

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbeltastung & 1 x Neuanlage) Schattenrezeptor: RZ A - Koksberg 1, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni							
1	08:32 16:26	14:50 (WP Hirsch-4N) 15:52 (WP Hirsch-01)	08:05 17:13	15:14 (WP Hirsch-11) 16:39 (WP Hirsch-02)	07:13 18:04	07:41 (WP EIB-42) 19:57	07:03 21	07:25 (WP EIB-41) 07:50 (WP EIB-14)	05:59 20:48	05:15 21:33	06:05 (WP EIB-44) 46	06:51 (WP EIB-44)	
2	08:32 16:27	14:50 (WP Hirsch-4N) 15:53 (WP Hirsch-01)	08:04 17:15	15:15 (WP Hirsch-11) 16:42 (WP Hirsch-02)	07:11 18:06	07:41 (WP EIB-42) 19:59	07:01 21	07:23 (WP EIB-41) 07:39 (WP EIB-41)	05:57 20:49	05:14 21:34	06:05 (WP EIB-44) 46	06:51 (WP EIB-44)	
3	08:31 16:28	14:51 (WP Hirsch-4N) 15:54 (WP Hirsch-01)	08:02 17:16	15:16 (WP Hirsch-11) 16:43 (WP Hirsch-02)	07:09 18:07	07:41 (WP EIB-42) 19:59	07:01 21	07:23 (WP EIB-41) 07:39 (WP EIB-41)	05:55 20:49	05:13 21:34	06:05 (WP EIB-44) 46	06:51 (WP EIB-44)	
4	08:31 16:30	14:52 (WP Hirsch-4N) 15:56 (WP Hirsch-01)	08:01 17:19	15:17 (WP Hirsch-11) 16:44 (WP Hirsch-02)	07:06 18:10	07:34 (WP EIB-15) 19:59	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:53 20:52	05:12 21:36	06:06 (WP EIB-44) 46	06:52 (WP EIB-44)	
5	08:31 16:31	14:53 (WP Hirsch-4N) 15:56 (WP Hirsch-01)	07:59 17:21	15:18 (WP Hirsch-11) 16:44 (WP Hirsch-02)	07:04 18:11	07:31 (WP EIB-15) 19:59	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:52 20:54	05:12 21:37	06:05 (WP EIB-44) 46	06:51 (WP EIB-44)	
6	08:31 16:32	14:54 (WP Hirsch-4N) 15:58 (WP Hirsch-01)	07:58 17:23	15:19 (WP Hirsch-11) 16:45 (WP Hirsch-02)	07:02 18:13	07:30 (WP EIB-15) 19:59	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:50 20:56	05:11 21:38	06:06 (WP EIB-44) 46	06:52 (WP EIB-44)	
7	08:30 16:33	14:55 (WP Hirsch-4N) 15:59 (WP Hirsch-01)	07:56 17:24	15:20 (WP Hirsch-11) 16:46 (WP Hirsch-02)	07:00 18:15	07:29 (WP EIB-15) 19:59	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:48 20:57	05:11 21:39	06:06 (WP EIB-44) 46	06:52 (WP EIB-44)	
8	08:30 16:34	14:58 (WP Hirsch-4N) 16:01 (WP Hirsch-01)	07:54 17:26	15:21 (WP Hirsch-11) 16:47 (WP Hirsch-02)	06:58 18:17	07:28 (WP EIB-15) 19:59	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:46 20:59	05:10 21:40	06:06 (WP EIB-44) 46	06:52 (WP EIB-44)	
9	08:29 16:36	15:00 (WP Hirsch-01) 16:02 (WP Hirsch-01)	07:52 17:28	16:44 (WP Hirsch-02) 18:18	06:55 18:18	07:29 (WP EIB-15) 20:11	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:45 21:01	05:09 21:40	06:06 (WP EIB-44) 46	06:53 (WP EIB-44)	
10	08:29 16:37	15:08 (WP Hirsch-11) 16:03 (WP Hirsch-01)	07:51 17:30	16:43 (WP Hirsch-02) 18:20	06:53 18:20	07:29 (WP EIB-15) 20:13	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:43 21:02	05:09 21:41	06:06 (WP EIB-44) 46	06:53 (WP EIB-44)	
11	08:28 16:39	15:09 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:49 17:32	16:42 (WP Hirsch-02) 18:22	06:51 18:22	07:30 (WP EIB-15) 20:14	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:41 21:04	05:09 21:42	06:07 (WP EIB-44) 46	06:54 (WP EIB-44)	
12	08:28 16:40	15:08 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:47 17:34	16:42 (WP Hirsch-02) 18:24	06:49 18:24	07:28 (WP EIB-15) 20:16	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:40 21:05	05:08 21:43	06:07 (WP EIB-44) 46	06:54 (WP EIB-44)	
13	08:27 16:41	15:08 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:45 17:35	16:42 (WP Hirsch-02) 18:25	06:46 18:25	07:28 (WP EIB-15) 20:16	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:38 21:07	05:08 21:43	06:07 (WP EIB-44) 46	06:54 (WP EIB-44)	
14	08:26 16:42	15:08 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:43 17:36	16:43 (WP Hirsch-02) 18:26	06:44 18:26	07:27 (WP EIB-15) 20:16	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:36 21:08	05:08 21:44	06:07 (WP EIB-44) 46	06:54 (WP EIB-44)	
15	08:26 16:44	15:08 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:41 17:39	16:43 (WP Hirsch-02) 18:29	06:42 18:29	07:06 (WP EIB-27) 20:32	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:35 21:10	05:08 21:44	06:07 (WP EIB-44) 46	06:54 (WP EIB-44)	
16	08:25 16:46	15:08 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:39 17:41	16:44 (WP Hirsch-02) 18:30	06:40 18:30	08:01 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:33 21:11	05:07 21:45	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
17	08:24 16:48	15:08 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:38 17:43	16:44 (WP Hirsch-02) 18:31	06:37 18:32	08:01 (WP EIB-26) 20:32	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:32 21:13	05:07 21:45	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
18	08:23 16:49	15:09 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:36 17:45	16:45 (WP Hirsch-02) 18:34	06:35 18:34	07:02 (WP EIB-27) 20:32	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:31 21:14	05:07 21:46	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
19	08:22 16:51	15:09 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:34 17:46	16:45 (WP Hirsch-02) 18:36	06:33 18:36	07:01 (WP EIB-27) 20:32	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:29 21:16	05:07 21:46	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
20	08:21 16:52	15:09 (WP Hirsch-11) 16:03 (WP Hirsch-01)	07:32 17:48	16:46 (WP Hirsch-02) 18:37	06:30 18:37	07:01 (WP EIB-27) 20:32	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:28 21:17	05:07 21:46	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
21	08:20 16:54	15:09 (WP Hirsch-11) 16:03 (WP Hirsch-01)	07:30 17:50	16:47 (WP Hirsch-02) 18:39	06:28 18:39	07:02 (WP EIB-27) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:26 21:19	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
22	08:19 16:56	15:09 (WP Hirsch-11) 16:03 (WP Hirsch-01)	07:28 17:52	16:48 (WP Hirsch-02) 18:41	06:26 18:41	07:03 (WP EIB-27) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:25 21:20	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
23	08:18 16:58	15:10 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:25 17:54	16:49 (WP Hirsch-02) 18:42	06:24 18:42	07:03 (WP EIB-27) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:24 21:21	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
24	08:16 16:59	15:10 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:23 17:55	16:50 (WP Hirsch-02) 18:44	06:21 18:44	07:04 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:23 21:23	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
25	08:15 17:01	15:10 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:21 17:57	16:51 (WP Hirsch-02) 18:46	06:19 18:46	07:05 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:22 21:24	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
26	08:14 17:03	15:11 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:19 17:59	16:52 (WP Hirsch-02) 18:47	06:17 18:47	07:06 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:20 21:25	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
27	08:13 17:04	15:11 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:17 18:01	16:53 (WP Hirsch-02) 18:49	06:14 18:49	07:07 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:19 21:27	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
28	08:11 17:06	15:12 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:15 18:03	16:54 (WP Hirsch-02) 18:51	06:12 18:51	07:08 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:18 21:28	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
29	08:08 17:08	15:13 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:14 18:08	16:55 (WP Hirsch-02) 18:52	06:11 18:52	07:09 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:16 21:29	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
30	08:08 17:10	15:13 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:14 18:08	16:56 (WP Hirsch-02) 18:53	06:11 18:53	07:10 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:15 21:30	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
31	08:07 17:12	15:13 (WP Hirsch-11) 16:04 (WP Hirsch-01)	07:14 18:08	16:57 (WP Hirsch-02) 18:54	06:11 18:54	07:11 (WP EIB-26) 20:31	07:01 21	07:26 (WP EIB-41) 07:40 (WP EIB-41)	05:15 21:32	05:07 21:47	06:06 (WP EIB-44) 46	06:54 (WP EIB-44)	
Sonnenscheinstunden	261	278	367	415	484	760	949	1140	1059	606	326	7370	
astr. max. mögl. Beschattung	1524	862	984	495	495	495	495	495	495	495	495	495	1469
Red. Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36	0,43	0,43	0,43	0,43	0,43	0,43	0,43	0,43	0,34
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,70	0,67	0,63	0,69	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72
Gesamte Reduktion	0,11	0,18	0,15	0,21	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,20
Met. wahrsch. Beschattung	168	156	147	104	196	298	326	326	326	326	326	326	298

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	WEA mit erstem Schatten	WEA mit letztem Schatten
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Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ A - Koksberg 1, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AA - Am Südhang 32, Bad Wünnenberg (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
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	16:27	17:14	18:04	19:58	20:48	21:33	21:46	21:15	20:14	19:06	17:00	16:21
2	08:32	08:04	07:11	07:01	05:57	05:14	05:13	05:49	06:38	07:26	07:19	08:09
	16:28	17:15	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:58	16:20
3	08:31	08:02	07:09	06:59	05:56	05:13	05:13	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:19
4	08:31	08:01	07:06	06:56	05:54	05:13	05:14	05:52	06:41	07:30	07:23	08:12
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	16:31	17:21	18:12	20:04	20:54	21:37	21:45	21:09	20:05	18:56	16:53	16:18
6	08:31	07:58	07:02	06:52	05:50	05:11	05:16	05:55	06:45	07:33	07:27	08:15
	16:32	17:23	18:13	20:06	20:56	21:38	21:44	21:07	20:03	18:54	16:51	16:18
7	08:30	07:56	07:00	06:50	05:48	05:11	05:17	05:57	06:46	07:35	07:28	08:16
	16:33	17:25	18:15	20:08	20:57	21:39	21:44	21:05	20:01	18:52	16:50	16:18
8	08:30	07:54	06:58	06:47	05:47	05:10	05:18	05:59	06:48	07:36	07:30	08:17
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9	08:29	07:52	06:55	06:45	05:45	05:10	05:18	06:00	06:49	07:38	07:32	08:18
	16:36	17:28	18:19	20:11	21:01	21:40	21:43	21:01	19:56	18:47	16:47	16:17
10	08:29	07:51	06:53	06:43	05:43	05:09	05:19	06:02	06:51	07:40	07:34	08:19
	16:37	17:30	18:20	20:13	21:02	21:41	21:42	21:00	19:54	18:45	16:45	16:17
11	08:28	07:49	06:51	06:41	05:42	05:09	05:20	06:03	06:53	07:41	07:35	08:20
	16:39	17:32	18:22	20:14	21:04	21:42	21:41	20:58	19:52	18:43	16:43	16:17
12	08:28	07:47	06:49	06:39	05:40	05:09	05:22	06:05	06:54	07:43	07:37	08:21
	16:40	17:34	18:24	20:16	21:05	21:43	21:40	20:56	19:49	18:41	16:42	16:16
13	08:27	07:45	06:46	06:36	05:38	05:08	05:23	06:06	06:56	07:45	07:39	08:22
	16:42	17:36	18:25	20:18	21:07	21:43	21:39	20:54	19:47	18:39	16:40	16:16
14	08:26	07:43	06:44	06:34	05:37	05:08	05:24	06:08	06:57	07:46	07:41	08:23
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16	08:25	07:40	06:40	06:30	05:34	05:08	05:26	06:11	07:01	07:50	07:44	08:25
	16:46	17:41	18:31	20:23	21:11	21:45	21:37	20:48	19:40	18:32	16:36	16:17
17	08:24	07:38	06:37	06:28	05:32	05:08	05:27	06:13	07:02	07:52	07:46	08:26
	16:48	17:43	18:32	20:24	21:13	21:45	21:36	20:46	19:38	18:30	16:35	16:17
18	08:23	07:36	06:35	06:26	05:31	05:08	05:28	06:14	07:04	07:53	07:47	08:27
	16:49	17:45	18:34	20:26	21:14	21:46	21:34	20:44	19:35	18:28	16:34	16:17
19	08:22	07:34	06:33	06:23	05:29	05:08	05:30	06:16	07:05	07:55	07:49	08:27
	16:51	17:47	18:36	20:28	21:16	21:46	21:33	20:42	19:33	18:26	16:32	16:17
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	16:54	17:50	18:39	20:31	21:19	21:47	21:31	20:38	19:28	18:22	16:30	16:18
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	16:56	17:52	18:41	20:33	21:20	21:47	21:30	20:36	19:26	18:20	16:29	16:19
23	08:18	07:26	06:24	06:15	05:24	05:08	05:35	06:22	07:12	08:02	07:56	08:30
	16:58	17:54	18:42	20:34	21:21	21:47	21:28	20:34	19:24	18:18	16:28	16:19
24	08:16	07:23	06:21	06:13	05:23	05:09	05:36	06:24	07:13	08:04	07:57	08:30
	16:59	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	16:20
25	08:15	07:21	06:19	06:11	05:22	05:09	05:38	06:25	07:15	07:05	07:59	08:31
	17:01	17:57	18:46	20:38	21:24	21:47	21:26	20:29	19:19	17:14	16:26	16:20
26	08:14	07:19	06:17	06:09	05:21	05:09	05:39	06:27	07:17	07:07	08:00	08:31
	17:03	17:59	18:47	20:39	21:25	21:47	21:24	20:27	19:17	17:12	16:25	16:21
27	08:13	07:17	06:15	06:07	05:20	05:10	05:41	06:29	07:18	07:09	08:02	08:31
	17:05	18:01	18:49	20:41	21:27	21:47	21:23	20:25	19:15	17:10	16:24	16:22
28	08:11	07:15	06:12	06:05	05:19	05:10	05:42	06:30	07:20	07:11	08:04	08:31
	17:06	18:03	18:51	20:43	21:28	21:47	21:21	20:23	19:12	17:08	16:23	16:23
29	08:10		07:10	06:03	05:18	05:11	05:43	06:32	07:22	07:12	08:05	08:32
	17:08		19:53	20:44	21:29	21:47	21:20	20:21	19:10	17:06	16:22	16:23
30	08:08		07:08	06:01	05:17	05:11	05:45	06:33	07:23	07:14	08:06	08:32
	17:10		19:54	20:46	21:30	21:47	21:18	20:19	19:08	17:04	16:21	16:24
31	08:07		07:05	06:05	05:16	05:16	05:46	06:35	07:16	07:16	08:02	08:32
	17:12		19:56	20:48	21:32	21:47	21:17	20:16		17:02	16:25	16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AB - Am Südhang 30, Bad Wünnenberg (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:32	08:06	07:13	07:03	05:59	05:15	05:12	05:48	06:37	07:25	07:18	08:08
	16:27	17:14	18:04	19:58	20:48	21:33	21:46	21:15	20:14	19:06	17:00	16:21
2	08:32	08:04	07:11	07:01	05:57	05:14	05:13	05:49	06:38	07:26	07:19	08:09
	16:28	17:15	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:58	16:20
3	08:31	08:02	07:09	06:59	05:56	05:13	05:13	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:19
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	16:32	17:23	18:13	20:06	20:56	21:38	21:44	21:07	20:03	18:54	16:51	16:18
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	16:33	17:25	18:15	20:08	20:57	21:39	21:44	21:05	20:01	18:52	16:50	16:18
8	08:30	07:54	06:58	06:47	05:47	05:10	05:18	05:59	06:48	07:36	07:30	08:17
	16:35	17:26	18:17	20:09	20:59	21:40	21:43	21:03	19:58	18:50	16:48	16:17
9	08:29	07:52	06:55	06:45	05:45	05:10	05:18	06:00	06:49	07:38	07:32	08:18
	16:36	17:28	18:19	20:11	21:01	21:40	21:43	21:01	19:56	18:47	16:47	16:17
10	08:29	07:51	06:53	06:43	05:43	05:09	05:19	06:02	06:51	07:40	07:34	08:19
	16:37	17:30	18:20	20:13	21:02	21:41	21:42	21:00	19:54	18:45	16:45	16:17
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12	08:28	07:47	06:49	06:39	05:40	05:09	05:22	06:05	06:54	07:43	07:37	08:21
	16:40	17:34	18:24	20:16	21:05	21:43	21:40	20:56	19:49	18:41	16:42	16:17
13	08:27	07:45	06:46	06:36	05:38	05:08	05:23	06:06	06:56	07:45	07:39	08:22
	16:42	17:36	18:25	20:18	21:07	21:43	21:39	20:54	19:47	18:39	16:40	16:16
14	08:26	07:43	06:44	06:34	05:37	05:08	05:24	06:08	06:57	07:46	07:41	08:23
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	16:46	17:41	18:31	20:23	21:11	21:45	21:37	20:48	19:40	18:32	16:36	16:17
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	16:48	17:43	18:32	20:24	21:13	21:45	21:36	20:46	19:38	18:30	16:35	16:17
18	08:23	07:36	06:35	06:26	05:31	05:08	05:28	06:14	07:04	07:53	07:47	08:27
	16:49	17:45	18:34	20:26	21:14	21:46	21:34	20:44	19:35	18:28	16:34	16:17
19	08:22	07:34	06:33	06:23	05:29	05:08	05:30	06:16	07:05	07:55	07:49	08:27
	16:51	17:47	18:36	20:28	21:16	21:46	21:33	20:42	19:33	18:26	16:32	16:17
20	08:21	07:32	06:31	06:21	05:28	05:08	05:31	06:18	07:07	07:57	07:51	08:28
	16:53	17:48	18:37	20:29	21:17	21:46	21:32	20:40	19:31	18:24	16:31	16:18
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	16:58	17:54	18:42	20:34	21:21	21:47	21:28	20:34	19:24	18:18	16:28	16:19
24	08:16	07:23	06:21	06:13	05:23	05:09	05:36	06:24	07:13	08:04	07:57	08:30
	16:59	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	16:20
25	08:15	07:21	06:19	06:11	05:22	05:09	05:38	06:25	07:15	07:05	07:59	08:31
	17:01	17:57	18:46	20:38	21:24	21:47	21:26	20:29	19:19	17:14	16:26	16:20
26	08:14	07:19	06:17	06:09	05:21	05:09	05:39	06:27	07:17	07:07	08:00	08:31
	17:03	17:59	18:47	20:39	21:25	21:47	21:24	20:27	19:17	17:12	16:25	16:21
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	17:05	18:01	18:49	20:41	21:27	21:47	21:23	20:25	19:15	17:10	16:24	16:22
28	08:11	07:15	06:12	06:05	05:19	05:10	05:42	06:30	07:20	07:11	08:04	08:31
	17:06	18:03	18:51	20:43	21:28	21:47	21:21	20:23	19:12	17:08	16:23	16:23
29	08:10		07:10	06:03	05:18	05:11	05:43	06:32	07:22	07:12	08:05	08:32
	17:08		19:53	20:44	21:29	21:47	21:20	20:21	19:10	17:06	16:22	16:23
30	08:08		07:08	06:01	05:17	05:11	05:45	06:33	07:23	07:14	08:06	08:32
	17:10		19:54	20:46	21:30	21:47	21:18	20:19	19:08	17:04	16:21	16:24
31	08:07		07:05	06:05	05:16	05:16	05:46	06:35	07:25	07:16	08:08	08:32
	17:12		19:56		21:32		21:17	20:16		17:02		16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:

Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:

Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:

Power of Nature - Windenergie

Aulendorf 40

DE-48727 Billerbeck

02543 9304674

Fürtges / joerg.fuertges@powernature.de

Berechnet:

07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AC - Leihberger Straße 11, Bad Wünnenberg (SO)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
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1	08:32 16:27	08:06 17:14	07:13 18:05	07:03 19:58	05:59 20:48	05:15 21:33	05:12 21:46	05:48 21:15	06:37 20:14	07:25 19:06	07:18 17:00	08:08 16:21	
2	08:32 16:28	08:04 17:16	07:11 18:06	07:01 19:59	05:57 20:49	05:14 21:34	05:13 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:19 16:58	08:09 16:20	
3	08:31 16:29	08:02 17:17	07:09 18:08	06:59 20:01	05:56 20:51	05:13 21:35	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:21 16:57	08:11 16:19	
4	08:31 16:30	08:01 17:19	07:06 18:10	06:56 20:03	05:54 20:53	05:13 21:36	05:14 21:45	05:52 21:10	06:42 20:07	07:30 18:59	07:23 16:55	08:12 16:19	
5	08:31 16:31	07:59 17:21	07:04 18:12	06:54 20:04	05:52 20:54	05:12 21:37	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:25 16:53	08:13 16:18	
6	08:31 16:32	07:58 17:23	07:02 18:13	06:52 20:06	05:50 20:56	05:11 21:38	05:16 21:44	05:55 21:07	06:45 20:03	07:33 18:54	07:27 16:51	08:15 16:18	
7	08:30 16:33	07:56 17:25	07:00 18:15	06:50 20:08	05:48 20:57	05:11 21:39	05:17 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:28 16:50	08:16 16:18	
8	08:30 16:35	07:54 17:26	06:58 18:17	06:47 20:09	05:48 20:59	05:10 21:40	05:18 21:43	05:59 21:03	06:48 19:58	07:36 18:50	07:30 16:48	08:17 16:17	
9	08:29 16:36	07:52 17:28	06:55 18:19	06:45 20:11	05:45 21:01	05:10 21:40	05:19 21:43	06:00 21:01	06:49 19:56	07:38 18:48	07:32 16:47	08:18 16:17	
10	08:29 16:37	07:51 17:30	06:53 18:20	06:43 20:13	05:43 21:02	05:09 21:41	05:19 21:42	06:02 21:00	06:51 19:54	07:40 18:45	07:34 16:45	08:19 16:17	
11	08:28 16:39	07:49 17:32	06:51 18:22	06:41 20:14	05:42 21:04	05:09 21:42	05:21 21:41	06:03 20:58	06:53 19:52	07:41 18:43	07:35 16:43	08:20 16:17	
12	08:28 16:40	07:47 17:34	06:49 18:24	06:39 20:16	05:40 21:05	05:09 21:43	05:22 21:40	06:05 20:56	06:54 19:49	07:43 18:41	07:37 16:42	08:21 16:17	
13	08:27 16:42	07:45 17:36	06:47 18:25	06:36 20:18	05:38 21:07	05:08 21:43	05:23 21:39	06:06 20:54	06:56 19:47	07:45 18:39	07:39 16:40	08:22 16:17	
14	08:26 16:43	07:43 17:37	06:44 18:27	06:34 20:19	05:37 21:08	05:08 21:44	05:24 21:39	06:08 20:52	06:57 19:45	07:46 18:37	07:41 16:39	08:23 16:17	
15	08:26 16:45	07:41 17:39	06:42 18:29	06:32 20:21	05:35 21:10	05:08 21:44	05:25 21:38	06:10 20:50	06:59 19:42	07:48 18:34	07:42 16:38	08:24 16:17	
16	08:25 16:46	07:40 17:41	06:40 18:31	06:30 20:23	05:34 21:11	05:08 21:45	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	07:44 16:36	08:25 16:17	
17	08:24 16:48	07:38 17:43	06:37 18:32	06:28 20:24	05:32 21:13	05:08 21:45	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	07:46 16:35	08:26 16:17	
18	08:23 16:50	07:36 17:45	06:35 18:34	06:26 20:26	05:31 21:14	05:08 21:46	05:28 21:44	06:14 20:44	07:04 19:35	07:53 18:28	07:47 16:34	08:27 16:17	
19	08:22 16:51	07:34 17:47	06:33 18:36	06:24 20:28	05:29 21:16	05:08 21:46	05:30 21:33	06:16 20:42	07:05 19:33	07:55 18:26	07:49 16:32	08:27 16:17	
20	08:21 16:53	07:32 17:48	06:31 18:37	06:21 20:29	05:28 21:17	05:08 21:46	05:31 21:32	06:18 20:40	07:07 19:31	07:57 18:24	07:51 16:31	08:28 16:18	
21	08:20 16:54	07:30 17:50	06:28 18:39	06:19 20:31	05:27 21:19	05:08 21:47	05:32 21:31	06:19 20:38	07:09 19:29	07:58 18:22	07:52 16:30	08:29 16:18	
22	08:19 16:56	07:28 17:52	06:26 18:41	06:17 20:33	05:25 21:20	05:08 21:47	05:34 21:30	06:21 20:36	07:10 19:26	08:00 18:20	07:54 16:29	08:29 16:19	
23	08:18 16:58	07:26 17:54	06:24 18:42	06:15 20:34	05:24 21:21	05:08 21:47	05:35 21:28	06:22 20:34	07:12 19:24	08:02 18:18	07:56 16:28	08:30 16:19	
24	08:16 17:00	07:24 17:56	06:21 18:44	06:13 20:36	05:23 21:23	05:09 21:47	05:36 21:27	06:24 20:32	07:13 19:22	08:04 18:16	07:57 16:27	08:30 16:20	
25	08:15 17:01	07:21 17:57	06:19 18:46	06:11 20:38	05:22 21:24	05:09 21:47	05:38 21:26	06:26 20:29	07:15 19:19	07:05 17:14	07:59 16:26	08:31 16:20	
26	08:14 17:03	07:19 17:59	06:17 18:48	06:09 20:39	05:21 21:25	05:09 21:47	05:39 21:24	06:27 20:27	07:17 19:17	07:07 17:12	08:00 16:25	08:31 16:21	
27	08:13 17:05	07:17 18:01	06:15 18:49	06:07 20:41	05:20 21:27	05:10 21:47	05:41 21:23	06:29 20:25	07:18 19:15	07:09 17:10	08:02 16:24	08:31 16:22	
28	08:11 17:07	07:15 18:03	06:12 18:51	06:05 20:43	05:19 21:28	05:10 21:47	05:42 21:21	06:30 20:23	07:20 19:12	07:11 17:08	08:04 16:23	08:31 16:23	
29	08:10 17:08		07:10 19:53	06:03 20:44	05:18 21:29	05:11 21:47	05:43 21:20	06:32 20:21	07:22 19:10	07:12 17:06	08:05 16:22	08:32 16:23	
30	08:08 17:10		07:08 19:54	06:01 20:46	05:17 21:30	05:11 21:47	05:45 21:18	06:34 20:19	07:23 19:08	07:14 17:04	08:06 16:21	08:32 16:24	
31	08:07 17:12		07:06 19:56	05:16 21:32	05:16 21:32	05:16 21:17	05:46 20:16	06:35 20:16	07:16 17:02	07:16 17:02	08:07 16:25	08:32 16:25	
	Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
	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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AD - Unter der Grotte 11 a, Bad Wünnenberg (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
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	16:28	17:15	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:58	16:20
3	08:31	08:02	07:09	06:59	05:56	05:13	05:13	05:51	06:40	07:28	07:21	08:11
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	16:32	17:23	18:13	20:06	20:56	21:38	21:44	21:07	20:03	18:54	16:51	16:18
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	16:35	17:26	18:17	20:09	20:59	21:39	21:43	21:03	19:58	18:50	16:48	16:17
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31	08:07		07:05	06:05	05:16	05:16	05:46	06:35	07:16	07:16	08:02	08:32
	17:12		19:56		21:31		21:17	20:16		17:02		16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AE - Sintfeld 3, Fürstenberg (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:31	08:05	07:13	07:03	05:59	05:15	05:12	05:48	06:37	07:25	07:18	08:08
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21	08:20	07:29	06:28	06:19	05:27	05:08	05:32	06:19	07:08	07:58	07:52	08:28
	16:54	17:50	18:39	20:31	21:18	21:46	21:31	20:38	19:28	18:22	16:30	16:18
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	16:59	17:55	18:44	20:36	21:23	21:47	21:27	20:31	19:21	18:15	16:26	16:20
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31	08:07		07:05	06:05	05:16	05:16	05:46	06:35	07:16	07:16	08:08	08:31
	17:12		19:56		21:31		21:17	20:16		17:02		16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
astr.max.mögl.Beschattung												
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Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

