 17:55-18:59/64 20:31	07:18 16:57-17:32/35 19:23	07:07 17:19	07:59 14:06-14:27/21 16:32	08:30 12:23-12:37/14 14:17-14:42/25 16:27 11:26-12:08/42
26	05:46 18:57-19:58/61 21:24	06:32 17:53-18:57/64 20:29	07:20 16:56-17:31/35 19:20	07:09 17:17	08:01 14:07-14:29/22 16:31	08:30 12:23-12:37/14 14:17-14:42/25 16:28 11:26-12:08/42
27	05:47 18:57-19:58/61 21:23	06:34 17:51-18:53/62 20:27	07:21 16:57-17:30/33 19:18	07:10 17:15	08:02 14:06-14:29/23 16:30	08:31 12:24-12:37/13 14:18-14:42/24 16:29 11:26-12:08/42
28	05:48 18:48-19:57/69 21:22	06:35 17:50-18:47/57 20:25	07:23 16:57-17:28/31 19:16	07:12 17:13	08:03 14:06-14:30/24 16:29	08:31 12:25-12:37/12 14:18-14:43/25 16:30 11:27-12:08/41
29	05:50 18:46-19:57/71 21:20	06:37 17:48-18:46/58 20:23	07:25 16:58-17:27/29 19:14	07:14 17:11	08:05 14:07-14:31/24 16:29	08:31 12:26-12:37/11 14:18-14:43/25 16:30 11:27-12:08/41
30	05:51 18:43-19:56/73 21:19	06:38 17:47-18:45/58 20:20	07:26 16:59-17:26/27 19:11	07:16 17:09	08:06 14:06-14:31/25 16:28	08:31 12:27-12:37/10 14:19-14:44/25 16:31 11:28-12:08/40
31	05:53 18:41-19:56/75 21:17	06:40 17:46-18:44/58 20:18		07:17 17:07		08:31 12:29-12:36/7 14:19-14:44/25 16:32 11:29-12:08/39
Sonnenscheinstunden	496	450	380	333	270	250
Anzahl Minuten mit Schatten	2190	1874	1142	54	213	2105