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	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AF - Sintfeld 15, Fürstenberg (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:31 16:26	08:05 17:14	07:13 18:04	07:03 19:57	05:59 20:47	05:15 21:32	05:12 21:46	05:48 21:15	06:37 20:14	07:25 19:05	07:18 17:00	08:08 16:21	
2	08:31 16:27	08:04 17:15	07:11 18:06	07:01 19:59	05:57 20:49	05:14 21:34	05:13 21:46	05:49 21:13	06:38 20:12	07:26 19:03	07:19 16:58	08:09 16:20	
3	08:31 16:29	08:02 17:17	07:08 18:08	06:59 20:01	05:55 20:51	05:13 21:35	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:21 16:57	08:11 16:19	
4	08:31 16:30	08:01 17:19	07:06 18:10	06:56 20:02	05:54 20:52	05:12 21:36	05:14 21:45	05:52 21:10	06:41 20:07	07:30 18:59	07:23 16:55	08:12 16:19	
5	08:31 16:31	07:59 17:21	07:04 18:11	06:54 20:04	05:52 20:54	05:12 21:37	05:15 21:45	05:54 21:08	06:43 20:05	07:31 18:56	07:25 16:53	08:13 16:18	
6	08:31 16:32	07:57 17:23	07:02 18:13	06:52 20:06	05:50 20:56	05:11 21:38	05:16 21:44	05:55 21:07	06:45 20:03	07:33 18:54	07:26 16:51	08:14 16:18	
7	08:30 16:33	07:56 17:24	07:00 18:15	06:50 20:07	05:48 20:57	05:11 21:38	05:16 21:44	05:57 21:05	06:46 20:00	07:35 18:52	07:28 16:50	08:16 16:17	
8	08:30 16:35	07:54 17:26	06:57 18:17	06:47 20:09	05:46 20:59	05:10 21:39	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:30 16:48	08:17 16:17	
9	08:29 16:36	07:52 17:28	06:55 18:18	06:45 20:11	05:45 21:00	05:10 21:40	05:18 21:42	06:00 21:01	06:49 19:56	07:38 18:47	07:32 16:46	08:18 16:17	
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11	08:28 16:39	07:49 17:32	06:51 18:22	06:41 20:14	05:41 21:04	05:09 21:42	05:20 21:41	06:03 20:58	06:52 19:51	07:41 18:43	07:35 16:43	08:20 16:16	
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15	08:25 16:45	07:41 17:39	06:42 18:29	06:32 20:21	05:35 21:10	05:08 21:44	05:25 21:37	06:09 20:50	06:59 19:42	07:48 18:34	07:42 16:37	08:24 16:16	
16	08:25 16:46	07:39 17:41	06:40 18:30	06:30 20:23	05:34 21:11	05:08 21:45	05:26 21:36	06:11 20:48	07:00 19:40	07:50 18:32	07:44 16:36	08:25 16:17	
17	08:24 16:48	07:37 17:43	06:37 18:32	06:28 20:24	05:32 21:13	05:08 21:45	05:27 21:35	06:13 20:46	07:02 19:38	07:51 18:30	07:46 16:35	08:26 16:17	
18	08:23 16:49	07:35 17:45	06:35 18:34	06:25 20:26	05:31 21:14	05:08 21:46	05:28 21:44	06:14 20:44	07:04 19:35	07:53 18:28	07:47 16:33	08:27 16:17	
19	08:22 16:51	07:33 17:46	06:33 18:36	06:23 20:28	05:29 21:16	05:08 21:46	05:30 21:33	06:16 20:42	07:05 19:33	07:55 18:26	07:49 16:32	08:27 16:17	
20	08:21 16:53	07:31 17:48	06:30 18:37	06:21 20:29	05:28 21:17	05:08 21:46	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	07:51 16:31	08:28 16:18	
21	08:20 16:54	07:29 17:50	06:28 18:39	06:19 20:31	05:27 21:18	05:08 21:46	05:32 21:31	06:19 20:38	07:08 19:28	07:58 18:22	07:52 16:30	08:28 16:18	
22	08:19 16:56	07:27 17:52	06:26 18:41	06:17 20:33	05:25 21:20	05:08 21:47	05:33 21:30	06:21 20:36	07:10 19:26	08:00 18:20	07:54 16:29	08:29 16:18	
23	08:17 16:58	07:25 17:54	06:24 18:42	06:15 20:34	05:24 21:21	05:08 21:47	05:35 21:28	06:22 20:33	07:12 19:24	08:02 18:17	07:56 16:28	08:30 16:19	
24	08:16 16:59	07:23 17:55	06:21 18:44	06:13 20:36	05:23 21:23	05:08 21:47	05:36 21:27	06:24 20:31	07:13 19:21	08:03 18:15	07:57 16:26	08:30 16:20	
25	08:15 17:01	07:21 17:57	06:19 18:46	06:11 20:38	05:22 21:24	05:09 21:47	05:38 21:26	06:25 20:29	07:15 19:19	07:05 17:13	07:59 16:25	08:30 16:20	
26	08:14 17:03	07:19 17:59	06:17 18:47	06:09 20:39	05:21 21:25	05:09 21:47	05:39 21:24	06:27 20:27	07:17 19:17	07:07 17:12	08:00 16:25	08:31 16:21	
27	08:12 17:05	07:17 18:01	06:14 18:49	06:07 20:41	05:19 21:26	05:10 21:47	05:40 21:23	06:29 20:25	07:18 19:15	07:09 17:10	08:02 16:24	08:31 16:22	
28	08:11 17:06	07:15 18:03	06:12 18:51	06:05 20:42	05:18 21:28	05:10 21:47	05:42 21:21	06:30 20:23	07:20 19:12	07:10 17:08	08:03 16:23	08:31 16:22	
29	08:10 17:08		07:10 19:52	06:03 20:44	05:17 21:29	05:11 21:47	05:43 21:20	06:32 20:21	07:21 19:10	07:12 17:06	08:05 16:22	08:31 16:23	
30	08:08 17:10		07:08 19:54	06:01 20:46	05:16 21:30	05:11 21:47	05:45 21:18	06:33 20:18	07:23 19:08	07:14 17:04	08:06 16:21	08:31 16:24	
31	08:07 17:12		07:05 19:56	06:00 21:31	05:16 21:31	05:16 21:17	05:46 20:16	06:35 20:16	07:16 17:02	07:16 17:02	08:05 16:25	08:31 16:25	
	Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
	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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AG - Windmühlenweg 17, Haaren (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni							
1	08:32	09:03 (WP EIIb-26)	08:06	07:13	07:03	05:15							
16:26	27	15:49 (WP KLUS-31)	17:13	18:04	42	08:20 (WP EIIb-44)	19:57	14	07:50 (WP EIIb-03)	05:59	05:15		
2	08:32	09:02 (WP EIIb-26)	08:04	07:11	07:01	05:14							
16:27	26	15:48 (WP KLUS-31)	17:15	18:06	39	08:20 (WP EIIb-44)	19:59	10	08:02 (WP EIIb-03)	05:57	05:14		
3	08:32	09:02 (WP EIIb-26)	08:02	07:09	07:49 (WP EIIb-44)	06:59	05:55	05:13					
16:28	27	15:49 (WP KLUS-31)	17:17	18:08	30	08:19 (WP EIIb-44)	20:01	05:51	05:13				
4	08:31	09:02 (WP EIIb-26)	08:01	07:06	07:49 (WP EIIb-44)	06:56	05:53	05:12					
16:29	27	15:49 (WP KLUS-31)	17:19	18:10	28	08:17 (WP EIIb-44)	20:03	05:52	05:12				
5	08:31	09:01 (WP EIIb-26)	07:59	07:04	07:51 (WP EIIb-44)	06:54	05:52	05:12					
16:31	28	15:49 (WP KLUS-31)	17:21	18:11	25	08:16 (WP EIIb-44)	20:04	05:50	05:11				
6	08:31	09:01 (WP EIIb-26)	07:58	07:02	07:25 (WP EIIb-05)	06:52	05:50	05:11					
16:32	28	15:49 (WP KLUS-31)	17:23	18:13	23	08:14 (WP EIIb-44)	20:06	05:58	05:10				
7	08:30	09:00 (WP EIIb-26)	07:56	07:00	07:23 (WP EIIb-05)	06:50	05:48	05:10					
16:33	29	15:49 (WP KLUS-31)	17:24	18:15	23	08:12 (WP EIIb-44)	20:08	05:57	05:10				
8	08:30	09:00 (WP EIIb-26)	07:54	06:58	07:20 (WP EIIb-05)	06:47	07:10 (WP EIIb-16)	05:46	05:10				
16:34	29	15:50 (WP KLUS-31)	17:26	18:17	20	08:08 (WP EIIb-44)	20:09	4	07:14 (WP EIIb-16)	05:59	05:10		
9	08:30	08:59 (WP EIIb-26)	07:52	08:17 (WP EIIb-40)	06:55	07:18 (WP EIIb-05)	06:45	07:05 (WP EIIb-16)	05:45	05:09			
16:36	30	15:49 (WP KLUS-31)	17:28	3	08:20 (WP EIIb-40)	18:18	10	07:28 (WP EIIb-05)	20:11	7	07:15 (WP EIIb-16)	21:01	21:40
10	08:29	08:58 (WP EIIb-26)	07:51	08:15 (WP EIIb-40)	06:53	07:16 (WP EIIb-05)	06:43	07:05 (WP EIIb-16)	05:43	05:09			
16:37	28	15:48 (WP KLUS-31)	17:30	7	08:22 (WP EIIb-40)	18:20	12	07:28 (WP EIIb-05)	20:13	9	07:14 (WP EIIb-16)	21:02	21:41
11	08:28	08:59 (WP EIIb-26)	07:49	08:14 (WP EIIb-40)	06:51	07:16 (WP EIIb-05)	06:41	07:04 (WP EIIb-16)	05:41	05:09			
16:39	24	15:47 (WP KLUS-31)	17:32	10	08:24 (WP EIIb-40)	18:22	12	07:28 (WP EIIb-05)	20:14	10	07:14 (WP EIIb-16)	21:04	21:42
12	08:28	08:59 (WP EIIb-26)	07:47	08:12 (WP EIIb-40)	06:49	07:15 (WP EIIb-05)	06:38	07:05 (WP EIIb-16)	05:40	05:08			
16:40	22	09:21 (WP EIIb-26)	17:34	12	08:24 (WP EIIb-40)	18:24	11	07:26 (WP EIIb-05)	20:16	9	07:14 (WP EIIb-16)	21:05	21:43
13	08:27	08:59 (WP EIIb-26)	07:45	08:10 (WP EIIb-40)	06:46	07:17 (WP EIIb-05)	06:36	07:06 (WP EIIb-16)	05:38	05:08			
16:41	22	09:21 (WP EIIb-26)	17:35	14	08:24 (WP EIIb-40)	18:25	8	07:25 (WP EIIb-05)	20:18	6	07:12 (WP EIIb-16)	21:07	21:43
14	08:26	09:00 (WP EIIb-26)	07:43	08:10 (WP EIIb-40)	06:44	07:17 (WP EIIb-05)	06:34	07:06 (WP EIIb-16)	05:36	05:08			
16:43	21	09:21 (WP EIIb-26)	17:37	14	08:24 (WP EIIb-40)	18:27	20:19	21:08	21:44				
15	08:26	09:00 (WP EIIb-26)	07:41	08:06 (WP EIIb-44)	06:42	07:16 (WP EIIb-05)	06:32	05:35	05:08				
16:44	21	09:21 (WP EIIb-26)	17:39	18	08:24 (WP EIIb-40)	18:29	20:21	21:10	21:44				
16	08:25	09:01 (WP EIIb-26)	07:39	08:04 (WP EIIb-44)	06:40	07:16 (WP EIIb-05)	06:30	05:33	05:07				
16:46	20	09:21 (WP EIIb-26)	17:41	19	08:23 (WP EIIb-40)	18:30	20:23	21:11	21:45				
17	08:24	09:02 (WP EIIb-26)	07:38	08:02 (WP EIIb-44)	06:37	07:16 (WP EIIb-05)	06:28	05:32	05:07				
16:48	19	09:21 (WP EIIb-26)	17:43	20	08:22 (WP EIIb-40)	18:32	20:24	21:13	21:45				
18	08:23	09:03 (WP EIIb-26)	07:36	08:00 (WP EIIb-44)	06:35	07:16 (WP EIIb-05)	06:25	05:31	05:07				
16:49	18	09:21 (WP EIIb-26)	17:45	20	08:20 (WP EIIb-40)	18:34	20:26	21:14	21:46				
19	08:22	09:04 (WP EIIb-26)	07:34	07:58 (WP EIIb-44)	06:33	07:16 (WP EIIb-05)	06:23	05:29	05:07				
16:51	17	09:21 (WP EIIb-26)	17:46	22	08:20 (WP EIIb-44)	18:36	20:28	21:16	21:46				
20	08:21	09:05 (WP EIIb-26)	07:32	07:55 (WP EIIb-44)	06:30	07:16 (WP EIIb-05)	06:21	05:28	05:07				
16:52	16	09:21 (WP EIIb-26)	17:48	25	08:20 (WP EIIb-44)	18:37	20:29	21:17	21:46				
21	08:20	09:05 (WP EIIb-26)	07:30	07:53 (WP EIIb-44)	06:28	07:16 (WP EIIb-05)	06:19	05:26	05:08				
16:54	14	09:19 (WP EIIb-26)	17:50	27	08:20 (WP EIIb-44)	18:39	20:31	21:19	21:47				
22	08:19	09:07 (WP EIIb-26)	07:28	07:51 (WP EIIb-44)	06:26	06:56 (WP EIIb-03)	06:17	05:25	05:08				
16:56	12	09:19 (WP EIIb-26)	17:52	30	08:21 (WP EIIb-44)	18:41	8	07:04 (WP EIIb-03)	20:33	21:20	21:47		
23	08:18	09:10 (WP EIIb-26)	07:25	07:49 (WP EIIb-44)	06:24	06:54 (WP EIIb-03)	06:15	05:24	05:08				
16:58	7	09:17 (WP EIIb-26)	17:54	32	08:21 (WP EIIb-44)	18:42	13	07:07 (WP EIIb-03)	20:34	21:21	21:47		
24	08:16	09:07 (WP EIIb-26)	07:23	07:48 (WP EIIb-44)	06:21	06:52 (WP EIIb-03)	06:13	05:23	05:08				
16:59	7	09:17 (WP EIIb-26)	17:55	34	08:22 (WP EIIb-44)	18:44	16	07:08 (WP EIIb-03)	20:36	21:23	21:47		
25	08:15	09:06 (WP EIIb-26)	07:21	07:45 (WP EIIb-13)	06:19	06:50 (WP EIIb-03)	06:11	05:21	05:09				
17:01	7	09:17 (WP EIIb-26)	17:57	37	08:22 (WP EIIb-44)	18:46	18	07:08 (WP EIIb-03)	20:38	21:24	21:47		
26	08:14	09:06 (WP EIIb-26)	07:19	07:43 (WP EIIb-13)	06:17	06:39 (WP EIIb-08)	06:09	05:20	05:09				
17:03	7	09:17 (WP EIIb-26)	17:59	39	08:22 (WP EIIb-44)	18:47	21	07:08 (WP EIIb-03)	20:39	21:25	21:47		
27	08:13	09:07 (WP EIIb-26)	07:17	07:40 (WP EIIb-13)	06:14	06:37 (WP EIIb-08)	06:07	05:19	05:09				
17:04	7	09:17 (WP EIIb-26)	18:01	41	08:21 (WP EIIb-44)	18:49	26	07:09 (WP EIIb-03)	20:41	21:27	21:47		
28	08:11	09:08 (WP EIIb-26)	07:15	07:38 (WP EIIb-13)	06:12	06:35 (WP EIIb-08)	06:05	05:18	05:10				
17:06	7	09:17 (WP EIIb-26)	18:03	42	08:21 (WP EIIb-44)	18:51	28	07:09 (WP EIIb-03)	20:43	21:28	21:47		
29	08:10	09:09 (WP EIIb-26)	07:14	07:10 (WP EIIb-13)	06:11	06:34 (WP EIIb-08)	06:03	05:17	05:10				
17:08	7	09:17 (WP EIIb-26)	18:05	44	08:22 (WP EIIb-44)	18:53	30	07:10 (WP EIIb-03)	20:45	21:29	21:47		
30	08:08	09:10 (WP EIIb-26)	07:13	07:08 (WP EIIb-13)	06:10	06:33 (WP EIIb-08)	06:01	05:16	05:11				
17:10	7	09:17 (WP EIIb-26)	18:07	46	08:23 (WP EIIb-44)	18:55	32	07:11 (WP EIIb-03)	20:47	21:30	21:47		
31	08:07	09:11 (WP EIIb-26)	07:12	07:05 (WP EIIb-13)	06:09	06:32 (WP EIIb-08)	05:59	05:15	05:10				
17:12	7	09:17 (WP EIIb-26)	18:09	48	08:24 (WP EIIb-44)	18:57	34	07:12 (WP EIIb-03)	20:49	21:31	21:47		
Sonnenscheinstunden	260	278	367	415	484	497							
astr. max. mögl. Beschattung	512	466	475	69									
Red. Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36									
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84									
Reduktion Windrichtung	0,58	0,62	0,64	0,69									
Gesamte Reduktion	0,09	0,17	0,15	0,21									
Met. wahrsch. Beschattung	47	78	72	14									

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen
 Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AG - Windmühlenweg 17, Haaren (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Juli		August		September		Oktober		November		Dezember		
1	05:12	05:48	06:37	07:03 (WP EIB-16)	07:25	07:56 (WP EIB-05)	07:18	07:45 (WP EIB-40)	08:08	08:41 (WP EIB-26)			
	21:47	21:15	20:14	10 07:13 (WP EIB-16)	19:05	10 08:06 (WP EIB-05)	17:00	6 07:51 (WP EIB-40)	16:20	24 15:29 (WP KLU-31)			
2	05:12	05:49	06:38	07:04 (WP EIB-16)	07:26	07:54 (WP EIB-05)	07:19	07:47 (WP EIB-40)	08:09	08:41 (WP EIB-26)			
	21:46	21:14	20:12	9 07:13 (WP EIB-16)	19:03	12 08:06 (WP EIB-05)	16:58	2 07:49 (WP EIB-40)	16:20	28 15:31 (WP KLU-31)			
3	05:13	05:51	06:40	07:05 (WP EIB-16)	07:28	07:53 (WP EIB-05)	07:21		08:11	08:43 (WP EIB-26)			
	21:46	21:12	20:10	7 07:12 (WP EIB-16)	19:01	13 08:06 (WP EIB-05)	16:56		16:19	29 15:33 (WP KLU-31)			
4	05:14	05:52	06:41	07:07 (WP EIB-16)	07:30	07:55 (WP EIB-05)	07:23		08:12	08:44 (WP EIB-26)			
	21:45	21:10	20:07	4 07:11 (WP EIB-16)	18:59	11 08:06 (WP EIB-05)	16:55		16:19	30 15:34 (WP KLU-31)			
5	05:15	05:54	06:43	07:31	07:31	07:56 (WP EIB-05)	07:25		08:13	08:45 (WP EIB-26)			
	21:45	21:09	20:05		18:56	15 08:42 (WP EIB-44)	16:53		16:18	29 15:34 (WP KLU-31)			
6	05:15	05:55	06:44		07:33	07:58 (WP EIB-05)	07:27		08:15	08:47 (WP EIB-26)			
	21:44	21:07	20:03		18:54	21 08:47 (WP EIB-44)	16:51		16:18	29 15:36 (WP KLU-31)			
7	05:16	05:57	06:46		07:35	08:00 (WP EIB-05)	07:28		08:16	08:48 (WP EIB-26)			
	21:44	21:05	20:01		18:52	23 08:49 (WP EIB-44)	16:50		16:17	28 15:36 (WP KLU-31)			
8	05:17	05:58	06:48		07:36	08:26 (WP EIB-44)	07:30		08:17	08:49 (WP EIB-26)			
	21:43	21:03	19:58		18:50	24 08:50 (WP EIB-44)	16:48		16:17	27 15:36 (WP KLU-31)			
9	05:18	06:00	06:49		07:38	08:25 (WP EIB-44)	07:32		08:18	08:51 (WP EIB-26)			
	21:43	21:01	19:56		18:47	26 08:51 (WP EIB-44)	16:46		16:17	27 15:38 (WP KLU-31)			
10	05:19	06:01	06:51	07:45 (WP EIB-03)	07:40	08:24 (WP EIB-44)	07:34		08:19	08:52 (WP EIB-26)			
	21:42	21:00	19:54	9 07:54 (WP EIB-03)	18:45	28 08:52 (WP EIB-44)	16:45		16:16	27 15:38 (WP KLU-31)			
11	05:20	06:03	06:52	07:43 (WP EIB-03)	07:41	08:13 (WP EIB-13)	07:35		08:20	08:53 (WP EIB-26)			
	21:41	20:58	19:51	14 07:57 (WP EIB-03)	18:43	35 08:53 (WP EIB-44)	16:43		16:16	27 15:39 (WP KLU-31)			
12	05:21	06:05	06:54	07:41 (WP EIB-03)	07:43	08:09 (WP EIB-13)	07:37		08:22	08:54 (WP EIB-26)			
	21:40	20:56	19:49	16 07:57 (WP EIB-03)	18:41	42 08:53 (WP EIB-44)	16:42		16:16	26 15:39 (WP KLU-31)			
13	05:22	06:06	06:56	07:40 (WP EIB-03)	07:45	08:10 (WP EIB-13)	07:39		08:23	08:55 (WP EIB-26)			
	21:39	20:54	19:47	18 07:58 (WP EIB-03)	18:39	43 08:54 (WP EIB-44)	16:40		16:16	25 15:40 (WP KLU-31)			
14	05:23	06:08	06:57	07:24 (WP EIB-08)	07:46	08:12 (WP EIB-13)	07:41		08:23	08:56 (WP EIB-26)			
	21:39	20:52	19:45	26 07:58 (WP EIB-03)	18:36	41 08:54 (WP EIB-44)	16:39		16:16	25 15:40 (WP KLU-31)			
15	05:25	06:09	06:59	07:24 (WP EIB-08)	07:48	08:14 (WP EIB-13)	07:42		08:24	08:57 (WP EIB-26)			
	21:38	20:50	19:42	27 07:58 (WP EIB-03)	18:34	40 08:54 (WP EIB-44)	16:37		16:16	24 15:41 (WP KLU-31)			
16	05:26	06:11	07:00	07:26 (WP EIB-08)	07:50	08:15 (WP EIB-13)	07:44		08:25	08:58 (WP EIB-26)			
	21:37	20:48	19:40	25 07:58 (WP EIB-03)	18:32	38 08:53 (WP EIB-44)	16:36		16:16	23 15:41 (WP KLU-31)			
17	05:27	06:13	07:02	07:27 (WP EIB-08)	07:51	08:17 (WP EIB-13)	07:46		08:26	08:58 (WP EIB-26)			
	21:36	20:46	19:38	23 07:57 (WP EIB-03)	18:30	36 08:53 (WP EIB-44)	16:35		16:17	23 15:41 (WP KLU-31)			
18	05:28	06:14	07:04	07:29 (WP EIB-08)	07:53	08:20 (WP EIB-44)	07:47		08:27	08:59 (WP EIB-26)			
	21:35	20:44	19:35	20 07:57 (WP EIB-03)	18:28	33 08:53 (WP EIB-44)	16:33		16:17	23 15:42 (WP KLU-31)			
19	05:29	06:16	07:05	07:38 (WP EIB-03)	07:55	08:21 (WP EIB-44)	07:49	08:44 (WP EIB-26)	08:27	09:00 (WP EIB-26)			
	21:33	20:42	19:33	17 07:55 (WP EIB-03)	18:26	32 08:53 (WP EIB-44)	16:32	7 08:51 (WP EIB-26)	16:17	23 15:43 (WP KLU-31)			
20	05:31	06:17	07:07	07:40 (WP EIB-03)	07:57	08:23 (WP EIB-44)	07:51	08:42 (WP EIB-26)	08:28	09:00 (WP EIB-26)			
	21:32	20:40	19:31	14 07:54 (WP EIB-03)	18:24	29 08:52 (WP EIB-44)	16:31	12 08:54 (WP EIB-26)	16:17	22 15:42 (WP KLU-31)			
21	05:32	06:19	07:08	07:41 (WP EIB-03)	07:58	08:25 (WP EIB-44)	07:52	08:42 (WP EIB-26)	08:29	09:01 (WP EIB-26)			
	21:31	20:38	19:28	10 07:51 (WP EIB-03)	18:22	26 08:51 (WP EIB-44)	16:30	13 08:55 (WP EIB-26)	16:18	22 15:43 (WP KLU-31)			
22	05:33	06:20	07:10	08:00	08:00	08:26 (WP EIB-44)	07:54	08:41 (WP EIB-26)	08:29	09:01 (WP EIB-26)			
	21:30	20:36	19:26	18:19	24 08:50 (WP EIB-44)	16:28	16 08:57 (WP EIB-26)	16:18	22 15:43 (WP KLU-31)				
23	05:35	06:22	07:12	08:02	08:02	08:28 (WP EIB-44)	07:56	08:41 (WP EIB-26)	08:30	09:02 (WP EIB-26)			
	21:28	20:34	19:24	18:17	21 08:49 (WP EIB-44)	16:27	17 08:58 (WP EIB-26)	16:19	22 15:44 (WP KLU-31)				
24	05:36	06:24	07:13	08:04	08:04	08:30 (WP EIB-44)	07:57	08:40 (WP EIB-26)	08:30	09:02 (WP EIB-26)			
	21:27	20:31	19:21	18:15	20 08:50 (WP EIB-44)	16:26	18 08:58 (WP EIB-26)	16:19	22 15:44 (WP KLU-31)				
25	05:37	06:25	07:15	08:05	08:05	08:32 (WP EIB-44)	07:59	08:40 (WP EIB-26)	08:31	09:02 (WP EIB-26)			
	21:26	20:29	19:19	17:13	20 07:52 (WP EIB-40)	16:25	19 08:59 (WP EIB-26)	16:20	22 15:45 (WP KLU-31)				
26	05:39	06:27	07:17	08:07	08:07	07:34 (WP EIB-44)	08:00	08:40 (WP EIB-26)	08:31	09:03 (WP EIB-26)			
	21:24	20:27	19:17	17:11	19 07:53 (WP EIB-44)	16:24	20 09:00 (WP EIB-26)	16:21	23 15:46 (WP KLU-31)				
27	05:40	06:28	07:18	08:09	08:09	07:36 (WP EIB-44)	08:02	08:39 (WP EIB-26)	08:31	09:03 (WP EIB-26)			
	21:23	20:25	19:15	17:10	18 07:54 (WP EIB-40)	16:23	21 09:00 (WP EIB-26)	16:21	23 15:46 (WP KLU-31)				
28	05:42	06:30	07:20	08:11	08:11	07:39 (WP EIB-40)	08:04	08:40 (WP EIB-26)	08:31	09:03 (WP EIB-26)			
	21:22	20:23	19:12	17:08	15 07:54 (WP EIB-40)	16:23	21 09:01 (WP EIB-26)	16:22	24 15:47 (WP KLU-31)				
29	05:43	06:32	07:21	08:12	08:12	07:39 (WP EIB-40)	08:05	08:40 (WP EIB-26)	08:32	09:03 (WP EIB-26)			
	21:20	20:21	19:10	17:06	14 07:53 (WP EIB-40)	16:22	22 09:02 (WP EIB-26)	16:23	24 15:47 (WP KLU-31)				
30	05:45	06:33	07:23	08:14	08:14	07:41 (WP EIB-40)	08:07	08:40 (WP EIB-26)	08:32	09:03 (WP EIB-26)			
	21:18	20:19	6 07:12 (WP EIB-16)	19:08	6 08:04 (WP EIB-05)	17:04	12 07:53 (WP EIB-40)	16:21	22 09:02 (WP EIB-26)	16:24	25 15:47 (WP KLU-31)		
31	05:46	06:35	07:24	08:15	08:15	07:43 (WP EIB-40)	08:08	08:40 (WP EIB-26)	08:32	09:03 (WP EIB-26)			
	21:17	20:16	9 07:13 (WP EIB-16)	19:07	7 07:16	17:02	9 07:52 (WP EIB-40)	16:20	25 15:48 (WP KLU-31)				
Sonnenscheinstunden	500	453	381	332	268	216	246	774	1,17	0,84	0,63	0,09	69
astr. max. mögl. Beschattung		15	255	750	216	774							
Red. Sonnenscheinwahrsch.		0,40	0,32	0,29	0,23	0,23	0,17	0,17	0,17	0,17	0,17	0,17	0,17
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung		0,69	0,67	0,62	0,55	0,55	0,63	0,63	0,63	0,63	0,63	0,63	0,63
Gesamte Reduktion		0,23	0,18	0,15	0,10	0,10	0,09	0,09	0,09	0,09	0,09	0,09	0,09
Met. wahrsch. Beschattung		3	46	112	23	69							

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AH - Salmes-Feld 6, Haaren (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32	08:06	07:13	07:03	05:59	05:15
	16:26	17:13	18:04	18:04	20:48	21:33
2	08:32	08:04	07:11	07:01	05:57	05:14
	16:27	17:15	18:06	18:14 (WP EIIb-44)	19:59	20:49
3	08:32	08:02	07:09	07:49 (WP EIIb-44)	06:59	05:55
	16:28	17:17	18:08	18:13 (WP EIIb-44)	20:01	20:51
4	08:31	08:01	07:06	07:49 (WP EIIb-44)	06:56	05:53
	16:30	17:19	18:10	18:11 (WP EIIb-44)	20:03	20:53
5	08:31	07:59	07:04	07:51 (WP EIIb-44)	06:54	05:52
	16:31	17:21	18:11	18:09 (WP EIIb-44)	20:04	20:54
6	08:31	07:58	07:02	07:25 (WP EIIb-05)	06:52	05:50
	16:32	17:23	18:13	18:06 (WP EIIb-44)	20:06	20:56
7	08:30	07:56	07:00	07:23 (WP EIIb-05)	06:50	05:48
	16:33	17:24	18:15	18:06 (WP EIIb-44)	20:06	20:56
8	08:30	07:54	06:58	07:20 (WP EIIb-05)	06:47	05:46
	16:34	17:26	18:17	18:06 (WP EIIb-44)	20:06	20:56
9	08:30	07:52	06:55	07:18 (WP EIIb-05)	06:45	05:45
	16:36	17:28	18:18	18:06 (WP EIIb-44)	20:06	20:56
10	08:29	07:51	06:53	07:18 (WP EIIb-05)	06:43	05:43
	16:37	17:30	18:20	18:14 (WP EIIb-44)	20:13	21:02
11	08:28	07:49	06:51	07:20 (WP EIIb-05)	06:41	05:41
	16:39	17:32	18:22	18:19 (WP EIIb-44)	20:14	21:04
12	08:28	07:47	06:49	07:26 (WP EIIb-05)	06:38	05:40
	16:40	17:34	18:24	18:20 (WP EIIb-44)	20:16	21:05
13	08:27	07:45	06:46	07:26 (WP EIIb-05)	06:36	05:38
	16:41	17:35	18:25	18:20 (WP EIIb-44)	20:18	21:07
14	08:26	07:43	06:44	07:26 (WP EIIb-05)	06:34	05:36
	16:43	17:37	18:27	18:20 (WP EIIb-44)	20:19	21:08
15	08:26	07:41	06:42	07:26 (WP EIIb-05)	06:32	05:35
	16:44	17:39	18:29	18:20 (WP EIIb-44)	20:21	21:10
16	08:25	07:39	06:40	07:05 (WP EIIb-03)	06:30	05:33
	16:46	17:41	18:30	18:20 (WP EIIb-44)	20:23	21:11
17	08:24	07:38	06:37	07:02 (WP EIIb-03)	06:28	05:32
	16:48	17:43	18:32	18:20 (WP EIIb-44)	20:24	21:13
18	08:23	07:36	06:35	07:01 (WP EIIb-03)	06:25	05:31
	16:49	17:45	18:34	18:20 (WP EIIb-44)	20:26	21:14
19	08:22	07:34	06:33	06:59 (WP EIIb-03)	06:23	05:29
	16:51	17:46	18:36	18:20 (WP EIIb-44)	20:28	21:16
20	08:21	07:32	06:30	06:59 (WP EIIb-03)	06:21	05:28
	16:52	17:48	18:37	18:20 (WP EIIb-44)	20:29	21:17
21	08:20	07:30	06:28	06:59 (WP EIIb-03)	06:19	05:26
	16:54	17:50	18:39	18:20 (WP EIIb-44)	20:31	21:19
22	08:19	07:28	06:26	06:58 (WP EIIb-03)	06:17	05:25
	16:56	17:52	18:41	18:20 (WP EIIb-44)	20:33	21:20
23	08:18	07:26	06:24	06:58 (WP EIIb-03)	06:15	05:24
	16:58	17:54	18:42	18:20 (WP EIIb-44)	20:34	21:21
24	08:16	07:23	06:21	06:59 (WP EIIb-03)	06:13	05:23
	16:59	17:55	18:44	18:20 (WP EIIb-44)	20:36	21:23
25	08:15	07:21	06:19	07:00 (WP EIIb-03)	06:11	05:22
	17:01	17:57	18:46	18:20 (WP EIIb-44)	20:38	21:24
26	08:14	07:19	06:17	07:09 (WP EIIb-03)	06:09	05:20
	17:03	17:59	18:47	18:20 (WP EIIb-44)	20:39	21:25
27	08:13	07:17	06:14	07:17 (WP EIIb-03)	06:07	05:19
	17:04	18:01	18:49	18:20 (WP EIIb-44)	20:41	21:27
28	08:11	07:15	06:12	07:15 (WP EIIb-03)	06:05	05:18
	17:06	18:03	18:51	18:20 (WP EIIb-44)	20:43	21:28
29	08:10		07:10		06:03	05:17
	17:08		19:52		20:44	21:29
30	08:08		07:08		06:01	05:16
	17:10		19:54		20:46	21:30
31	08:07		07:05			05:15
	17:12		19:56			21:32
Sonnenscheinstunden	260	278	367		415	484
astr. max. mögl. Beschattung	293	361	301		32	497
Red. Sonnenscheinwahrsch.	0,19	0,32	0,28		0,36	
Reduktion Betriebsdauer	0,84	0,84	0,84		0,84	
Reduktion Windrichtung	0,56	0,62	0,64		0,69	
Gesamte Reduktion	0,09	0,17	0,15		0,21	
Met. wahrsch. Beschattung	26	60	45		7	

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AH - Salmes-Feld 6, Haaren (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	July	August	September	Oktober	November	Dezember
1	05:12 21:47	05:48 21:15	06:37 20:14	07:25 19:05	07:18 17:00	08:08 16:20
2	05:12 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:19 16:58	08:09 16:20
3	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:21 16:56	08:11 16:19
4	05:14 21:45	05:52 21:10	06:41 20:07	07:30 18:59	07:23 16:55	08:12 16:19
5	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:25 16:53	08:13 16:18
6	05:15 21:44	05:55 21:07	06:45 20:03	07:33 18:54	07:27 16:51	08:15 16:18
7	05:16 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:28 16:50	08:16 16:17
8	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:30 16:48	08:17 16:17
9	05:18 21:43	06:00 21:01	06:49 19:56	07:38 18:47	07:32 16:46	08:18 16:17
10	05:19 21:42	06:01 21:00	06:51 19:54	07:40 18:45	07:34 16:45	08:19 16:16
11	05:20 21:41	06:03 20:58	06:52 19:51	07:41 18:43	07:35 16:43	08:21 16:16
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	07:37 16:42	08:22 16:16
13	05:22 21:40	06:06 20:54	06:56 19:47	07:45 18:39	07:39 16:40	08:23 16:16
14	05:23 21:39	06:08 20:52	06:57 19:45	07:46 18:36	07:41 16:39	08:23 16:16
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	07:42 16:37	08:24 16:16
16	05:26 21:37	06:11 20:48	07:00 19:40	07:50 18:32	07:44 16:36	08:25 16:16
17	05:27 21:36	06:13 20:46	07:02 19:38	07:51 18:30	07:46 16:35	08:26 16:17
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	07:47 16:33	08:27 16:17
19	05:29 21:33	06:16 20:42	07:05 19:33	07:55 18:26	07:49 16:32	08:27 16:17
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	07:51 16:31	08:28 16:17
21	05:32 21:31	06:19 20:38	07:08 19:28	07:58 18:22	07:52 16:30	08:29 16:18
22	05:33 21:30	06:20 20:36	07:10 19:26	08:00 18:19	07:54 16:28	08:29 16:18
23	05:35 21:29	06:22 20:34	07:12 19:24	08:02 18:17	07:56 16:27	08:30 16:19
24	05:36 21:27	06:24 20:32	07:13 19:21	08:04 18:15	07:57 16:26	08:30 16:19
25	05:37 21:26	06:25 20:29	07:15 19:19	08:05 18:13	07:59 16:25	08:31 16:20
26	05:39 21:24	06:27 20:27	07:17 19:17	08:07 18:11	08:00 16:24	08:31 16:21
27	05:40 21:23	06:28 20:25	07:18 19:15	08:09 18:09	08:02 16:24	08:33 16:21
28	05:42 21:22	06:30 20:23	07:20 19:12	08:11 18:07	08:04 16:23	08:35 16:22
29	05:43 21:20	06:32 20:21	07:21 19:10	08:12 18:06	08:05 16:22	08:37 16:23
30	05:45 21:18	06:33 20:19	07:23 19:08	08:14 18:04	08:07 16:21	08:38 16:24
31	05:46 21:17	06:35 20:16	07:25 19:06	08:16 18:02	08:09 16:20	08:39 16:25
Sonnenscheinstunden	500	453	381	332	268	246
astr. max. mögl. Beschattung			161	546	230	194
Red. Sonnenscheinwahrsch.			0,32	0,29	0,23	0,17
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,66	0,62	0,56	0,65
Gesamte Reduktion			0,18	0,15	0,11	0,09
Met. wahrsch. Beschattung			29	81	24	18

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AI - Ausfallstr. Hegensdorf zu L754 (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32 16:27	08:06 17:14	07:13 18:05	07:03 19:58	06:00 20:48	07:12 (WP KLUS-02) 05:15
2	08:32 16:28	08:04 17:16	07:11 18:07	07:01 20:00	05:58 20:50	07:12 (WP KLUS-02) 05:14
3	08:32 16:29	08:03 17:18	07:09 18:08	06:59 20:01	05:56 20:51	07:13 (WP KLUS-02) 05:13
4	08:32 16:30	08:01 17:19	07:07 18:10	06:57 20:03	05:54 20:53	07:13 (WP KLUS-02) 05:13
5	08:31 16:31	08:00 17:21	07:05 18:12	06:54 20:05	05:52 20:54	07:15 (WP KLUS-02) 05:12
6	08:31 16:32	07:58 17:23	07:02 18:14	06:52 20:06	05:50 20:56	07:17 (WP KLUS-02) 05:11
7	08:31 16:34	07:56 17:25	07:00 18:15	06:50 20:08	05:49 20:58	07:24 (WP KLUS-02) 05:11
8	08:30 16:35	07:54 17:27	06:58 18:17	06:48 20:10	05:47 20:59	05:10 21:40
9	08:30 16:36	07:53 17:29	06:56 18:19	06:45 20:11	05:45 21:01	05:10 21:41
10	08:29 16:38	07:51 17:30	06:53 18:21	06:43 20:13	05:43 21:02	05:09 21:41
11	08:29 16:39	07:49 17:32	06:51 18:22	06:41 20:15	05:42 21:04	05:09 21:42
12	08:28 16:41	07:47 17:34	06:49 18:24	06:39 20:16	05:40 21:06	05:09 21:43
13	08:27 16:42	07:45 17:36	06:47 18:26	06:37 20:18	05:39 21:07	06:23 (WP KLUS-01) 05:08
14	08:27 16:43	07:44 17:38	06:45 18:27	06:34 20:20	05:37 21:09	06:29 (WP KLUS-01) 21:44
15	08:26 16:45	07:42 17:40	06:42 18:29	06:32 20:21	05:35 21:10	06:22 (WP KLUS-01) 05:08
16	08:25 16:47	07:40 17:41	06:40 18:31	06:30 20:23	05:34 21:12	06:31 (WP KLUS-01) 21:45
17	08:24 16:48	07:38 17:43	06:38 18:33	06:28 20:25	05:32 21:13	06:20 (WP KLUS-01) 05:08
18	08:23 16:50	07:36 17:45	06:35 18:34	06:26 20:26	05:31 21:15	06:33 (WP KLUS-01) 21:46
19	08:22 16:51	07:34 17:47	06:33 18:36	06:24 20:28	05:30 21:16	06:21 (WP KLUS-01) 05:09
20	08:21 16:53	07:32 17:49	06:31 18:38	06:22 20:30	05:28 21:18	06:33 (WP KLUS-01) 21:47
21	08:20 16:55	07:30 17:50	06:29 18:39	06:20 20:31	05:27 21:19	06:20 (WP KLUS-01) 05:08
22	08:19 16:56	07:28 17:52	06:26 18:41	06:17 20:33	05:26 21:20	07:21 (WP KLUS-02) 05:08
23	08:18 16:58	07:26 17:54	06:24 18:43	06:15 20:35	05:24 21:22	07:26 (WP KLUS-02) 21:19
24	08:17 17:00	07:24 17:56	06:22 18:44	06:13 20:36	05:23 21:23	07:17 (WP KLUS-02) 05:26
25	08:16 17:01	07:22 17:58	06:19 18:46	06:11 20:38	05:22 21:24	07:29 (WP KLUS-02) 21:20
26	08:14 17:03	07:20 17:59	06:17 18:48	06:09 20:40	05:21 21:26	07:16 (WP KLUS-02) 05:24
27	08:13 17:05	07:17 18:01	06:15 18:49	06:07 20:41	05:20 21:27	07:30 (WP KLUS-02) 21:22
28	08:12 17:07	07:15 18:03	06:13 18:51	06:05 20:43	05:19 21:28	07:14 (WP KLUS-02) 05:23
29	08:10 17:09		07:10 19:53	06:03 20:45	05:18 21:29	07:31 (WP KLUS-02) 21:23
30	08:09 17:10		07:08 19:54	06:01 20:46	05:17 21:31	07:13 (WP KLUS-02) 05:22
31	08:07 17:12		07:06 19:56		05:16 21:32	07:32 (WP KLUS-02) 21:24
Sonnenscheinstunden	261	278	367	415	483	497
astr.max.mögl.Beschattung				168	242	
Red.Sonnenscheinwahrsch.				0,36	0,43	
Reduktion Betriebsdauer				0,84	0,84	
Reduktion Windrichtung				0,69	0,71	
Gesamte Reduktion				0,21	0,25	
Met.wahrsch.Beschattung				36	62	