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA05 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:31 14:47-14:58/11 10:27-10:53/26 16:34 13:30-14:41/71	08:06 13:47-16:20/153 17:19	07:15 07:39-08:10/31 18:09	07:07 07:51-08:10/19 20:00 07:29-07:36/7	06:05 06:59-07:04/5 20:49 06:29-06:54/25	05:22 05:53-06:36/43 21:32
2	08:31 14:46-14:59/13 10:28-10:53/25 16:35 13:31-14:42/71	08:05 14:49-16:21/92 13:50-14:07/17 17:21 14:12-14:47/35	07:13 07:39-08:10/31 18:10	07:05 07:53-08:08/15 20:02 07:27-07:39/12	06:03 06:28-06:54/26 20:50	05:21 05:54-06:35/41 21:33
3	08:31 14:46-15:01/15 10:29-10:53/24 16:36 13:31-14:43/72	08:03 15:40-16:21/41 14:27-14:45/18 17:23 14:50-15:39/49 13:53-14:03/10	07:11 07:39-08:10/31 18:12	07:03 07:56-08:04/8 20:03 07:25-07:40/15	06:01 06:27-06:54/27 20:52	05:20 05:54-06:35/41 21:34
4	08:31 14:45-15:02/17 10:31-10:53/22 16:37 13:31-14:43/72	08:02 15:41-16:23/42 14:31-14:42/11 17:25 14:52-15:39/47	07:09 07:39-08:11/32 18:14	07:01 07:23-07:42/19 20:05	05:59 06:26-06:54/28 20:53	05:20 05:54-06:35/41 21:35
5	08:31 14:45-15:03/18 10:31-10:52/21 16:38 13:31-14:44/73	08:00 15:42-16:23/41 14:53-15:14/21 17:27 15:17-15:38/21	07:07 07:38-08:09/31 18:16	06:58 07:20-07:41/21 20:07	05:58 06:27-06:54/27 20:55	05:19 05:54-06:35/41 21:36
6	08:30 13:32-15:05/93 16:39 10:33-10:52/19	07:59 15:43-16:23/40 14:55-15:12/17 17:28 15:19-15:36/17	07:05 07:38-08:09/31 18:17	06:56 07:18-07:42/24 20:08	05:56 06:26-06:54/28 20:56	05:18 05:55-06:35/40 21:37
7	08:30 13:31-15:06/95 16:40 10:34-10:51/17	07:57 15:45-16:24/39 15:00-15:10/10 17:30 15:22-15:34/12	07:03 07:38-08:09/31 18:19	06:54 07:16-07:42/26 20:10	05:54 06:27-06:54/27 20:58	05:18 05:54-06:34/40 21:38
8	08:30 13:32-15:07/95 16:42 10:37-10:50/13	07:55 15:46-16:24/38 17:32	07:00 07:39-08:08/29 18:21	06:52 07:16-07:42/26 20:12	05:53 06:27-06:54/27 21:00	05:17 05:55-06:34/39 21:39
9	08:29 15:16-15:23/7 10:39-10:48/9 16:43 13:32-15:08/96	07:54 15:48-16:24/36 17:34	06:58 07:39-08:07/28 18:22	06:50 07:16-07:42/26 20:13	05:51 06:15-06:53/38 21:01	05:17 05:54-06:33/39 21:40
10	08:29 15:14-15:25/11 16:44 13:32-15:09/97	07:52 15:59-16:23/24 17:35	06:56 07:39-08:05/26 18:24	06:47 07:16-07:42/26 20:15	05:49 06:14-06:53/39 21:03	05:17 05:55-06:33/38 21:40
11	08:28 15:14-15:27/13 16:46 13:33-15:10/97	07:50 15:59-16:23/24 17:37	06:54 07:41-08:04/23 18:26	06:45 07:16-07:41/25 20:16	05:48 06:12-06:52/40 21:04	05:16 05:55-06:34/39 21:41
12	08:28 15:13-15:29/16 16:47 13:33-15:11/98	07:48 16:00-16:22/22 17:39	06:52 07:42-08:02/20 18:27	06:43 07:15-07:40/25 20:18	05:46 06:11-06:52/41 21:06	05:16 05:56-06:34/38 21:42
13	08:27 13:33-15:30/117 16:48	07:47 16:02-16:22/20 17:41	06:49 07:45-07:59/14 18:29	06:41 07:16-07:39/23 20:20	05:45 06:10-06:51/41 21:07	05:16 05:56-06:34/38 21:42
14	08:26 13:33-15:31/118 16:50	07:45 16:03-16:21/18 17:43	06:47 07:49-07:55/6 18:31	06:39 07:16-07:37/21 20:21	05:43 06:08-06:50/42 21:09	05:15 05:55-06:33/38 21:43