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AI - Ausfallstr. Hegensdorf zu L754 (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

| Juli | August | September | Oktober | November | Dezember

1	05:12					06:37	07:25	07:18	08:08	
	21:47					20:14	19:06	17:01	16:21	
2	05:13					06:39	07:27	07:20	08:10	
	21:46					20:12	19:04	16:59	16:20	
3	05:14					06:40	07:28	07:22	08:11	
	21:46					20:10	19:01	16:57	16:20	
4	05:14					06:42	07:30	07:23	08:12	
	21:46					20:08	18:59	16:55	16:19	
5	05:15					06:43	07:32	07:25	08:14	
	21:45					20:05	18:57	16:53	16:19	
6	05:16					06:45	07:33	07:27	08:15	
	21:45					20:03	18:54	16:52	16:18	
7	05:17					06:47	07:35	07:29	08:16	
	21:44					20:01	18:52	16:50	16:18	
8	05:18					06:48	07:37	07:30	08:17	
	21:44					19:59	18:50	16:48	16:17	
9	05:19					06:50	07:38	07:32	08:19	
	21:43					19:56	18:48	16:47	16:17	
10	05:20					06:51	07:40	07:34	08:20	
	21:42					19:54	18:46	16:45	16:17	
11	05:21					06:53	07:42	07:36	08:21	
	21:41					19:52	18:43	16:44	16:17	
12	05:22					06:55	07:43	07:37	08:22	
	21:41					19:50	18:41	16:42	16:17	
13	05:23					06:56	07:45	07:39	08:23	
	21:40					19:47	18:39	16:41	16:17	
14	05:24					06:58	07:47	07:41	08:24	
	21:39					19:45	18:37	16:39	16:17	
15	05:25					06:59	07:48	07:43	08:25	
	21:38					19:43	18:35	16:38	16:17	
16	05:26					07:01	07:50	07:44	08:25	
	21:37					19:40	18:32	16:36	16:17	
17	05:27	6	06:33 (WP KLUS-01)	20:48	20	07:39 (WP KLUS-02)	19:40	18:32	16:36	16:17
	21:36			20:48		07:19 (WP KLUS-02)	07:02	07:52	07:46	08:26
18	05:29	6	06:39 (WP KLUS-01)	20:46	19	07:38 (WP KLUS-02)	19:38	18:30	16:35	16:17
	21:35			20:44		07:20 (WP KLUS-02)	07:04	07:54	07:48	08:27
19	05:30	8	06:40 (WP KLUS-01)	20:44	18	07:38 (WP KLUS-02)	19:36	18:28	16:34	16:17
	21:34			20:42		07:20 (WP KLUS-02)	07:06	07:55	07:49	08:28
20	05:31	10	06:41 (WP KLUS-01)	20:42	17	07:37 (WP KLUS-02)	19:33	18:26	16:32	16:18
	21:32			20:40		07:21 (WP KLUS-02)	07:07	07:57	07:51	08:28
21	05:33	11	06:42 (WP KLUS-01)	20:40	15	07:36 (WP KLUS-02)	19:31	18:24	16:31	16:18
	21:31			20:38		07:22 (WP KLUS-02)	07:09	07:59	07:53	08:29
22	05:34	12	06:43 (WP KLUS-01)	20:38	11	07:33 (WP KLUS-02)	19:29	18:22	16:30	16:18
	21:30			20:36		07:26 (WP KLUS-02)	07:10	08:00	07:54	08:30
23	05:35	13	06:43 (WP KLUS-01)	20:34	4	07:30 (WP KLUS-02)	19:26	18:20	16:29	16:19
	21:29			20:34			07:12	08:02	07:56	08:30
24	05:37	13	06:43 (WP KLUS-01)	20:34			19:24	18:18	16:28	16:19
	21:27			20:32			07:14	08:04	07:58	08:30
25	05:38	14	06:44 (WP KLUS-01)	20:32			19:22	18:16	16:27	16:20
	21:26			20:30			07:15	07:06	07:59	08:31
26	05:39	13	06:43 (WP KLUS-01)	20:30			19:20	17:14	16:26	16:21
	21:25			20:28			07:17	07:07	08:01	08:31
27	05:41	13	06:43 (WP KLUS-01)	20:28			19:17	17:12	16:25	16:21
	21:23			20:25			07:19	07:09	08:02	08:31
28	05:42	12	06:43 (WP KLUS-01)	20:25			19:15	17:10	16:24	16:22
	21:22			20:23			07:20	07:11	08:04	08:32
29	05:44	12	06:43 (WP KLUS-01)	20:23			19:13	17:08	16:23	16:23
	21:20			20:21			07:22	07:13	08:05	08:32
30	05:45	11	06:42 (WP KLUS-01)	20:21			19:10	17:06	16:22	16:24
	21:19			20:19			07:23	07:14	08:07	08:32
31	05:47	8	06:41 (WP KLUS-01)	20:19			19:08	17:04	16:22	16:25
	21:17			20:17				17:02		16:25
Sonnenscheinstunden	500			453			381	332	268	246
astr.max.mögl.Beschattung	160			255						
Red.Sonnenscheinwahrsch.	0,39			0,40						
Reduktion Betriebsdauer	0,84			0,84						
Reduktion Windrichtung	0,71			0,69						
Gesamte Reduktion	0,23			0,23						
Met.wahrsch.Beschattung	37			60						

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AJ - Im Wald nördl. WEA 31 (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:32	08:06	07:13	07:03	05:59	05:15	05:12	05:48	06:37	07:25	07:18	08:08	
	16:27	17:14	18:05	19:58	20:48	21:33	21:47	21:16	20:14	19:06	17:00	16:21	
2	08:32	08:04	07:11	07:01	05:58	05:14	05:13	05:49	06:38	07:27	07:20	08:10	
	16:28	17:16	18:06	20:00	20:50	21:34	21:46	21:14	20:12	19:03	16:59	16:20	
3	08:32	08:03	07:09	06:59	05:56	05:13	05:13	05:51	06:40	07:28	07:22	08:11	
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:20	
4	08:32	08:01	07:07	06:57	05:54	05:13	05:14	05:53	06:42	07:30	07:23	08:12	
	16:30	17:19	18:10	20:03	20:53	21:36	21:46	21:11	20:08	18:59	16:55	16:19	
5	08:31	08:00	07:05	06:54	05:52	05:12	05:15	05:54	06:43	07:32	07:25	08:14	
	16:31	17:21	18:12	20:05	20:54	21:37	21:45	21:09	20:05	18:57	16:53	16:19	
6	08:31	07:58	07:02	06:52	05:50	05:11	05:16	05:56	06:45	07:33	07:27	08:15	
	16:32	17:23	18:13	20:06	20:56	21:38	21:45	21:07	20:03	18:54	16:52	16:18	
7	08:31	07:56	07:00	06:50	05:48	05:11	05:17	05:57	06:46	07:35	07:29	08:16	
	16:34	17:25	18:15	20:08	20:58	21:39	21:44	21:05	20:01	18:52	16:50	16:18	
8	08:30	07:54	06:58	06:48	05:47	05:10	05:18	05:59	06:48	07:37	07:30	08:17	
	16:35	17:27	18:17	20:10	20:59	21:40	21:44	21:04	19:59	18:50	16:48	16:17	
9	08:30	07:53	06:56	06:45	05:45	05:10	05:19	06:00	06:50	07:38	07:32	08:19	
	16:36	17:28	18:19	20:11	21:01	21:41	21:43	21:02	19:56	18:48	16:47	16:17	
10	08:29	07:51	06:53	06:43	05:43	05:09	05:20	06:02	06:51	07:40	07:34	08:20	
	16:38	17:30	18:20	20:13	21:02	21:41	21:42	21:00	19:54	18:45	16:45	16:17	
11	08:29	07:49	06:51	06:41	05:42	05:09	05:21	06:03	06:53	07:42	07:36	08:21	
	16:39	17:32	18:22	20:15	21:04	21:42	21:41	20:58	19:52	18:43	16:44	8 08:30 (WP KLUS-04) 16:17	
12	08:28	07:47	06:49	06:39	05:40	05:09	05:22	06:05	06:54	07:43	07:37	08:21 (WP KLUS-04) 08:22	
	16:40	17:34	18:24	20:16	21:06	21:43	21:41	20:56	19:49	18:41	16:42	11 08:32 (WP KLUS-04) 16:17	
13	08:27	07:45	06:47	06:37	05:38	05:08	05:23	06:07	06:56	07:45	07:39	08:20 (WP KLUS-04) 08:23	
	16:42	17:36	18:26	20:18	21:07	21:44	21:40	20:54	19:47	18:39	16:41	12 08:32 (WP KLUS-04) 16:17	
14	08:27	07:44	06:44	06:34	05:37	05:08	05:24	06:08	06:58	07:47	07:41	08:19 (WP KLUS-04) 08:24	
	16:43	17:38	18:27	20:20	21:09	21:44	21:39	20:52	19:45	18:37	16:39	14 08:33 (WP KLUS-04) 16:17	
15	08:26	07:42	06:42	06:32	05:35	05:08	05:25	06:10	06:59	07:48	07:43	08:19 (WP KLUS-04) 08:25	
	16:45	17:39	18:29	20:21	21:10	21:45	21:38	20:50	19:43	18:35	16:38	14 08:33 (WP KLUS-04) 16:17	
16	08:25	07:40	06:40	06:30	05:34	05:08	05:26	06:11	07:01	07:50	07:44	14 08:33 (WP KLUS-04) 08:25	
	16:46	17:41	18:31	20:23	21:12	21:45	21:37	20:48	19:40	18:32	16:36	15 08:34 (WP KLUS-04) 16:17	
17	08:24	07:38	06:38	06:28	05:32	05:08	05:27	06:13	07:02	07:52	07:46	08:20 (WP KLUS-04) 08:26	
	16:48	17:43	18:33	20:25	21:13	21:46	21:36	20:46	19:38	18:30	16:35	14 08:34 (WP KLUS-04) 16:17	
18	08:23	08:51 (WP KLUS-04)	07:36	06:35	06:26	05:31	05:08	05:29	06:14	07:04	07:54	07:48	08:20 (WP KLUS-04) 08:27
	16:50	1 08:52 (WP KLUS-04)	17:45	18:34	20:26	21:15	21:46	21:35	20:44	19:36	18:28	16:34	14 08:34 (WP KLUS-04) 16:17
19	08:22	08:50 (WP KLUS-04)	07:34	06:33	06:24	05:30	05:08	05:30	06:16	07:06	07:55	07:49	08:21 (WP KLUS-04) 08:28
	16:51	5 08:55 (WP KLUS-04)	17:47	18:36	20:28	21:16	21:46	21:34	20:42	19:33	18:26	16:32	13 08:34 (WP KLUS-04) 16:18
20	08:21	08:49 (WP KLUS-04)	07:32	06:31	06:22	05:28	05:08	05:31	06:18	07:07	07:57	07:51	08:21 (WP KLUS-04) 08:28
	16:53	8 08:57 (WP KLUS-04)	17:49	18:38	20:30	21:18	21:47	21:33	20:40	19:31	18:24	16:31	12 08:33 (WP KLUS-04) 16:18
21	08:20	08:48 (WP KLUS-04)	07:30	06:29	06:19	05:27	05:08	05:32	06:19	07:09	07:59	07:53	08:23 (WP KLUS-04) 08:29
	16:55	10 08:58 (WP KLUS-04)	17:50	18:39	20:31	21:19	21:47	21:31	20:38	19:29	18:22	16:30	10 08:33 (WP KLUS-04) 16:18
22	08:19	08:46 (WP KLUS-04)	07:28	06:26	06:17	05:26	05:08	05:34	06:21	07:10	08:00	07:54	08:25 (WP KLUS-04) 08:30
	16:56	12 08:58 (WP KLUS-04)	17:52	18:41	20:33	21:20	21:47	21:30	20:36	19:26	18:20	16:29	8 08:33 (WP KLUS-04) 16:19
23	08:18	08:46 (WP KLUS-04)	07:26	06:24	06:15	05:24	05:08	05:35	06:22	07:12	08:02	07:56	08:27 (WP KLUS-04) 08:30
	16:58	13 08:59 (WP KLUS-04)	17:54	18:43	20:35	21:22	21:47	21:29	20:34	19:24	18:18	16:28	5 08:32 (WP KLUS-04) 16:19
24	08:17	08:46 (WP KLUS-04)	07:24	06:22	06:13	05:23	05:09	05:36	06:24	07:14	08:04	07:58	08:29 (WP KLUS-04) 08:30
	17:00	14 09:00 (WP KLUS-04)	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	2 08:31 (WP KLUS-04) 16:20
25	08:16	08:46 (WP KLUS-04)	07:22	06:19	06:11	05:22	05:09	05:38	06:26	07:15	07:06	07:59	08:31
	17:01	14 09:00 (WP KLUS-04)	17:58	18:46	20:38	21:24	21:48	21:26	20:30	19:20	17:14	16:26	16:20
26	08:14	08:46 (WP KLUS-04)	07:20	06:17	06:09	05:21	05:09	05:39	06:27	07:17	07:07	08:01	08:31
	17:03	15 09:01 (WP KLUS-04)	17:59	18:48	20:40	21:26	21:48	21:25	20:28	19:17	17:12	16:25	16:21
27	08:13	08:47 (WP KLUS-04)	07:17	06:15	06:07	05:20	05:10	05:41	06:29	07:19	07:09	08:02	08:31
	17:05	14 09:01 (WP KLUS-04)	18:01	18:49	20:41	21:27	21:48	21:23	20:25	19:15	17:10	16:24	16:22
28	08:12	08:47 (WP KLUS-04)	07:15	06:13	06:05	05:19	05:10	05:42	06:30	07:20	07:11	08:04	08:32
	17:07	14 09:01 (WP KLUS-04)	18:03	18:51	20:43	21:28	21:47	21:22	20:23	19:13	17:08	16:23	16:23
29	08:10	08:49 (WP KLUS-04)	07:10	06:03	05:18	05:11	05:44	06:32	07:22	07:13	08:05	08:32	
	17:08	12 09:01 (WP KLUS-04)	19:53	20:45	21:29	21:47	21:20	20:21	19:10	17:06	16:22	16:24	16:24
30	08:09	08:49 (WP KLUS-04)	07:08	06:01	05:17	05:11	05:45	06:34	07:23	07:14	08:07	08:32	
	17:10	11 09:00 (WP KLUS-04)	19:54	20:46	21:31	21:47	21:19	20:19	19:08	17:04	16:22	16:24	16:24
31	08:07	08:51 (WP KLUS-04)	07:06	06:01	05:16	05:11	05:46	06:35	07:16	07:06	08:00	08:32	
	17:12	7 08:58 (WP KLUS-04)	19:56	20:48	21:32	21:47	21:17	20:17	17:02	16:22	16:25	16:25	
Sonnenscheinstunden	261		278	367	415	484	497	500	453	381	332	268	246
astr. max. mögl. Beschattung		150									152		
Red. Sonnenscheinwahrsch.		0,19									0,23		
Reduktion Betriebsdauer		0,84									0,84		
Reduktion Windrichtung		0,58									0,58		
Gesamte Reduktion		0,09									0,11		
Met. wahrsch. Beschattung		14									17		

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AK - Stallbusch 20, Haaren (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar		Februar		März		April		Mai		Juni	
1	08:32	15:30 (WP KLUS-33)	08:06	15:30 (WP KLUS-33)	07:13	15:30 (WP KLUS-33)	07:03	15:30 (WP KLUS-33)	05:59	15:30 (WP KLUS-33)	05:15	15:30 (WP KLUS-33)
2	08:32	15:30 (WP KLUS-33)	08:04	15:30 (WP KLUS-33)	07:11	15:30 (WP KLUS-33)	07:01	15:30 (WP KLUS-33)	05:57	15:30 (WP KLUS-33)	05:14	15:30 (WP KLUS-33)
3	08:32	15:30 (WP KLUS-33)	08:02	15:30 (WP KLUS-33)	07:09	15:30 (WP KLUS-33)	06:59	15:30 (WP KLUS-33)	05:55	15:30 (WP KLUS-33)	05:13	15:30 (WP KLUS-33)
4	08:31	15:31 (WP KLUS-33)	08:01	15:31 (WP KLUS-33)	07:06	15:31 (WP KLUS-33)	06:56	15:31 (WP KLUS-33)	05:53	15:31 (WP KLUS-33)	05:12	15:31 (WP KLUS-33)
5	08:31	15:31 (WP KLUS-33)	07:59	15:31 (WP KLUS-33)	07:04	15:31 (WP KLUS-33)	06:54	15:31 (WP KLUS-33)	05:52	15:31 (WP KLUS-33)	05:12	15:31 (WP KLUS-33)
6	08:31	15:31 (WP KLUS-33)	07:58	15:31 (WP KLUS-33)	07:02	15:31 (WP KLUS-33)	06:52	15:31 (WP KLUS-33)	05:50	15:31 (WP KLUS-33)	05:11	15:31 (WP KLUS-33)
7	08:30	15:31 (WP KLUS-33)	07:56	15:31 (WP KLUS-33)	07:00	15:31 (WP KLUS-33)	06:50	15:31 (WP KLUS-33)	05:48	15:31 (WP KLUS-33)	05:10	15:31 (WP KLUS-33)
8	08:30	15:32 (WP KLUS-33)	07:54	15:32 (WP KLUS-33)	06:58	15:32 (WP KLUS-33)	06:47	15:32 (WP KLUS-33)	05:46	15:32 (WP KLUS-33)	05:10	15:32 (WP KLUS-33)
9	08:30	15:32 (WP KLUS-33)	07:52	15:32 (WP KLUS-33)	06:55	15:32 (WP KLUS-33)	06:45	15:32 (WP KLUS-33)	05:45	15:32 (WP KLUS-33)	05:09	15:32 (WP KLUS-33)
10	08:29	15:32 (WP KLUS-33)	07:51	15:32 (WP KLUS-33)	06:53	15:32 (WP KLUS-33)	06:43	15:32 (WP KLUS-33)	05:43	15:32 (WP KLUS-33)	05:09	15:32 (WP KLUS-33)
11	08:28	15:33 (WP KLUS-33)	07:49	15:33 (WP KLUS-33)	06:51	15:33 (WP KLUS-33)	06:41	15:33 (WP KLUS-33)	05:41	15:33 (WP KLUS-33)	05:09	15:33 (WP KLUS-33)
12	08:28	15:33 (WP KLUS-33)	07:47	15:33 (WP KLUS-33)	06:49	15:33 (WP KLUS-33)	06:38	15:33 (WP KLUS-33)	05:40	15:33 (WP KLUS-33)	05:08	15:33 (WP KLUS-33)
13	08:27	15:34 (WP KLUS-33)	07:45	15:34 (WP KLUS-33)	06:46	15:34 (WP KLUS-33)	06:36	15:34 (WP KLUS-33)	05:38	15:34 (WP KLUS-33)	05:08	15:34 (WP KLUS-33)
14	08:26	15:34 (WP KLUS-33)	07:43	15:34 (WP KLUS-33)	06:44	15:34 (WP KLUS-33)	06:34	15:34 (WP KLUS-33)	05:37	15:34 (WP KLUS-33)	05:08	15:34 (WP KLUS-33)
15	08:26	15:35 (WP KLUS-33)	07:41	15:35 (WP KLUS-33)	06:42	15:35 (WP KLUS-33)	06:32	15:35 (WP KLUS-33)	05:35	15:35 (WP KLUS-33)	05:08	15:35 (WP KLUS-33)
16	08:25	15:35 (WP KLUS-33)	07:40	15:35 (WP KLUS-33)	06:40	15:35 (WP KLUS-33)	06:30	15:35 (WP KLUS-33)	05:33	15:35 (WP KLUS-33)	05:07	15:35 (WP KLUS-33)
17	08:24	15:36 (WP KLUS-33)	07:38	15:36 (WP KLUS-33)	06:37	15:36 (WP KLUS-33)	06:28	15:36 (WP KLUS-33)	05:32	15:36 (WP KLUS-33)	05:07	15:36 (WP KLUS-33)
18	08:23	15:37 (WP KLUS-33)	07:36	15:37 (WP KLUS-33)	06:35	15:37 (WP KLUS-33)	06:25	15:37 (WP KLUS-33)	05:31	15:37 (WP KLUS-33)	05:07	15:37 (WP KLUS-33)
19	08:22	15:38 (WP KLUS-33)	07:34	15:38 (WP KLUS-33)	06:33	15:38 (WP KLUS-33)	06:23	15:38 (WP KLUS-33)	05:29	15:38 (WP KLUS-33)	05:07	15:38 (WP KLUS-33)
20	08:21	15:40 (WP KLUS-33)	07:32	15:40 (WP KLUS-33)	06:31	15:40 (WP KLUS-33)	06:21	15:40 (WP KLUS-33)	05:28	15:40 (WP KLUS-33)	05:08	15:40 (WP KLUS-33)
21	08:20	15:41 (WP KLUS-33)	07:30	15:41 (WP KLUS-33)	06:28	15:41 (WP KLUS-33)	06:19	15:41 (WP KLUS-33)	05:26	15:41 (WP KLUS-33)	05:08	15:41 (WP KLUS-33)
22	08:19	15:43 (WP KLUS-33)	07:28	15:43 (WP KLUS-33)	06:26	15:43 (WP KLUS-33)	06:17	15:43 (WP KLUS-33)	05:25	15:43 (WP KLUS-33)	05:08	15:43 (WP KLUS-33)
23	08:18	15:51 (WP KLUS-33)	07:26	15:51 (WP KLUS-33)	06:24	15:51 (WP KLUS-33)	06:15	15:51 (WP KLUS-33)	05:24	15:51 (WP KLUS-33)	05:08	15:51 (WP KLUS-33)
24	08:17	15:54 (WP KLUS-33)	07:23	15:54 (WP KLUS-33)	06:22	15:54 (WP KLUS-33)	06:13	15:54 (WP KLUS-33)	05:23	15:54 (WP KLUS-33)	05:08	15:54 (WP KLUS-33)
25	08:15	15:55 (WP KLUS-33)	07:21	15:55 (WP KLUS-33)	06:19	15:55 (WP KLUS-33)	06:11	15:55 (WP KLUS-33)	05:22	15:55 (WP KLUS-33)	05:09	15:55 (WP KLUS-33)
26	08:14	15:57 (WP KLUS-33)	07:19	15:57 (WP KLUS-33)	06:17	15:57 (WP KLUS-33)	06:09	15:57 (WP KLUS-33)	05:20	15:57 (WP KLUS-33)	05:09	15:57 (WP KLUS-33)
27	08:13	15:59 (WP KLUS-33)	07:17	15:59 (WP KLUS-33)	06:15	15:59 (WP KLUS-33)	06:07	15:59 (WP KLUS-33)	05:19	15:59 (WP KLUS-33)	05:10	15:59 (WP KLUS-33)
28	08:11	16:01 (WP KLUS-33)	07:15	16:01 (WP KLUS-33)	06:12	16:01 (WP KLUS-33)	06:05	16:01 (WP KLUS-33)	05:18	16:01 (WP KLUS-33)	05:10	16:01 (WP KLUS-33)
29	08:10	16:03 (WP KLUS-33)	07:13	16:03 (WP KLUS-33)	06:10	16:03 (WP KLUS-33)	06:03	16:03 (WP KLUS-33)	05:17	16:03 (WP KLUS-33)	05:11	16:03 (WP KLUS-33)
30	08:09	16:05 (WP KLUS-33)	07:11	16:05 (WP KLUS-33)	06:08	16:05 (WP KLUS-33)	06:01	16:05 (WP KLUS-33)	05:16	16:05 (WP KLUS-33)	05:11	16:05 (WP KLUS-33)
31	08:07	16:07 (WP KLUS-33)	07:09	16:07 (WP KLUS-33)	06:06	16:07 (WP KLUS-33)	05:59	16:07 (WP KLUS-33)	05:15	16:07 (WP KLUS-33)	05:11	16:07 (WP KLUS-33)
	17:12		17:12		19:56		19:56		21:32		21:32	
	Sonnenscheinstunden	261	278	367	415	451	484	497				
	astr.max.mögl.Beschattung	412	52	120	2							
	Red.Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36							
	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84							
	Reduktion Windrichtung	0,70	0,62	0,65	0,69							
	Gesamte Reduktion	0,11	0,17	0,16	0,21							
	Met.wahrsch.Beschattung	46	9	19	0							