15	08:26 13:33-15:32/119 16:51	07:43 16:05-16:19/14 17:44	06:45 18:32	06:37 07:17-07:36/19 20:23	05:42 06:08-06:49/41 21:10	05:15 05:56-06:33/37 21:44
16	08:25 13:33-15:33/120 16:53	07:41 16:08-16:16/8 17:46	06:43 18:34	06:35 07:19-07:34/15 20:24	05:40 06:08-06:48/40 21:12	05:15 05:56-06:33/37 21:44
17	08:24 15:45-15:52/7 16:54 13:34-15:34/120	07:39 17:48	06:41 07:03-07:11/8 18:36	06:33 07:21-07:31/10 20:26	05:39 06:07-06:46/39 21:13	05:15 05:56-06:33/37 21:44
18	08:23 15:43-15:55/12 16:56 13:34-15:35/121	07:37 17:50	06:38 07:01-07:14/13 18:37	06:30 06:53-07:16/23 20:28	05:37 06:36-06:43/7 21:14	05:15 05:56-06:33/37 21:45
19	08:22 15:42-15:57/15 16:58 13:35-15:36/121	07:35 17:51	06:36 06:58-07:15/17 18:39	06:28 06:51-07:16/25 20:29	05:36 06:02-06:36/34 21:16	05:15 05:57-06:33/36 21:45
20	08:21 15:41-15:58/17 16:59 13:35-15:37/122	07:33 17:53	06:34 06:56-07:16/20 18:41	06:26 06:50-07:16/26 20:31	05:35 06:01-06:36/35 21:17	05:15 05:58-06:34/36 21:46
21	08:20 15:40-16:00/20 17:01 13:36-15:38/122	07:32 17:55	06:32 06:54-07:17/23 18:42	06:24 06:49-07:16/27 20:33	05:33 05:59-06:35/36 21:19	05:15 05:58-06:34/36 21:46
22	08:19 15:40-16:01/21 17:02 13:37-15:39/122	07:30 07:53-08:01/8 17:57	06:29 06:52-07:18/26 18:44	06:22 06:49-07:16/27 20:34	05:32 05:58-06:36/38 21:20	05:16 05:58-06:34/36 21:46
23	08:18 13:37-16:03/146 17:04	07:28 07:51-08:04/13 17:58	06:27 06:50-07:17/27 18:46	06:20 06:49-07:15/26 20:36	05:31 05:57-06:36/39 21:21	05:16 05:58-06:34/36 21:46
24	08:17 13:37-16:03/146 17:06	07:26 07:49-08:06/17 18:00	06:25 06:49-07:17/28 18:47	06:18 06:49-07:14/25 20:37	05:30 05:56-06:36/40 21:23	05:16 05:58-06:35/37 21:46
25	08:16 13:38-16:04/146 17:07	07:23 07:47-08:08/21 18:02	06:23 06:49-07:17/28 18:49	06:16 06:49-07:14/25 20:39	05:29 05:55-06:36/41 21:24	05:16 05:58-06:35/37 21:46
26	08:14 13:40-16:05/145 17:09	07:21 07:45-08:09/24 18:04	06:21 06:49-07:17/28 18:50	06:14 06:51-07:14/23 20:41	05:28 05:54-06:36/42 21:25	05:17 05:58-06:35/37 21:46
27	08:13 13:40-16:05/145 17:11	07:19 07:42-08:09/27 18:05	06:18 06:48-07:16/28 18:52	06:12 06:36-07:12/36 20:42	05:26 05:54-06:36/42 21:26	05:17 05:59-06:36/37 21:46
28	08:12 13:41-16:06/145 17:12	07:17 07:40-08:09/29 18:07	06:16 06:48-07:15/27 18:54	06:11 06:34-07:11/37 20:44	05:25 05:55-06:36/41 21:28	05:18 05:59-06:36/37 21:46
29	08:11 13:42-16:15/153 17:14		07:14 07:49-08:15/26 19:55	06:09 06:53-07:09/16 20:45	05:25 05:54-06:36/42 21:29	05:18 05:59-06:37/38 21:46
30	08:09 13:44-16:17/153 17:16		07:12 07:50-08:14/24 19:57	06:07 06:52-07:07/12 20:47	05:24 05:54-06:36/42 21:30	05:19 05:59-06:37/38 21:46
31	08:08 13:45-16:18/153 17:18		07:09 07:49-08:12/23 19:59		05:23 05:54-06:35/41 21:31	
Sonneneinstrahlung	264	280	367	414	480	492
Anzahl Minuten mit Schatten	3953	1076	710	844	1140	1305