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AK - Stallbusch 20, Haaren (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	July	August	September	Oktober	November	Dezember
1	05:12 21:47	05:48 21:15	06:37 20:14	07:25 19:05	07:50 (WP EIIb-44) 17:00	08:08 15:15 (WP KLUS-33)
2	05:12 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:51 (WP EIIb-44) 16:58	08:09 15:16 (WP KLUS-33)
3	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:53 (WP EIIb-44) 16:56	08:11 15:17 (WP KLUS-33)
4	05:14 21:45	05:52 21:10	06:41 20:07	07:30 18:59	07:55 (WP EIIb-44) 16:55	08:12 15:18 (WP KLUS-33)
5	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:56 (WP EIIb-44) 16:53	08:13 15:19 (WP KLUS-33)
6	05:15 21:45	05:55 21:07	06:45 20:03	07:33 18:54	07:57 (WP EIIb-44) 16:51	08:15 15:20 (WP KLUS-33)
7	05:16 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:58 (WP EIIb-44) 16:50	08:16 15:21 (WP KLUS-33)
8	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:59 (WP EIIb-44) 16:48	08:17 15:22 (WP KLUS-33)
9	05:18 21:43	06:00 21:01	06:49 19:56	07:38 18:47	08:00 (WP EIIb-44) 16:46	08:18 15:23 (WP KLUS-33)
10	05:19 21:42	06:01 21:00	06:51 19:54	07:40 18:45	08:01 (WP EIIb-44) 16:45	08:19 15:24 (WP KLUS-33)
11	05:20 21:41	06:03 20:58	06:53 19:51	07:41 18:43	08:02 (WP EIIb-44) 16:43	08:21 15:25 (WP KLUS-33)
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	08:03 (WP EIIb-44) 16:42	08:22 15:26 (WP KLUS-33)
13	05:22 21:40	06:06 20:54	06:56 19:47	07:45 18:39	08:04 (WP EIIb-44) 16:40	08:23 15:27 (WP KLUS-33)
14	05:23 21:39	06:08 20:52	06:57 19:45	07:46 18:36	08:05 (WP EIIb-44) 16:39	08:24 15:28 (WP KLUS-33)
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	08:06 (WP EIIb-44) 16:37	08:25 15:29 (WP KLUS-33)
16	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	08:07 (WP EIIb-44) 16:36	08:26 15:30 (WP KLUS-33)
17	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	08:08 (WP EIIb-44) 16:35	08:27 15:31 (WP KLUS-33)
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	08:09 (WP EIIb-44) 16:33	08:28 15:32 (WP KLUS-33)
19	05:29 21:33	06:16 20:42	07:05 19:33	07:55 18:26	08:10 (WP EIIb-44) 16:32	08:29 15:33 (WP KLUS-33)
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	08:11 (WP EIIb-44) 16:31	08:30 15:34 (WP KLUS-33)
21	05:32 21:31	06:19 20:38	07:09 19:28	07:58 18:22	08:12 (WP EIIb-44) 16:30	08:31 15:35 (WP KLUS-33)
22	05:33 21:30	06:21 20:36	07:10 19:26	08:00 18:20	08:13 (WP EIIb-44) 16:29	08:32 15:36 (WP KLUS-33)
23	05:35 21:29	06:22 20:34	07:12 19:24	08:02 18:17	08:14 (WP EIIb-44) 16:27	08:33 15:37 (WP KLUS-33)
24	05:36 21:27	06:24 20:32	07:13 19:21	08:04 18:15	08:15 (WP EIIb-44) 16:26	08:34 15:38 (WP KLUS-33)
25	05:37 21:26	06:25 20:29	07:15 19:19	08:05 18:13	08:16 (WP EIIb-44) 16:25	08:35 15:39 (WP KLUS-33)
26	05:39 21:24	06:27 20:27	07:17 19:17	08:07 18:12	08:17 (WP EIIb-44) 16:24	08:36 15:40 (WP KLUS-33)
27	05:40 21:23	06:29 20:25	07:18 19:15	08:09 18:10	08:18 (WP EIIb-44) 16:23	08:37 15:41 (WP KLUS-33)
28	05:42 21:22	06:30 20:23	07:20 19:12	08:11 18:08	08:19 (WP EIIb-44) 16:22	08:38 15:42 (WP KLUS-33)
29	05:43 21:20	06:32 20:21	07:21 19:10	08:12 18:06	08:20 (WP EIIb-44) 16:21	08:39 15:43 (WP KLUS-33)
30	05:45 21:19	06:33 20:19	07:23 19:08	08:14 18:04	08:21 (WP EIIb-44) 16:20	08:40 15:44 (WP KLUS-33)
31	05:46 21:17	06:35 20:16		08:16 18:02	08:22 (WP EIIb-44) 16:19	08:41 15:45 (WP KLUS-33)
Sonnenscheinstunden	500	453	381	332	268	246
astr. max. mögl. Beschattung			109	66	186	563
Red. Sonnenscheinwahrsch.			0,32	0,29	0,23	0,17
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,65	0,62	0,70	0,70
Gesamte Reduktion			0,18	0,15	0,13	0,10
Met. wahrsch. Beschattung			19	10	25	56

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

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
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Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen
 Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AL - Stallbusch 7, Haaren (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32 16:26 21	15:22 (WP KLUS-33) 15:43 (WP KLUS-33) 17:13	08:06 08:09 (WP EiiB-26) 3	07:13 07:04 (WP EiiB-44) 06:21	07:03 19:58 20:48	05:15 05:08 21:33
2	08:32 16:27 21	15:22 (WP KLUS-33) 15:43 (WP KLUS-33) 17:15	08:04 (WP EiiB-26) 06:40	07:11 07:02 (WP EiiB-44) 06:38	07:01 19:59 20:49	05:14 05:14 21:34
3	08:32 16:28 21	15:23 (WP KLUS-33) 15:44 (WP KLUS-33) 17:17	08:02 (WP EiiB-26) 06:37	07:09 07:00 (WP EiiB-44) 06:28	06:59 20:01 20:51	05:13 05:13 21:35
4	08:31 16:30 22	15:23 (WP KLUS-33) 15:45 (WP KLUS-33) 17:19	08:09 (WP EiiB-26) 06:38	07:07 07:08 (WP EiiB-44) 06:36	06:56 20:03 20:54	05:12 05:12 21:36
5	08:31 16:31 22	15:23 (WP KLUS-33) 15:45 (WP KLUS-33) 17:21	08:08 (WP EiiB-26) 06:31	07:06 07:07 (WP EiiB-44) 06:35	1 07:19 (WP EiiB-03) 20:53	05:12 05:12 21:37
6	08:31 16:32 22	15:24 (WP KLUS-33) 15:46 (WP KLUS-33) 17:23	08:04 (WP EiiB-26) 06:40	07:02 07:03 (WP EiiB-44) 06:34	06:54 20:04 20:54	05:11 05:11 21:38
7	08:30 16:33 21	15:24 (WP KLUS-33) 15:45 (WP KLUS-33) 17:24	08:09 (WP EiiB-26) 06:38	07:00 07:01 (WP EiiB-44) 06:29	06:50 20:06 20:56	05:10 05:10 21:39
8	08:30 16:34 21	15:25 (WP KLUS-33) 15:46 (WP KLUS-33) 17:26	08:08 (WP EiiB-26) 06:34	07:09 07:10 (WP EiiB-44) 06:36	06:47 20:08 20:57	05:10 05:10 21:40
9	08:30 16:36 21	15:25 (WP KLUS-33) 15:46 (WP KLUS-33) 17:28	08:08 (WP EiiB-26) 06:34	07:09 07:10 (WP EiiB-44) 06:36	06:45 20:09 20:59	05:09 05:09 21:40
10	08:29 16:37 21	15:26 (WP KLUS-33) 15:47 (WP KLUS-33) 17:30	08:08 (WP EiiB-26) 06:31	07:07 07:08 (WP EiiB-44) 06:35	06:43 20:11 21:01	05:09 05:09 21:40
11	08:28 16:39 20	15:27 (WP KLUS-33) 15:47 (WP KLUS-33) 17:32	08:06 (WP EiiB-26) 06:42	07:14 (WP EiiB-44) 06:41	06:43 20:13 21:02	05:09 05:09 21:41
12	08:28 16:40 20	15:27 (WP KLUS-33) 15:47 (WP KLUS-33) 17:34	08:09 (WP EiiB-26) 06:38	07:11 (WP EiiB-44) 06:38	06:41 20:14 21:04	05:09 05:09 21:42
13	08:27 16:42 19	15:28 (WP KLUS-33) 15:47 (WP KLUS-33) 17:35	08:02 (WP EiiB-26) 06:37	07:11 (WP EiiB-44) 06:38	06:38 20:16 21:05	05:08 05:08 21:43
14	08:26 16:43 19	15:28 (WP KLUS-33) 15:47 (WP KLUS-33) 17:37	08:09 (WP EiiB-26) 06:38	07:09 (WP EiiB-44) 06:36	06:36 20:18 21:07	05:08 05:08 21:43
15	08:26 16:45 18	15:29 (WP KLUS-33) 15:47 (WP KLUS-33) 17:39	08:08 (WP EiiB-26) 06:31	07:18 (WP EiiB-44) 06:34	06:34 20:19 21:08	05:08 05:08 21:44
16	08:25 16:46 17	15:30 (WP KLUS-33) 15:47 (WP KLUS-33) 17:41	08:09 (WP EiiB-26) 06:38	07:04 (WP EiiB-44) 06:32	06:32 20:21 21:10	05:08 05:08 21:44
17	08:24 16:48 15	15:31 (WP KLUS-33) 15:48 (WP KLUS-33) 17:43	08:04 (WP EiiB-26) 06:40	07:02 (WP EiiB-44) 06:30	06:30 20:23 21:11	05:07 05:07 21:45
18	08:23 16:49 13	15:33 (WP KLUS-33) 15:46 (WP KLUS-33) 17:45	08:02 (WP EiiB-26) 06:37	07:16 (WP EiiB-44) 06:24	06:28 20:24 21:13	05:07 05:07 21:45
19	08:22 16:51 10	15:35 (WP KLUS-33) 15:45 (WP KLUS-33) 17:46	08:00 (WP EiiB-26) 06:35	07:18 (WP EiiB-44) 06:25	06:25 20:26 21:14	05:07 05:07 21:46
20	08:21 16:53 5	15:38 (WP KLUS-33) 15:43 (WP KLUS-33) 17:48	08:08 (WP EiiB-26) 06:34	07:15 (WP EiiB-44) 06:23	06:23 20:26 21:14	05:07 05:07 21:46
21	08:20 16:54 17:50	17:50	08:08 (WP EiiB-26) 06:31	07:13 (WP EiiB-44) 06:21	06:21 20:28 21:16	05:08 05:08 21:46
22	08:19 16:56 17:52	17:52	08:05 (WP EiiB-26) 06:31	07:10 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:08 05:08 21:47
23	08:18 16:58 17:54	17:54	08:00 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:08 05:08 21:47
24	08:17 16:59 17:55	17:55	08:01 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:08 05:08 21:47
25	08:15 17:01 17:57	17:57	08:01 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:09 05:09 21:47
26	08:14 17:03 17:59	17:59	08:01 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:09 05:09 21:47
27	08:13 17:05 18:01	18:01	08:01 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:10 05:10 21:47
28	08:11 17:06 18:03	18:03	08:01 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:10 05:10 21:47
29	08:10 17:08 18:03	18:03	08:01 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:11 05:11 21:47
30	08:09 17:10 19:54	19:54	08:01 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:11 05:11 21:47
31	08:07 17:12	17:12	08:01 (WP EiiB-26) 06:28	07:13 (WP EiiB-44) 06:21	06:21 20:29 21:17	05:11 05:11 21:47
Sonnenscheinstunden	261	278	367	415	484	497
astr.max.mögl.Beschattung	369	43	111	1		
Red.Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36		
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		
Reduktion Windrichtung	0,70	0,62	0,65	0,69		
Gesamte Reduktion	0,11	0,17	0,16	0,21		
Met.wahrsch.Beschattung	41	7	17	0		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AL - Stallbusch 7, Haaren (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	July	August	September	Oktober	November	Dezember
1	05:12 21:47	05:48 21:15	06:37 20:14	07:25 19:05	07:50 (WP EIIb-44) 17:00	08:08 15:09 (WP KLUS-33)
2	05:12 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:51 (WP EIIb-44) 16:58	08:09 15:09 (WP KLUS-33)
3	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:53 (WP EIIb-44) 16:56	08:11 15:09 (WP KLUS-33)
4	05:14 21:45	05:52 21:10	06:41 20:07	07:30 18:59	07:55 (WP EIIb-44) 16:55	08:12 15:09 (WP KLUS-33)
5	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:56 (WP EIIb-44) 16:53	08:13 15:10 (WP KLUS-33)
6	05:15 21:45	05:55 21:07	06:45 20:03	07:33 18:54	07:57 (WP EIIb-44) 16:51	08:15 15:10 (WP KLUS-33)
7	05:16 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:58 (WP EIIb-44) 16:50	08:16 15:10 (WP KLUS-33)
8	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:59 (WP EIIb-44) 16:48	08:17 15:10 (WP KLUS-33)
9	05:18 21:43	06:00 21:01	06:49 19:56	07:38 18:47	08:00 (WP EIIb-44) 16:46	08:18 15:12 (WP KLUS-33)
10	05:19 21:42	06:01 21:00	06:51 19:54	07:40 18:45	08:01 (WP EIIb-44) 16:45	08:19 15:12 (WP KLUS-33)
11	05:20 21:41	06:03 20:58	06:53 19:52	07:41 18:43	08:02 (WP EIIb-44) 16:43	08:21 15:12 (WP KLUS-33)
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	08:03 (WP EIIb-44) 16:42	08:22 15:13 (WP KLUS-33)
13	05:22 21:40	06:06 20:54	06:56 19:47	07:45 18:39	08:04 (WP EIIb-44) 16:40	08:23 15:13 (WP KLUS-33)
14	05:23 21:39	06:08 20:52	06:57 19:45	07:46 18:36	08:05 (WP EIIb-44) 16:39	08:24 15:14 (WP KLUS-33)
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	08:06 (WP EIIb-44) 16:37	08:24 15:15 (WP KLUS-33)
16	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	08:07 (WP EIIb-44) 16:36	08:25 15:15 (WP KLUS-33)
17	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	08:08 (WP EIIb-44) 16:35	08:26 15:15 (WP KLUS-33)
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	08:09 (WP EIIb-44) 16:33	08:27 15:16 (WP KLUS-33)
19	05:29 21:33	06:16 20:42	07:05 19:33	07:55 18:26	08:10 (WP EIIb-44) 16:32	08:28 15:17 (WP KLUS-33)
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	08:11 (WP EIIb-44) 16:31	08:28 15:17 (WP KLUS-33)
21	05:32 21:31	06:19 20:38	07:09 19:28	07:58 18:22	08:12 (WP EIIb-44) 16:30	08:29 15:17 (WP KLUS-33)
22	05:33 21:30	06:21 20:36	07:10 19:26	08:00 18:20	08:13 (WP EIIb-44) 16:29	08:29 15:17 (WP KLUS-33)
23	05:35 21:29	06:22 20:34	07:12 19:24	08:02 18:17	08:14 (WP EIIb-44) 16:27	08:29 15:18 (WP KLUS-33)
24	05:36 21:27	06:24 20:32	07:13 19:22	08:04 18:15	08:15 (WP EIIb-44) 16:26	08:30 15:19 (WP KLUS-33)
25	05:37 21:26	06:25 20:29	07:15 19:19	08:05 18:13	08:16 (WP EIIb-44) 16:25	08:31 15:19 (WP KLUS-33)
26	05:39 21:24	06:27 20:27	07:17 19:17	08:07 18:12	08:17 (WP EIIb-44) 16:24	08:31 15:20 (WP KLUS-33)
27	05:40 21:23	06:29 20:25	07:18 19:15	08:09 18:10	08:18 (WP EIIb-44) 16:23	08:31 15:20 (WP KLUS-33)
28	05:42 21:22	06:30 20:23	07:20 19:12	08:11 18:08	08:19 (WP EIIb-44) 16:22	08:31 15:21 (WP KLUS-33)
29	05:43 21:20	06:32 20:21	07:21 19:10	08:12 18:06	08:20 (WP EIIb-44) 16:21	08:32 15:21 (WP KLUS-33)
30	05:45 21:19	06:33 20:19	07:23 19:08	08:14 18:04	08:21 (WP EIIb-44) 16:20	08:32 15:22 (WP KLUS-33)
31	05:46 21:17	06:35 20:16		08:16 18:02	08:22 (WP EIIb-44) 16:19	08:32 15:22 (WP KLUS-33)
Sonnenscheinstunden	500	453	381	332	268	246
astr. max. mögl. Beschattung			101	59	134	645
Red. Sonnenscheinwahrsch.			0,32	0,29	0,23	0,17
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,65	0,62	0,70	0,70
Gesamte Reduktion			0,18	0,15	0,13	0,10
Met. wahrsch. Beschattung			18	9	18	65