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

17.10.2023 09:23/3.6.361



SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA05 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:19 05:59-06:38/39 21:46 05:49-05:54/5	05:54 06:22-07:02/40 21:16 06:23-07:02/39	06:41 07:15-07:40/25 20:16 07:14-07:40/26	07:28 08:22-08:40/18 19:09 08:20-08:42/22	07:19 15:29-15:53/24 17:06 15:22-15:26/4	08:08 14:56-15:10/14 16:27 13:15-14:52/97
2	05:20 06:00-06:39/39 21:45 05:50-05:54/4	05:56 06:25-07:03/38 21:14 06:26-07:03/37	06:43 07:14-07:40/26 20:14 07:14-07:40/26	07:29 08:20-08:42/22 19:07 08:19-08:43/24	07:21 15:18-15:53/35 17:04 15:16-15:50/5	08:09 14:57-15:08/11 16:27 13:15-14:52/97
3	05:21 06:00-06:38/38 21:45 05:50-05:52/2	05:57 06:25-07:03/38 21:12 06:26-07:03/37	06:44 07:14-07:40/26 20:12 07:13-07:39/26	07:31 08:19-08:43/24 19:05 08:17-08:44/27	07:22 15:16-15:54/38 17:02 14:55-15:00/5	08:11 15:00-15:07/7 10:23-10:32/9 16:26 13:16-14:52/96
4	05:21 06:00-06:39/39 21:45 05:50-05:52/2	05:58 06:26-07:03/37 21:11 06:27-07:04/27	06:46 07:13-07:39/26 20:10 07:14-07:39/25	07:33 08:17-08:44/27 19:02 08:16-08:45/29	07:24 15:14-15:53/39 14:29-14:40/11 17:00 14:51-15:04/13	08:12 13:16-14:51/95 16:26 10:21-10:34/13
5	05:22 06:00-06:40/40 21:44 06:01-06:41/40	06:00 06:37-07:04/27 21:09 06:31-06:33/2	06:47 07:14-07:39/25 20:07 07:14-07:38/24	07:34 08:16-08:45/29 19:00 08:14-08:44/30	07:26 15:12-15:53/41 14:25-14:42/17 16:59 14:48-15:06/18	08:13 13:17-14:51/94 16:25 10:20-10:36/16
6	05:23 06:01-06:41/40 21:44 06:00-06:41/41	06:01 06:36-07:04/28 21:08 06:36-07:03/27	06:49 07:14-07:38/24 20:05 07:16-07:37/21	07:36 08:14-08:44/30 18:58 08:14-08:45/31	07:28 15:12-15:53/41 14:23-14:44/21 16:57 14:47-15:07/20	08:14 13:18-14:51/93 16:25 10:19-10:38/19
7	05:24 06:00-06:41/41 21:43 06:01-06:41/40	06:03 06:36-07:03/27 21:06 06:36-07:04/28	06:51 07:16-07:37/21 20:03 07:17-07:36/19	07:37 08:14-08:45/31 18:56 08:14-08:45/31	07:29 15:11-15:53/42 14:00-14:12/12 16:55 14:22-15:09/47	08:16 14:32-14:50/18 10:19-10:39/20 16:24 13:19-14:31/71
8	05:25 06:01-06:41/40 21:43 06:01-06:42/41	06:04 06:36-07:04/28 21:04 06:36-07:03/27	06:52 07:17-07:36/19 20:01 07:50-07:58/8	07:39 08:14-08:45/31 18:54 08:13-08:45/32	07:31 15:11-15:52/41 13:57-14:16/19 16:54 14:21-15:10/49 13:23-13:35/12	08:17 14:33-14:50/17 10:18-10:40/22 16:24 13:19-14:31/71
9	05:26 06:01-06:42/41 21:42 06:01-06:43/42	06:06 06:36-07:03/27 21:02 06:36-07:03/27	06:54 07:50-07:58/8 19:59 07:19-07:35/16	07:41 08:13-08:45/32 18:52 08:13-08:45/32	07:33 14:20-15:52/92 13:20-13:38/18 16:52 13:43-14:18/35	08:18 14:34-14:49/15 10:18-10:41/23 16:24 13:19-14:31/71
10	05:27 06:01-06:43/42 21:41 06:02-06:43/41	06:07 06:36-07:03/27 21:00 06:36-07:03/27	06:55 07:46-08:01/15 19:56 07:20-07:32/12	07:42 08:13-08:45/32 18:49 08:13-08:45/32	07:34 13:18-15:51/153 16:51 13:17-15:49/152	08:19 14:35-14:49/14 10:17-10:42/25 16:24 13:20-14:31/71
11	05:28 06:02-06:43/41 21:41 06:02-06:44/42	06:09 06:36-07:03/27 20:59 07:05-07:13/8	06:57 07:44-08:03/19 19:54 07:22-07:30/8	07:44 08:13-08:45/32 18:47 08:12-08:43/31	07:36 13:17-15:49/152 16:49 13:15-15:48/153	08:20 14:37-14:48/11 10:17-10:43/26 16:24 13:20-14:31/71
12	05:29 06:02-06:44/42 21:40 06:02-06:44/42	06:10 07:05-07:13/8 20:57 06:37-07:01/24	06:58 07:42-08:04/22 19:52 07:41-08:05/24	07:45 08:12-08:43/31 18:45 08:13-08:43/30	07:38 13:15-15:48/153 16:48 13:14-15:46/152	08:21 14:38-14:47/9 10:18-10:45/27 16:24 13:21-14:31/70
13	05:30 06:02-06:44/42 21:39 06:03-06:44/41	06:12 07:03-07:16/13 20:55 06:39-07:01/22	07:00 07:41-08:05/24 19:50 07:39-08:06/27	07:47 08:13-08:43/30 18:43 08:14-08:42/28	07:40 13:14-15:46/152 16:46 13:13-15:38/145	08:22 14:40-14:46/6 10:18-10:46/28 16:23 13:22-14:32/70
14	05:31 06:03-06:44/41 21:38 06:03-06:45/42	06:14 06:40-07:17/37 20:53 06:42-07:19/37	07:01 07:39-08:05/26 19:47 07:39-08:06/27	07:49 08:14-08:42/28 18:41 08:16-08:42/26	07:41 13:13-15:38/145 16:45 13:12-15:38/146	08:23 14:43-14:44/1 10:17-10:46/29 16:24 13:22-14:32/70
15	05:32 06:03-06:45/42 21:37 06:03-06:45/42	06:15 06:42-07:19/37 20:51 06:43-06:57/14	07:03 07:39-08:06/27 19:45 07:37-08:05/28	07:50 08:16-08:42/26 18:39 07:58-08:24/29/5	07:43 13:13-15:38/145 16:44 13:12-15:38/146	08:24 13:23-14:32/69 16:24 10:18-10:46/28
16	05:33 06:03-06:45/42 21:36 06:04-06:45/41	06:17 06:58-07:19/21 20:49 06:43-06:57/14	07:04 07:37-08:05/28 19:43 07:37-08:06/29	07:52 08:17-08:40/23 18:37 08:19-08:38/19	07:45 13:12-15:38/146 16:42 13:11-15:37/146	08:25 13:24-14:33/69 16:24 10:18-10:47/29
17	05:34 06:04-06:45/41 21:35 06:04-06:45/41	06:18 06:57-07:20/23 20:47 06:45-06:55/10	07:06 07:37-08:06/29 19:41 07:36-08:05/29	07:54 08:19-08:38/19 18:35 08:21-08:37/16	07:46 13:11-15:37/146 16:41 13:11-15:37/146	08:26 13:25-14:34/69 16:24 10:19-10:49/30
18	05:35 06:04-06:45/41 21:34 06:05-06:45/40	06:20 06:56-07:20/24 20:45 06:46-06:51/5	07:08 07:36-08:05/29 19:38 07:37-08:05/28	07:55 08:21-08:37/16 18:33 08:24-08:29/5	07:48 13:11-15:37/146 16:40 15:15-15:36/21	08:27 13:25-14:34/69 16:24 10:19-10:49/30
19	05:37 06:05-06:45/40 21:33 06:07-06:46/39	06:21 06:56-07:21/25 20:43 06:55-07:21/26	07:09 07:37-08:05/28 19:36 07:36-08:04/28	07:57 08:23-08:34/11 18:30 08:24-08:29/5	07:50 13:11-15:37/146 16:38 13:12-15:14/122	08:28 13:26-14:34/68 16:25 10:20-10:50/30
20	05:38 06:07-06:46/39 21:32 06:08-06:46/38	06:23 06:55-07:21/26 20:41 06:55-07:21/26	07:11 07:36-08:04/28 19:34 07:37-08:03/26	07:59 08:24-08:29/5 18:28 07:38-08:02/24	07:51 15:15-15:36/21 16:37 13:12-15:14/122	08:29 13:27-14:35/68 16:25 10:20-10:50/30
21	05:39 06:08-06:46/38 21:31 06:09-06:46/37	06:24 06:55-07:21/26 20:39 06:54-07:21/27	07:12 07:37-08:03/26 19:32 07:38-08:02/24	08:00 07:38-08:02/24 18:26 07:38-08:02/24	07:53 15:15-15:35/20 16:36 13:12-15:13/121	08:28 13:26-14:34/68 16:25 10:20-10:50/30
22	05:40 06:09-06:46/37 21:30 06:10-06:46/36	06:26 06:54-07:21/27 20:37 06:54-07:20/26	07:14 07:38-08:02/24 19:29 07:40-08:01/21	08:02 07:40-08:01/21 18:24 07:41-07:59/18	07:54 15:17-15:34/17 16:35 13:11-15:13/122	08:29 13:27-14:35/68 16:26 10:21-10:51/30
23	05:42 06:10-06:46/36 21:28 06:11-06:46/35	06:27 06:54-07:20/26 20:35 06:55-07:20/25	07:15 07:40-08:01/21 19:27 07:41-07:59/18	08:04 07:41-07:59/18 18:22 07:43-07:57/14	07:56 15:19-15:34/15 16:34 13:12-15:13/121	08:29 13:27-14:35/68 16:26 10:21-10:51/30
24	05:43 06:11-06:46/35 21:27 06:13-06:46/33	06:29 06:55-07:20/25 20:33 06:56-07:19/23	07:17 07:41-07:59/18 19:25 07:43-07:57/14	08:05 07:43-07:57/14 18:20 07:44-07:54/10	07:58 15:21-15:33/12 16:33 13:12-15:13/121	08:30 13:28-14:37/69 16:27 10:22-10:52/30
25	05:44 06:13-06:46/33 21:26 06:14-06:55/41	06:30 06:56-07:19/23 20:31 07:24-07:34/10	07:18 07:43-07:57/14 19:23 07:44-07:54/10	07:07 07:44-07:54/10 17:19 15:34-15:49/15	07:59 15:23-15:30/7 16:32 13:12-15:12/120	08:30 13:28-14:37/69 16:27 10:22-10:52/30
26	05:46 06:14-06:55/41 21:24 06:17-06:57/40	06:32 07:24-07:34/10 20:29 06:58-07:18/20	07:20 07:44-07:54/10 19:20 07:46-07:49/3	07:09 15:36-15:46/10 17:17 15:34-15:49/15	08:01 13:12-15:12/120 16:31 13:13-15:12/119	08:30 13:29-14:37/68 16:28 10:22-10:52/30
27	05:47 06:17-06:57/40 21:23 06:19-06:59/40	06:34 07:21-07:36/15 20:27 06:59-07:17/18	07:22 07:46-07:49/3 19:18 07:19-07:38/19	07:11 15:34-15:49/15 17:15 15:32-15:51/19	08:02 13:13-15:12/119 16:30 13:13-15:11/118	08:31 13:29-14:38/69 16:29 10:23-10:52/29
28	05:48 06:19-06:59/40 21:22 06:19-07:00/41	06:35 07:19-07:38/19 20:25 07:01-07:16/15	07:23 07:19-07:38/19 19:16 07:17-07:38/21	07:12 15:32-15:51/19 17:13 15:30-15:51/21	08:04 13:13-15:11/118 16:30 13:14-15:11/117	08:31 13:29-14:38/69 16:30 10:23-10:52/29
29	05:50 06:19-07:00/41 21:20 06:19-07:00/41	06:37 07:17-07:38/21 20:23 07:02-07:13/11	07:25 07:17-07:38/21 19:14 08:26-08:38/12	07:14 15:30-15:51/21 17:11 15:29-15:52/23	08:05 13:14-15:11/117 16:29 14:54-15:10/16	08:31 13:29-14:39/70 16:30 10:25-10:53/28
30	05:51 06:19-07:00/41 21:19 06:21-07:02/41	06:38 07:17-07:40/23 20:20 07:04-07:11/7	07:26 08:26-08:38/12 19:11 07:15-07:39/24	07:16 15:29-15:52/23 17:09 15:29-15:52/23	08:06 14:54-15:10/16 16:28 13:14-14:52/98	08:31 14:48-14:53/5 10:26-10:54/28 16:31 13:29-14:39/70
31	05:53 06:21-07:02/41 21:17 06:21-07:02/41	06:40 07:15-07:39/24 20:18 06:21-07:02/41	07:26 08:26-08:38/12 19:11 07:15-07:39/24	07:17 15:29-15:52/23 17:07 06:21-07:02/41	08:07 14:54-15:10/16 16:28 13:14-14:52/98	08:31 14:47-14:56/9 10:26-10:53/27 16:32 13:30-14:40/70
Sonnenscheinstunden	496	450	380	333	270	250
Anzahl Minuten mit Schatten	1244	946	639	608	3585	3202