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

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
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Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AM - Salmes Feld 18, Bad Wünnenberg-Haaren (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni							
1	08:32	09:03 (WP EIIb-26)	08:06	07:13	07:57 (WP EIIb-44)	07:03	05:59	05:15					
16:26	20	09:23 (WP EIIb-26)	17:13	18:04	08:25 (WP EIIb-44)	19:57	20:48	21:33					
2	08:32	09:02 (WP EIIb-26)	08:04	07:11	07:59 (WP EIIb-44)	07:01	05:57	05:14					
16:27	20	09:22 (WP EIIb-26)	17:15	18:06	08:24 (WP EIIb-44)	19:59	20:49	21:34					
3	08:32	09:02 (WP EIIb-26)	08:02	07:09	07:32 (WP EIIb-05)	06:59	05:55	05:13					
16:28	21	09:23 (WP EIIb-26)	17:17	18:08	08:22 (WP EIIb-44)	20:01	20:51	21:35					
4	08:31	09:02 (WP EIIb-26)	08:01	07:06	07:29 (WP EIIb-05)	06:56	05:53	05:12					
16:29	22	09:24 (WP EIIb-26)	17:19	18:10	08:19 (WP EIIb-44)	20:03	20:53	21:36					
5	08:31	09:02 (WP EIIb-26)	07:59	07:04	07:27 (WP EIIb-05)	06:54	07:16 (WP EIIb-16)	05:52	05:12				
16:31	22	09:24 (WP EIIb-26)	17:21	18:11	08:15 (WP EIIb-44)	20:04	4	07:20 (WP EIIb-16)	20:54	21:37			
6	08:31	09:03 (WP EIIb-26)	07:58	08:23 (WP EIIb-40)	07:02	07:25 (WP EIIb-05)	06:52	07:14 (WP EIIb-16)	05:50	05:11			
16:32	22	09:25 (WP EIIb-26)	17:23	3	08:26 (WP EIIb-40)	18:13	11	07:36 (WP EIIb-05)	20:06	7	07:21 (WP EIIb-16)	20:56	21:38
7	08:30	09:03 (WP EIIb-26)	07:56	08:21 (WP EIIb-40)	07:00	07:23 (WP EIIb-05)	06:50	07:12 (WP EIIb-16)	05:48	05:10			
16:33	22	09:25 (WP EIIb-26)	17:24	6	08:27 (WP EIIb-40)	18:15	13	07:36 (WP EIIb-05)	20:08	10	07:22 (WP EIIb-16)	20:57	21:39
8	08:30	09:04 (WP EIIb-26)	07:54	08:19 (WP EIIb-40)	06:58	08:19 (WP EIIb-40)	06:58	07:22 (WP EIIb-05)	06:47	07:11 (WP EIIb-16)	05:46	05:10	
16:34	21	09:25 (WP EIIb-26)	17:26	9	08:28 (WP EIIb-40)	18:17	13	07:35 (WP EIIb-05)	20:09	10	07:21 (WP EIIb-16)	20:59	21:40
9	08:30	09:04 (WP EIIb-26)	07:52	08:17 (WP EIIb-40)	06:55	08:17 (WP EIIb-40)	06:55	07:23 (WP EIIb-05)	06:45	07:11 (WP EIIb-16)	05:45	05:09	
16:36	21	09:25 (WP EIIb-26)	17:28	12	08:29 (WP EIIb-40)	18:18	11	07:34 (WP EIIb-05)	20:11	10	07:21 (WP EIIb-16)	21:01	21:40
10	08:29	09:04 (WP EIIb-26)	07:51	08:15 (WP EIIb-40)	06:53	08:15 (WP EIIb-40)	06:53	07:25 (WP EIIb-05)	06:43	07:11 (WP EIIb-16)	05:43	05:09	
16:37	21	09:25 (WP EIIb-26)	17:30	14	08:29 (WP EIIb-40)	18:20	7	07:32 (WP EIIb-05)	20:13	8	07:19 (WP EIIb-16)	21:02	21:41
11	08:28	09:06 (WP EIIb-26)	07:49	08:14 (WP EIIb-44)	06:51	08:14 (WP EIIb-44)	06:51	06:41	06:41	05:41	05:09		
16:39	20	09:26 (WP EIIb-26)	17:32	16	08:30 (WP EIIb-40)	18:22	20:14	20:14	05:41	21:04	21:42		
12	08:28	09:06 (WP EIIb-26)	07:47	08:12 (WP EIIb-44)	06:49	08:12 (WP EIIb-44)	06:49	06:38	05:40	21:05	21:43		
16:40	20	09:26 (WP EIIb-26)	17:34	18	08:30 (WP EIIb-40)	18:24	20:16	20:16	05:40	21:05	21:43		
13	08:27	09:07 (WP EIIb-26)	07:45	08:10 (WP EIIb-44)	06:46	08:10 (WP EIIb-44)	06:46	06:36	05:38	21:07	21:43		
16:41	19	09:26 (WP EIIb-26)	17:35	19	08:29 (WP EIIb-40)	18:25	20:18	20:18	05:38	21:07	21:43		
14	08:26	09:07 (WP EIIb-26)	07:43	08:08 (WP EIIb-44)	06:44	08:08 (WP EIIb-44)	06:44	06:34	05:36	21:08	21:44		
16:43	19	09:26 (WP EIIb-26)	17:37	20	08:28 (WP EIIb-40)	18:27	20:19	20:19	05:35	21:08	21:44		
15	08:26	09:08 (WP EIIb-26)	07:41	08:06 (WP EIIb-44)	06:42	08:06 (WP EIIb-44)	06:42	06:32	05:35	21:09	21:44		
16:44	18	09:26 (WP EIIb-26)	17:39	21	08:27 (WP EIIb-40)	18:29	20:21	20:21	05:33	21:10	21:44		
16	08:25	09:09 (WP EIIb-26)	07:39	08:04 (WP EIIb-44)	06:40	08:04 (WP EIIb-44)	06:40	07:11 (WP EIIb-03)	06:30	05:33	05:07		
16:46	16	09:25 (WP EIIb-26)	17:41	23	08:27 (WP EIIb-44)	18:30	10	07:21 (WP EIIb-03)	20:23	21:11	21:45		
17	08:24	09:11 (WP EIIb-26)	07:38	08:02 (WP EIIb-44)	06:37	08:02 (WP EIIb-44)	06:37	07:08 (WP EIIb-03)	06:28	05:32	05:07		
16:48	14	09:25 (WP EIIb-26)	17:43	26	08:28 (WP EIIb-44)	18:32	15	07:23 (WP EIIb-03)	20:24	21:13	21:45		
18	08:23	09:12 (WP EIIb-26)	07:36	08:00 (WP EIIb-44)	06:35	08:00 (WP EIIb-44)	06:35	07:07 (WP EIIb-03)	06:25	05:31	05:07		
16:49	12	09:24 (WP EIIb-26)	17:45	29	08:29 (WP EIIb-44)	18:34	17	07:24 (WP EIIb-03)	20:26	21:14	21:46		
19	08:22	09:14 (WP EIIb-26)	07:34	07:58 (WP EIIb-44)	06:33	07:58 (WP EIIb-44)	06:33	07:05 (WP EIIb-03)	06:23	05:29	05:07		
16:51	9	09:23 (WP EIIb-26)	17:46	31	08:29 (WP EIIb-44)	18:36	19	07:24 (WP EIIb-03)	20:28	21:16	21:46		
20	08:21	07:32	07:32	07:55 (WP EIIb-44)	06:30	07:55 (WP EIIb-44)	06:30	07:05 (WP EIIb-03)	06:21	05:28	05:07		
16:52	17:48	34	08:29 (WP EIIb-44)	18:37	19	07:24 (WP EIIb-03)	20:29	07:24 (WP EIIb-03)	20:29	21:17	21:46		
21	08:20	07:30	07:55 (WP EIIb-44)	06:28	21	07:04 (WP EIIb-03)	06:19	07:04 (WP EIIb-03)	06:19	05:26	05:08		
16:54	17:50	34	08:29 (WP EIIb-44)	18:39	21	07:25 (WP EIIb-03)	20:31	07:25 (WP EIIb-03)	20:31	21:19	21:47		
22	08:19	07:28	07:51 (WP EIIb-13)	06:26	20	07:03 (WP EIIb-03)	06:17	07:03 (WP EIIb-03)	06:17	05:25	05:08		
16:56	17:52	35	08:29 (WP EIIb-44)	18:41	20	07:23 (WP EIIb-03)	20:33	07:23 (WP EIIb-03)	20:33	21:20	21:47		
23	08:18	07:25	07:49 (WP EIIb-13)	06:24	21	06:46 (WP EIIb-08)	06:15	06:46 (WP EIIb-08)	06:15	05:24	05:08		
16:58	17:54	38	08:29 (WP EIIb-44)	18:42	21	07:23 (WP EIIb-03)	20:34	07:23 (WP EIIb-03)	20:34	21:21	21:47		
24	08:16	07:23	07:47 (WP EIIb-13)	06:21	24	06:44 (WP EIIb-08)	06:13	06:44 (WP EIIb-08)	06:13	05:23	05:08		
16:59	17:55	40	08:29 (WP EIIb-44)	18:44	24	07:23 (WP EIIb-03)	20:36	07:23 (WP EIIb-03)	20:36	21:23	21:47		
25	08:15	07:21	07:45 (WP EIIb-13)	06:19	24	06:41 (WP EIIb-08)	06:11	06:41 (WP EIIb-08)	06:11	05:21	05:09		
17:01	17:57	41	08:29 (WP EIIb-44)	18:46	24	07:21 (WP EIIb-03)	20:38	07:21 (WP EIIb-03)	20:38	21:24	21:47		
26	08:14	07:19	07:43 (WP EIIb-13)	06:17	22	06:40 (WP EIIb-08)	06:09	06:40 (WP EIIb-08)	06:09	05:20	05:09		
17:03	17:59	42	08:28 (WP EIIb-44)	18:47	22	07:19 (WP EIIb-03)	20:39	07:19 (WP EIIb-03)	20:39	21:25	21:47		
27	08:13	07:17	07:41 (WP EIIb-13)	06:14	15	06:41 (WP EIIb-08)	06:07	06:41 (WP EIIb-08)	06:07	05:19	05:09		
17:04	18:01	41	08:27 (WP EIIb-44)	18:49	15	07:17 (WP EIIb-03)	20:41	07:17 (WP EIIb-03)	20:41	21:27	21:47		
28	08:11	07:15	07:42 (WP EIIb-13)	06:12	37	07:15 (WP EIIb-03)	06:05	07:15 (WP EIIb-03)	06:05	05:18	05:10		
17:06	18:03	37	08:26 (WP EIIb-44)	18:51	37	07:10 (WP EIIb-03)	06:03	07:10 (WP EIIb-03)	06:03	21:28	21:47		
29	08:10	07:10	07:10	19:52	20:44	20:44	06:01	19:52	20:44	05:17	05:10		
17:08	07:08	07:08	19:54	20:46	20:46	20:46	06:01	19:54	20:46	21:29	21:47		
30	08:08	07:08	07:08	19:54	20:46	20:46	06:01	19:54	20:46	05:16	05:11		
17:10	07:05	07:05	19:56	20:46	20:46	20:46	06:01	19:56	20:46	21:30	21:47		
31	08:07	07:05	07:05	19:56	20:46	20:46	06:01	19:56	20:46	05:15	05:11		
17:12	07:05	07:05	19:56	20:46	20:46	20:46	06:01	19:56	20:46	21:32	21:47		
Sonnenscheinstunden	260	278	367	415	484	497							
astr. max. mögl. Beschattung	359	589	401	49									
Red. Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36									
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84									
Reduktion Windrichtung	0,55	0,61	0,64	0,69									
Gesamte Reduktion	0,09	0,16	0,15	0,21									
Met. wahrsch. Beschattung	31	97	60	10									

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

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

Projekt:

Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:

Auftraggeber:
 Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:

Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet:
 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AM - Salmes Feld 18, Bad Wünnenberg-Haaren (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Juli	August	September	Oktober	November	Dezember
1	05:12 21:47	05:48 21:15	06:36 20:14	07:13 (WP EIIb-16) 19:05	07:25 17:00	08:08 16:20
2	05:12 21:46	05:49 21:14	06:38 20:12	07:10 (WP EIIb-16) 19:03	07:26 16:58	08:09 16:20
3	05:13 21:46	05:51 21:12	06:40 20:10	07:08 (WP EIIb-16) 19:01	07:28 16:56	08:11 16:19
4	05:14 21:45	05:52 21:10	06:41 20:07	07:08 (WP EIIb-16) 18:59	07:30 16:55	08:12 16:19
5	05:15 21:45	05:54 21:09	06:43 20:05	07:08 (WP EIIb-16) 18:56	07:31 16:53	08:13 16:18
6	05:15 21:44	05:55 21:07	06:44 20:03	07:10 (WP EIIb-16) 18:54	07:33 16:51	08:15 16:18
7	05:16 21:44	05:57 21:05	06:46 20:01	07:12 (WP EIIb-16) 18:52	07:35 16:50	08:16 16:17
8	05:17 21:43	05:58 21:03	06:48 19:58	07:16 (WP EIIb-16) 18:50	07:36 16:48	08:17 16:17
9	05:18 21:43	06:00 21:01	06:49 19:56	07:38 18:47	08:03 (WP EIIb-05) 16:46	07:32 16:17
10	05:19 21:42	06:01 21:00	06:51 19:54	07:40 18:45	08:05 (WP EIIb-05) 16:45	07:34 16:16
11	05:20 21:41	06:03 20:58	06:52 19:51	07:41 18:43	08:34 (WP EIIb-44) 16:43	07:35 16:16
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	08:31 (WP EIIb-44) 16:42	07:37 16:16
13	05:22 21:39	06:06 20:54	06:56 19:47	07:45 18:39	08:18 (WP EIIb-13) 16:40	07:39 16:16
14	05:23 21:39	06:08 20:52	06:57 19:45	07:46 18:36	08:15 (WP EIIb-13) 16:39	07:41 16:16
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	08:14 (WP EIIb-13) 16:37	07:42 16:16
16	05:26 21:37	06:11 20:48	07:00 19:40	07:50 18:32	08:15 (WP EIIb-13) 16:36	07:44 16:16
17	05:27 21:36	06:13 20:46	07:02 19:38	07:51 18:30	08:17 (WP EIIb-13) 16:35	07:46 16:17
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	08:19 (WP EIIb-13) 16:33	07:47 16:17
19	05:29 21:33	06:16 20:42	07:05 19:33	07:55 18:26	08:21 (WP EIIb-13) 16:32	07:49 16:17
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	08:22 (WP EIIb-44) 16:31	07:51 16:17
21	05:32 21:31	06:19 20:38	07:08 19:28	07:58 18:22	08:27 (WP EIIb-44) 16:30	07:52 16:18
22	05:33 21:30	06:20 20:36	07:10 19:26	08:00 18:19	08:26 (WP EIIb-44) 16:28	07:54 16:18
23	05:35 21:28	06:22 20:34	07:12 19:24	08:02 18:17	08:28 (WP EIIb-44) 16:27	07:56 16:19
24	05:36 21:27	06:24 20:31	07:13 19:21	08:04 18:15	08:30 (WP EIIb-44) 16:26	07:57 16:19
25	05:37 21:26	06:25 20:29	07:15 19:19	08:05 (WP EIIb-03) 18:13	08:31 (WP EIIb-44) 16:25	07:59 16:20
26	05:39 21:24	06:27 20:27	07:17 19:17	08:07 (WP EIIb-03) 18:11	08:34 (WP EIIb-44) 16:24	08:00 16:21
27	05:40 21:23	06:28 20:25	07:18 19:15	08:08 (WP EIIb-03) 18:09	08:36 (WP EIIb-44) 16:23	08:02 16:21
28	05:42 21:22	06:30 20:23	07:20 19:12	08:09 (WP EIIb-03) 18:07	08:38 (WP EIIb-44) 16:22	08:04 16:22
29	05:43 21:20	06:32 20:21	07:21 19:10	08:00 (WP EIIb-03) 18:05	08:40 (WP EIIb-44) 16:21	08:05 16:23
30	05:45 21:18	06:33 20:19	07:23 19:08	07:06 17:04	07:58 (WP EIIb-40) 16:20	08:07 16:24
31	05:46 21:17	06:35 20:16	07:24 19:06	07:07 17:02	07:59 (WP EIIb-40) 16:19	08:08 16:25
Sonnenscheinstunden	500	453	381	332	268	246
astr. max. mögl. Beschattung			284	719	169	573
Red. Sonnenscheinwahrsch.			0,32	0,29	0,23	0,17
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,66	0,62	0,56	0,55
Gesamte Reduktion			0,18	0,15	0,11	0,08
Met. wahrsch. Beschattung			50	106	18	44