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG****Unter den Eichen 7
65195 Wiesbaden**

Lizenzierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt
Berechnet:
17.10.2023 09:23/3.6.361

SHADOW - Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung **WEA:** WEA06 - E-175 EP5; 162 m

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BONN]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,76 3,05 3,38 5,06 6,16 5,30 6,18 5,97 4,66 2,89 2,21 1,34

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
429 295 501 689 900 798 628 993 773 870 849 616 8.341
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Juli		August		September		Oktober		November		Dezember	
1	05:19 18:54-19:36/42	05:54 18:05-18:54/49	06:41 18:05-18:54/49	06:41 18:05-18:54/49	06:41 18:05-18:54/49	06:41 18:05-18:54/49	06:41 18:05-18:54/49	07:19 14:12-14:28/16	17:05	08:08 08:54-09:14/20	12:09-12:45/36 10:30-11:22/52
2	05:20 18:54-19:35/41	05:56 18:05-18:53/48	06:43 18:05-18:53/48	06:43 18:05-18:53/48	06:43 18:05-18:53/48	06:43 18:05-18:53/48	06:43 18:05-18:53/48	07:21 08:35-08:45/10	17:05	08:09 08:55-09:14/19	12:09-12:45/36 10:31-11:22/51
3	05:21 18:55-19:36/41	05:57 18:06-18:53/47	06:44 18:06-18:53/47	06:44 18:06-18:53/47	06:44 18:06-18:53/47	06:44 18:06-18:53/47	06:44 18:06-18:53/47	07:22 08:33-08:48/15	17:04 14:10-14:30/20	08:11 08:56-09:14/18	12:09-12:46/37 10:32-11:23/51
4	05:21 18:55-19:36/41	05:58 18:05-18:53/48	06:46 18:05-18:53/48	06:46 18:05-18:53/48	06:46 18:05-18:53/48	06:46 18:05-18:53/48	06:46 18:05-18:53/48	07:24 08:32-08:50/18	17:00 14:06-14:32/26	08:12 08:57-09:13/16	12:09-12:46/37 10:33-11:22/49
5	05:22 18:56-19:36/40	06:00 18:05-18:52/47	06:47 18:05-18:52/47	06:47 18:05-18:52/47	06:47 18:05-18:52/47	06:47 18:05-18:52/47	06:47 18:05-18:52/47	07:26 08:30-08:50/20	17:00 14:06-14:32/26	08:12 08:57-09:13/16	12:09-12:46/37 10:33-11:22/49
6	05:23 18:56-19:35/39	06:01 18:06-18:52/46	06:49 18:06-18:52/46	06:49 18:06-18:52/46	06:49 18:06-18:52/46	06:49 18:06-18:52/46	06:49 18:06-18:52/46	07:28 08:29-08:51/22	16:59 14:05-14:33/28	08:13 08:58-09:12/14	12:09-12:46/37 10:34-11:22/48
7	05:24 18:56-19:36/40	06:03 18:06-18:51/45	06:51 18:06-18:51/45	06:51 18:06-18:51/45	06:51 18:06-18:51/45	06:51 18:06-18:51/45	06:51 18:06-18:51/45	07:29 08:29-08:52/23	16:59 14:05-14:33/28	08:14 08:59-09:13/14	12:10-12:47/37 10:36-11:23/47
8	05:25 18:57-19:36/39	06:04 18:07-18:51/44	06:52 18:07-18:51/44	06:52 18:07-18:51/44	06:52 18:07-18:51/44	06:52 18:07-18:51/44	06:52 18:07-18:51/44	07:31 10:23-11:00/37	16:55 14:04-14:35/31	08:15 09:01-09:12/11	12:10-12:47/37 10:37-11:23/46
9	05:26 18:58-19:35/37	06:06 18:07-18:49/42	06:54 18:07-18:49/42	06:54 18:07-18:49/42	06:54 18:07-18:49/42	06:54 18:07-18:49/42	06:54 18:07-18:49/42	07:33 10:22-11:05/43	16:55 14:04-14:35/31	08:16 09:01-09:12/11	12:10-12:47/37 10:37-11:23/46
10	05:27 18:58-19:35/37	06:07 18:07-18:48/41	06:55 18:07-18:48/41	06:55 18:07-18:48/41	06:55 18:07-18:48/41	06:55 18:07-18:48/41	06:55 18:07-18:48/41	07:34 08:29-09:04/35	16:55 14:04-14:35/31	08:17 09:02-09:11/9	12:11-12:48/37 10:39-11:23/44
11	05:28 18:59-19:35/36	06:09 18:08-18:48/40	06:57 18:08-18:48/40	06:57 18:08-18:48/40	06:57 18:08-18:48/40	06:57 18:08-18:48/40	06:57 18:08-18:48/40	07:36 08:29-09:06/37	16:55 14:04-14:35/31	08:18 09:03-09:10/7	12:11-12:48/37 10:41-11:23/42
12	05:29 18:59-19:35/36	06:10 18:08-18:46/38	06:58 18:08-18:46/38	06:58 18:08-18:46/38	06:58 18:08-18:46/38	06:58 18:08-18:46/38	06:58 18:08-18:46/38	07:38 08:28-09:07/39	16:55 14:04-14:35/31	08:19 09:06-09:08/2	12:11-12:48/37 10:43-10:47/4
13	05:30 19:00-19:34/34	06:12 18:10-18:45/35	07:00 18:10-18:45/35	07:00 18:10-18:45/35	07:00 18:10-18:45/35	07:00 18:10-18:45/35	07:00 18:10-18:45/35	07:40 08:28-09:08/40	16:48 13:33-13:48/15	08:20 12:58-14:04/66	11:29-12:05/36 10:43-10:47/4
14	05:31 19:01-19:34/33	06:14 18:10-18:43/33	07:01 18:10-18:43/33	07:01 18:10-18:43/33	07:01 18:10-18:43/33	07:01 18:10-18:43/33	07:01 18:10-18:43/33	07:41 08:29-09:10/41	16:48 13:33-13:48/15	08:21 12:59-14:04/65	11:29-12:05/36 10:43-10:47/4
15	05:32 19:01-19:33/32	06:15 18:12-18:42/30	07:03 18:12-18:42/30	07:03 18:12-18:42/30	07:03 18:12-18:42/30	07:03 18:12-18:42/30	07:03 18:12-18:42/30	07:43 08:30-09:11/41	16:48 13:33-13:48/15	08:22 12:59-14:05/66	11:30-12:06/36 10:43-10:47/4
16	05:33 19:02-19:32/30	06:17 18:14-18:39/25	07:04 18:14-18:39/25	07:04 18:14-18:39/25	07:04 18:14-18:39/25	07:04 18:14-18:39/25	07:04 18:14-18:39/25	07:45 08:30-09:12/42	16:48 13:33-13:48/15	08:23 13:00-13:35/35	11:31-12:07/36 10:43-10:47/4
17	05:34 19:03-19:31/28	06:18 18:16-18:37/21	07:06 18:16-18:37/21	07:06 18:16-18:37/21	07:06 18:16-18:37/21	07:06 18:16-18:37/21	07:06 18:16-18:37/21	07:46 08:31-09:12/41	16:48 13:33-13:48/15	08:24 13:00-14:05/65	11:32-12:07/35 10:43-10:47/4
18	05:35 19:04-19:30/26	06:20 18:19-18:33/14	07:07 18:19-18:33/14	07:07 18:19-18:33/14	07:07 18:19-18:33/14	07:07 18:19-18:33/14	07:07 18:19-18:33/14	07:48 08:31-09:12/41	16:48 13:33-13:48/15	08:25 13:01-14:06/65	11:33-12:08/35 10:43-10:47/4
19	05:37 19:05-19:29/24	06:21 18:19-18:33/14	07:08 18:19-18:33/14	07:08 18:19-18:33/14	07:08 18:19-18:33/14	07:08 18:19-18:33/14	07:08 18:19-18:33/14	07:49 08:33-09:13/40	16:48 13:33-13:48/15	08:26 13:02-13:37/35	11:33-12:08/35 10:43-10:47/4
20	05:38 19:07-19:27/20	06:23 18:18-18:52/44	07:10 18:18-18:52/44	07:10 18:18-18:52/44	07:10 18:18-18:52/44	07:10 18:18-18:52/44	07:10 18:18-18:52/44	07:51 08:34-09:13/39	16:48 13:33-13:48/15	08:27 13:03-13:39/36	11:34-12:09/35 10:43-10:47/4
21	05:39 19:09-19:27/18	06:24 18:18-18:54/46	07:11 18:18-18:54/46	07:11 18:18-18:54/46	07:11 18:18-18:54/46	07:11 18:18-18:54/46	07:11 18:18-18:54/46	07:53 08:36-09:14/38	16:48 13:33-13:48/15	08:28 13:40-14:07/27	12:16-12:53/37 10:55-11:27/32
22	05:40 19:12-19:24/12	06:26 18:18-18:54/47	07:12 18:18-18:54/47	07:12 18:18-18:54/47	07:12 18:18-18:54/47	07:12 18:18-18:54/47	07:12 18:18-18:54/47	07:54 08:37-09:14/37	16:48 13:33-13:48/15	08:29 13:41-14:08/27	12:17-12:54/37 10:56-11:28/32
23	05:42 18:07-18:54/47	06:27 18:18-18:54/47	07:13 18:18-18:54/47	07:13 18:18-18:54/47	07:13 18:18-18:54/47	07:13 18:18-18:54/47	07:13 18:18-18:54/47	07:56 08:40-09:14/25	16:48 13:33-13:48/15	08:30 13:42-14:10/28	12:19-12:55/36 10:57-11:29/32
24	05:43 18:06-18:53/47	06:29 18:18-18:53/47	07:15 18:18-18:53/47	07:15 18:18-18:53/47	07:15 18:18-18:53/47	07:15 18:18-18:53/47	07:15 18:18-18:53/47	07:57 08:41-09:14/25	16:48 13:33-13:48/15	08:31 13:42-14:11/29	12:19-12:55/36 10:57-11:29/32
25	05:44 18:07-18:54/47	06:30 18:18-18:54/47	07:16 18:18-18:54/47	07:16 18:18-18:54/47	07:16 18:18-18:54/47	07:16 18:18-18:54/47	07:16 18:18-18:54/47	07:59 08:42-09:14/25	16:48 13:33-13:48/15	08:32 13:43-14:12/30	12:20-12:56/37 10:58-11:31/33
26	05:46 18:06-18:54/48	06:32 18:18-18:54/48	07:18 18:18-18:54/48	07:18 18:18-18:54/48	07:18 18:18-18:54/48	07:18 18:18-18:54/48	07:18 18:18-18:54/48	08:01 08:50-09:14/24	16:48 13:33-13:48/15	08:33 13:06-13:41/35	11:38-12:13/35 10:58-11:31/33
27	05:47 18:06-18:54/48	06:34 18:18-18:54/48	07:20 18:18-18:54/48	07:20 18:18-18:54/48	07:20 18:18-18:54/48	07:20 18:18-18:54/48	07:20 18:18-18:54/48	08:03 08:51-09:15/24	16:48 13:33-13:48/15	08:34 13:07-13:42/36	11:39-12:14/35 10:58-11:31/33
28	05:48 18:05-18:54/49	06:35 18:18-18:54/49	07:21 18:18-18:54/49	07:21 18:18-18:54/49	07:21 18:18-18:54/49	07:21 18:18-18:54/49	07:21 18:18-18:54/49	08:04 08:51-09:14/23	16:48 13:33-13:48/15	08:35 13:08-13:43/37	11:40-12:15/36 10:58-11:31/33
29	05:50 18:06-18:54/48	06:37 18:18-18:54/48	07:23 18:18-18:54/48	07:23 18:18-18:54/48	07:23 18:18-18:54/48	07:23 18:18-18:54/48	07:23 18:18-18:54/48	08:05 08:52-09:14/23	16:48 13:33-13:48/15	08:36 13:09-13:44/38	11:41-12:16/37 10:58-11:31/33
30	05:51 18:05-18:54/49	06:38 18:18-18:54/49	07:24 18:18-18:54/49	07:24 18:18-18:54/49	07:24 18:18-18:54/49	07:24 18:18-18:54/49	07:24 18:18-18:54/49	08:06 08:53-09:14/21	16:48 13:33-13:48/15	08:37 13:10-13:45/39	11:42-12:17/38 10:58-11:31/33
31	05:53 18:05-18:53/48	06:40 18:18-18:53/48	07:26 18:18-18:53/48	07:26 18:18-18:53/48	07:26 18:18-18:53/48	07:26 18:18-18:53/48	07:26 18:18-18:53/48	08:08 08:54-09:14/21	16:48 13:33-13:48/15	08:38 13:11-13:46/40	11:43-12:18/39 10:58-11:31/33
Sonnenscheinstunden		496	450	380	333	270	4825	270	4825	250	5553
Anzahl Minuten mit Schatten		1991	693	0	8	14:16-14:24/8					

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

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

Projekt:

**Alter Bornskopf
ABO Wind AG**

**Unter den Eichen 7
65195 Wiesbaden**

Lizenziierter Anwender:

windtest grevenbroich gmbh
Frimmersdorfer Straße 73a
DE-41517 Grevenbroich
+49 2181 2278 0
Florian Schmidt

Berechnet:

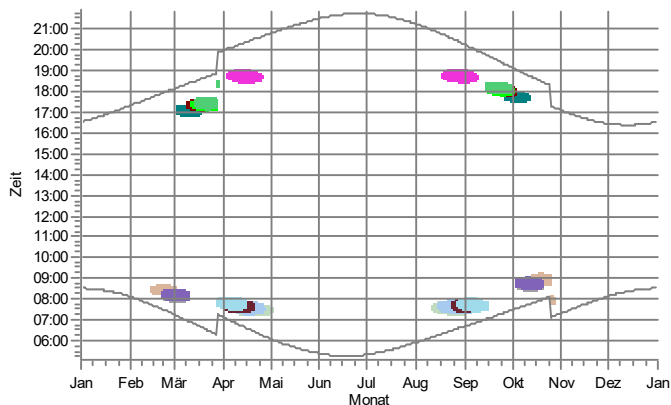
17.10.2023 09:23/3.6.361



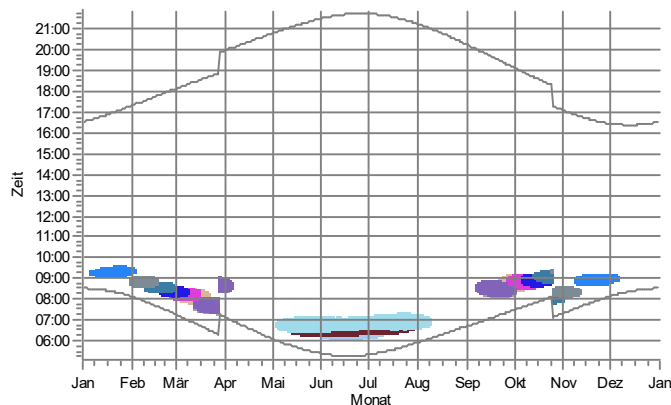
SHADOW - Grafischer Kalender pro WEA

Berechnung: SW23015 Alter-Bornskopf Zusatz- / Gesamtbelastung

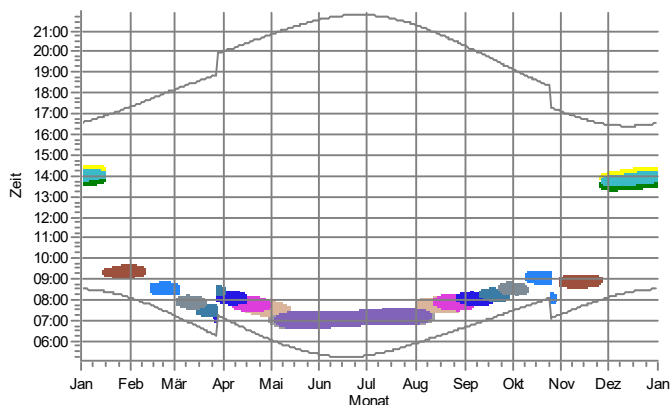
WEA01: E-175 EP5; 162 m



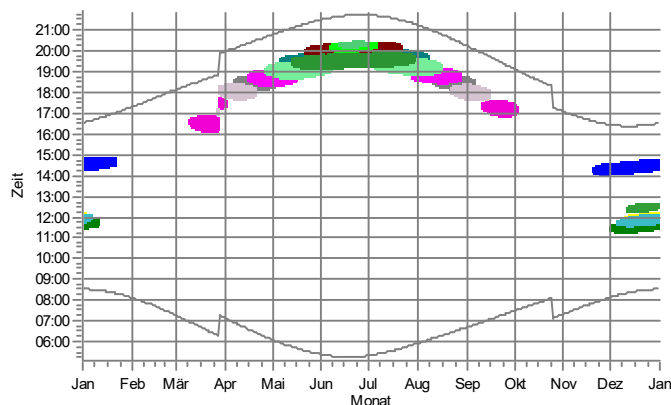
WEA02: E-175 EP5; 162 m



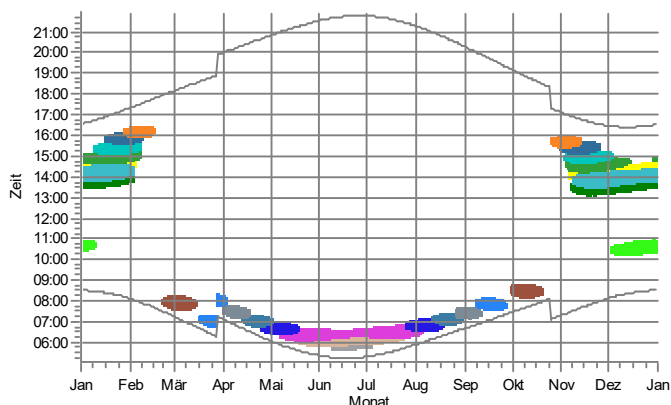
WEA03: E-175 EP5; 162 m



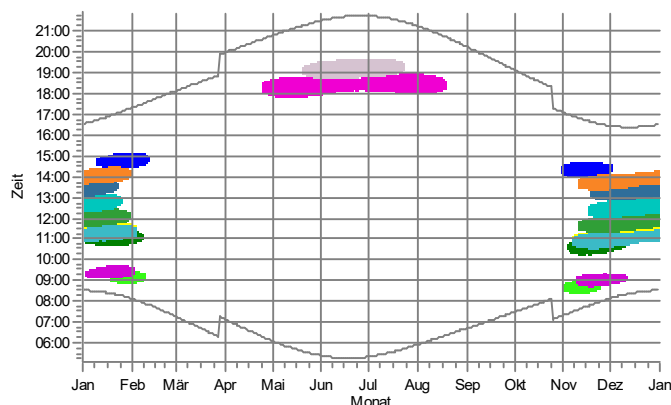
WEA04: E-175 EP5; 162 m



WEA05: E-175 EP5; 162 m



WEA06: E-175 EP5; 162 m



Schattenrezeptoren

IP01: Lindenstraße 35, 57518 Alsdorf
IP02: Am Arsberg 62, 57518 Alsdorf
IP03: Schutzbacher Weg 81, 57518 Alsdorf
IP04: Auf dem Ebenhahn 1, 57520 Schutzbach
IP05: Auf dem Ebenhahn 25, 57520 Schutzbach
IP06: Im Stangenwald 3, 57520 Schutzbach
IP07: Zur Grünen Au 7, 57520 Schutzbach
IP08: Auf d. Bühnhardt 6, 57520 Schutzbach
IP09: Auf d. Bühnhardt 2, 57520 Schutzbach

IP14: Lärchenweg 13, 57520 Molzhain
IP15: Auf d. Höhe 25, 57520 Molzhain
IP16: Lindentalstraße 42, 57518 Steinerth
IP17: Peter-Hellinghausen-Straße 41, 57518 Steinerth
IP18: Franz-Josef-Magnus-Straße 26, 57518 Betzdorf
IP19: Lerchenweg 12, 57518 Alsdorf
IP20: Am Arsberg 46, 57518 Alsdorf
IP21: Am Arsberg 26, 57518 Alsdorf
IP22: Am Krahstück 31, 57518 Alsdorf

IP23: Rehzugstraße 5, 57518 Alsdorf
IP24: Am bnf Schutzbach 2, 57518 Alsdorf
IP25: Bahnhofsweg 1, 57520 Schutzbach
IP26: Auf dem Ebenhahn 17, 57520 Schutzbach
IP27: Schulstraße 22, 57520 Schutzbach
IP28: Auf d. Bühnhardt 23, 57520 Schutzbach
IP31: In d. Eichwies 11, 57520 Schutzbach
IP32: Auf d. Höhe 13, 57520 Molzhain
IP33: Oberbergstraße 29, 57520 Molzhain

IP34: Lindentalstraße, 57518 Steinerth
IP35: Peter-Hellinghausen-Straße 31, 57518 Steinerth
IP36: Peter-Hellinghausen-Straße 17, 57518 Steinerth
IP37: Weiherstraße 6, 57518 Steinerth
IP38: Betzdorfer Str. 1, 57518 Steinerth
IP39: Betzdorfer Str. 2, 57518 Steinerth
IP40: Gewerbepark-Betzdorf 2A, 57518 Betzdorf
IP41: Franz-Josef-Magnus-Straße 12, 57518 Betzdorf