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

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
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Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen
 Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AN - Am Südhang 31, Bad Wünnenberg (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:32	08:06	07:13	07:03	05:59	05:15	05:12	05:48	06:37	07:25	07:18	08:08
	16:27	17:14	18:04	19:58	20:48	21:33	21:46	21:15	20:14	19:06	17:00	16:21
2	08:32	08:04	07:11	07:01	05:57	05:14	05:13	05:49	06:38	07:26	07:19	08:09
	16:28	17:15	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:58	16:20
3	08:31	08:02	07:09	06:59	05:56	05:13	05:13	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:19
4	08:31	08:01	07:06	06:56	05:54	05:13	05:14	05:52	06:41	07:30	07:23	08:12
	16:30	17:19	18:10	20:03	20:53	21:36	21:45	21:10	20:07	18:59	16:55	16:19
5	08:31	07:59	07:04	06:54	05:52	05:12	05:15	05:54	06:43	07:31	07:25	08:13
	16:31	17:21	18:12	20:04	20:54	21:37	21:45	21:09	20:05	18:56	16:53	16:18
6	08:31	07:58	07:02	06:52	05:50	05:11	05:16	05:55	06:45	07:33	07:27	08:15
	16:32	17:23	18:13	20:06	20:56	21:38	21:44	21:07	20:03	18:54	16:51	16:18
7	08:30	07:56	07:00	06:50	05:48	05:11	05:17	05:57	06:46	07:35	07:28	08:16
	16:33	17:25	18:15	20:08	20:57	21:39	21:44	21:05	20:01	18:52	16:50	16:18
8	08:30	07:54	06:58	06:47	05:47	05:10	05:18	05:59	06:48	07:36	07:30	08:17
	16:35	17:26	18:17	20:09	20:59	21:40	21:43	21:03	19:58	18:50	16:48	16:17
9	08:29	07:52	06:55	06:45	05:45	05:10	05:18	06:00	06:49	07:38	07:32	08:18
	16:36	17:28	18:19	20:11	21:01	21:40	21:43	21:01	19:56	18:47	16:47	16:17
10	08:29	07:51	06:53	06:43	05:43	05:09	05:19	06:02	06:51	07:40	07:34	08:19
	16:37	17:30	18:20	20:13	21:02	21:41	21:42	21:00	19:54	18:45	16:45	16:17
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12	08:28	07:47	06:49	06:39	05:40	05:09	05:22	06:05	06:54	07:43	07:37	08:21
	16:40	17:34	18:24	20:16	21:05	21:43	21:40	20:56	19:49	18:41	16:42	16:17
13	08:27	07:45	06:46	06:36	05:38	05:08	05:23	06:06	06:56	07:45	07:39	08:22
	16:42	17:36	18:25	20:18	21:07	21:43	21:39	20:54	19:47	18:39	16:40	16:16
14	08:26	07:43	06:44	06:34	05:37	05:08	05:24	06:08	06:57	07:46	07:41	08:23
	16:43	17:37	18:27	20:19	21:08	21:44	21:39	20:52	19:45	18:37	16:39	16:16
15	08:26	07:41	06:42	06:32	05:35	05:08	05:25	06:10	06:59	07:48	07:42	08:24
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16	08:25	07:40	06:40	06:30	05:34	05:08	05:26	06:11	07:01	07:50	07:44	08:25
	16:46	17:41	18:31	20:23	21:11	21:45	21:37	20:48	19:40	18:32	16:36	16:17
17	08:24	07:38	06:37	06:28	05:32	05:08	05:27	06:13	07:02	07:52	07:46	08:26
	16:48	17:43	18:32	20:24	21:13	21:45	21:36	20:46	19:38	18:30	16:35	16:17
18	08:23	07:36	06:35	06:26	05:31	05:08	05:28	06:14	07:04	07:53	07:47	08:27
	16:49	17:45	18:34	20:26	21:14	21:46	21:34	20:44	19:35	18:28	16:34	16:17
19	08:22	07:34	06:33	06:23	05:29	05:08	05:30	06:16	07:05	07:55	07:49	08:27
	16:51	17:47	18:36	20:28	21:16	21:46	21:33	20:42	19:33	18:26	16:32	16:17
20	08:21	07:32	06:31	06:21	05:28	05:08	05:31	06:18	07:07	07:57	07:51	08:28
	16:53	17:48	18:37	20:29	21:17	21:46	21:32	20:40	19:31	18:24	16:31	16:18
21	08:20	07:30	06:28	06:19	05:27	05:08	05:32	06:19	07:09	07:58	07:52	08:29
	16:54	17:50	18:39	20:31	21:19	21:47	21:31	20:38	19:29	18:22	16:30	16:18
22	08:19	07:28	06:26	06:17	05:25	05:08	05:34	06:21	07:10	08:00	07:54	08:29
	16:56	17:52	18:41	20:33	21:20	21:47	21:30	20:36	19:26	18:20	16:29	16:19
23	08:18	07:26	06:24	06:15	05:24	05:08	05:35	06:22	07:12	08:02	07:56	08:30
	16:58	17:54	18:42	20:34	21:21	21:47	21:28	20:34	19:24	18:18	16:28	16:19
24	08:16	07:23	06:21	06:13	05:23	05:09	05:36	06:24	07:13	08:04	07:57	08:30
	16:59	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	16:20
25	08:15	07:21	06:19	06:11	05:22	05:09	05:38	06:25	07:15	08:05	07:59	08:31
	17:01	17:57	18:46	20:38	21:24	21:47	21:26	20:29	19:19	18:14	16:26	16:20
26	08:14	07:19	06:17	06:09	05:21	05:09	05:39	06:27	07:17	08:07	08:00	08:31
	17:03	17:59	18:47	20:39	21:25	21:47	21:24	20:27	19:17	18:12	16:25	16:21
27	08:13	07:17	06:15	06:07	05:20	05:10	05:41	06:29	07:18	08:09	08:02	08:31
	17:05	18:01	18:49	20:41	21:27	21:47	21:23	20:25	19:15	18:10	16:24	16:22
28	08:11	07:15	06:12	06:05	05:19	05:10	05:42	06:30	07:20	08:11	08:04	08:31
	17:06	18:03	18:51	20:43	21:28	21:47	21:21	20:23	19:12	18:08	16:23	16:23
29	08:10	07:10	06:03	06:03	05:18	05:11	05:43	06:32	07:22	08:12	08:05	08:32
	17:08	19:53	20:44	21:29	21:29	21:47	21:20	20:21	19:10	18:06	16:22	16:23
30	08:08	07:08	06:01	06:01	05:17	05:11	05:45	06:33	07:23	08:14	08:06	08:32
	17:10	19:54	20:46	21:30	21:30	21:47	21:18	20:19	19:08	18:04	16:21	16:24
31	08:07	07:05	06:00	06:00	05:16	05:16	05:46	06:35	07:24	08:15	08:07	08:32
	17:12	19:56	20:48	21:32	21:32	21:47	21:17	20:16	19:07	18:02	16:20	16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
astr. max. mögl. Beschattung				84				84				
Red. Sonnenscheinwahrsch.				0,36				0,40				
Reduktion Betriebsdauer				0,84				0,84				
Reduktion Windrichtung				0,63				0,63				
Gesamte Reduktion				0,19				0,21				
Met. wahrsch. Beschattung				16				18				

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AO - Am Südhang 28, Bad Wünnenberg (WA)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:32	08:06	07:13	07:03	05:59	05:15	05:12	05:48	06:37	07:25	07:18	08:08
	16:27	17:14	18:04	19:58	20:48	21:33	21:46	21:15	20:14	19:06	17:00	16:21
2	08:32	08:04	07:11	07:01	05:57	05:14	05:13	05:49	06:38	07:26	07:19	08:09
	16:28	17:15	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:58	16:20
3	08:31	08:02	07:09	06:59	05:56	05:13	05:13	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:19
4	08:31	08:01	07:06	06:56	05:54	05:13	05:14	05:52	06:41	07:30	07:23	08:12
	16:30	17:19	18:10	20:03	20:53	21:36	21:45	21:10	20:07	18:59	16:55	16:19
5	08:31	07:59	07:04	06:54	05:52	05:12	05:15	05:54	06:43	07:31	07:25	08:13
	16:31	17:21	18:12	20:04	20:54	21:37	21:45	21:09	20:05	18:56	16:53	16:18
6	08:31	07:58	07:02	06:52	05:50	05:11	05:16	05:55	06:45	07:33	07:27	08:15
	16:32	17:23	18:13	20:06	20:56	21:38	21:44	21:07	20:03	18:54	16:51	16:18
7	08:30	07:56	07:00	06:50	05:48	05:11	05:17	05:57	06:46	07:35	07:28	08:16
	16:33	17:25	18:15	20:08	20:57	21:39	21:44	21:05	20:01	18:52	16:50	16:18
8	08:30	07:54	06:58	06:47	05:47	05:10	05:18	05:59	06:48	07:36	07:30	08:17
	16:35	17:26	18:17	20:09	20:59	21:40	21:43	21:03	19:58	18:50	16:48	16:17
9	08:29	07:52	06:55	06:45	05:45	05:10	05:18	06:00	06:49	07:38	07:32	08:18
	16:36	17:28	18:19	20:11	21:01	21:40	21:43	21:01	19:56	18:47	16:47	16:17
10	08:29	07:51	06:53	06:43	05:43	05:09	05:19	06:02	06:51	07:40	07:34	08:19
	16:37	17:30	18:20	20:13	21:02	21:41	21:42	21:00	19:54	18:45	16:45	16:17
11	08:28	07:49	06:51	06:41	05:42	05:09	05:20	06:03	06:53	07:41	07:35	08:20
	16:39	17:32	18:22	20:14	21:04	21:42	21:41	20:58	19:52	18:43	16:43	16:17
12	08:28	07:47	06:49	06:39	05:40	05:09	05:22	06:05	06:54	07:43	07:37	08:21
	16:40	17:34	18:24	20:16	21:05	21:43	21:40	20:56	19:49	18:41	16:42	16:17
13	08:27	07:45	06:46	06:36	05:38	05:08	05:23	06:06	06:56	07:45	07:39	08:22
	16:42	17:36	18:25	20:18	21:07	21:43	21:39	20:54	19:47	18:39	16:40	16:16
14	08:26	07:43	06:44	06:34	05:37	05:08	05:24	06:08	06:57	07:46	07:41	08:23
	16:43	17:37	18:27	20:19	21:08	21:44	21:39	20:52	19:45	18:37	16:39	16:16
15	08:26	07:41	06:42	06:32	05:35	05:08	05:25	06:10	06:59	07:48	07:42	08:24
	16:45	17:39	18:29	20:21	21:10	21:44	21:38	20:50	19:42	18:34	16:38	16:17
16	08:25	07:40	06:40	06:30	05:34	05:08	05:26	06:11	07:01	07:50	07:44	08:25
	16:46	17:41	18:31	20:23	21:11	21:45	21:37	20:48	19:40	18:32	16:36	16:17
17	08:24	07:38	06:37	06:28	05:32	05:08	05:27	06:13	07:02	07:52	07:46	08:26
	16:48	17:43	18:32	20:24	21:13	21:45	21:36	20:46	19:38	18:30	16:35	16:17
18	08:23	07:36	06:35	06:26	05:31	05:08	05:28	06:14	07:04	07:53	07:47	08:27
	16:49	17:45	18:34	20:26	21:14	21:46	21:34	20:44	19:35	18:28	16:34	16:17
19	08:22	07:34	06:33	06:23	05:29	05:08	05:30	06:16	07:05	07:55	07:49	08:27
	16:51	17:47	18:36	20:28	21:16	21:46	21:33	20:42	19:33	18:26	16:32	16:17
20	08:21	07:32	06:31	06:21	05:28	05:08	05:31	06:18	07:07	07:57	07:51	08:28
	16:53	17:48	18:37	20:29	21:17	21:46	21:32	20:40	19:31	18:24	16:31	16:18
21	08:20	07:30	06:28	06:19	05:27	05:08	05:32	06:19	07:09	07:58	07:52	08:29
	16:54	17:50	18:39	20:31	21:19	21:47	21:31	20:38	19:29	18:22	16:30	16:18
22	08:19	07:28	06:26	06:17	05:25	05:08	05:34	06:21	07:10	08:00	07:54	08:29
	16:56	17:52	18:41	20:33	21:20	21:47	21:30	20:36	19:26	18:20	16:29	16:19
23	08:18	07:26	06:24	06:15	05:24	05:08	05:35	06:22	07:12	08:02	07:56	08:30
	16:58	17:54	18:42	20:34	21:21	21:47	21:28	20:34	19:24	18:18	16:28	16:19
24	08:16	07:23	06:21	06:13	05:23	05:09	05:36	06:24	07:13	08:04	07:57	08:30
	16:59	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	16:20
25	08:15	07:21	06:19	06:11	05:22	05:09	05:38	06:25	07:15	07:05	07:59	08:31
	17:01	17:57	18:46	20:38	21:24	21:47	21:26	20:29	19:19	17:14	16:26	16:20
26	08:14	07:19	06:17	06:09	05:21	05:09	05:39	06:27	07:17	07:07	08:00	08:31
	17:03	17:59	18:47	20:39	21:25	21:47	21:24	20:27	19:17	17:12	16:25	16:21
27	08:13	07:17	06:15	06:07	05:20	05:10	05:41	06:29	07:18	07:09	08:02	08:31
	17:05	18:01	18:49	20:41	21:27	21:47	21:23	20:25	19:15	17:10	16:24	16:22
28	08:11	07:15	06:12	06:05	05:19	05:10	05:42	06:30	07:20	07:11	08:04	08:31
	17:06	18:03	18:51	20:43	21:28	21:47	21:21	20:23	19:12	17:08	16:23	16:23
29	08:10		07:10	06:03	05:18	05:11	05:43	06:32	07:22	07:12	08:05	08:32
	17:08		19:53	20:44	21:29	21:47	21:20	20:21	19:10	17:06	16:22	16:23
30	08:08		07:08	06:01	05:17	05:11	05:45	06:33	07:23	07:14	08:06	08:32
	17:10		19:54	20:46	21:30	21:47	21:18	20:19	19:08	17:04	16:21	16:24
31	08:07		07:05	06:05	05:16	05:16	05:46	06:35	07:16	07:16	08:02	08:32
	17:12		19:56		21:32		21:17	20:16		17:02		16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AP - Stallbusch 18, Haaren (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32	15:31 (WP KLUS-33)	08:06	07:13	07:03	05:59
	16:26	18 15:31 (WP KLUS-33)	08:06	18:04	19:58	20:48
2	08:32	15:30 (WP KLUS-33)	08:04	07:11	07:01	05:57
	16:27	19 15:49 (WP KLUS-33)	17:15	18:06	19:59	20:49
3	08:32	15:31 (WP KLUS-33)	08:02	07:09	06:59	05:55
	16:28	19 15:50 (WP KLUS-33)	17:17	18:08	20:01	20:51
4	08:31	15:32 (WP KLUS-33)	08:01	07:06	06:56	05:54
	16:30	19 15:51 (WP KLUS-33)	17:19	18:10	20:03	20:53
5	08:31	15:31 (WP KLUS-33)	07:59	07:04	06:54	05:52
	16:31	20 15:51 (WP KLUS-33)	17:21	18:11	20:04	20:54
6	08:31	15:32 (WP KLUS-33)	07:58	07:02	06:52	05:50
	16:32	20 15:52 (WP KLUS-33)	17:23	18:13	20:06	20:56
7	08:30	15:32 (WP KLUS-33)	07:56	07:00	06:50	05:48
	16:33	20 15:52 (WP KLUS-33)	17:24	18:15	20:08	20:57
8	08:30	15:33 (WP KLUS-33)	07:54	06:58	06:47	05:46
	16:34	20 15:53 (WP KLUS-33)	17:26	18:17	20:09	20:59
9	08:30	15:32 (WP KLUS-33)	07:52	06:55	06:45	05:45
	16:36	22 15:54 (WP KLUS-33)	17:28	18:18	20:11	21:01
10	08:29	15:32 (WP KLUS-33)	07:51	06:53	06:43	05:43
	16:37	22 15:54 (WP KLUS-33)	17:30	18:20	20:13	21:02
11	08:28	15:34 (WP KLUS-33)	07:49	06:51	06:41	05:41
	16:39	21 15:55 (WP KLUS-33)	17:32	18:22	20:14	21:04
12	08:28	15:34 (WP KLUS-33)	07:47	06:49	06:38	05:40
	16:40	21 15:55 (WP KLUS-33)	17:34	18:24	3 07:14 (WP EiiB-44)	20:16
13	08:27	15:34 (WP KLUS-33)	07:45	06:46	07:09 (WP EiiB-44)	06:36
	16:42	21 15:55 (WP KLUS-33)	17:35	18:25	6 07:15 (WP EiiB-44)	20:18
14	08:26	15:34 (WP KLUS-33)	07:43	06:44	07:07 (WP EiiB-44)	06:34
	16:43	21 15:55 (WP KLUS-33)	17:37	18:27	9 07:16 (WP EiiB-44)	20:19
15	08:26	15:35 (WP KLUS-33)	07:41	06:42	07:04 (WP EiiB-44)	06:32
	16:45	21 15:56 (WP KLUS-33)	17:39	18:29	11 07:15 (WP EiiB-44)	20:21
16	08:25	15:35 (WP KLUS-33)	07:40	06:40	07:02 (WP EiiB-44)	06:30
	16:46	21 15:56 (WP KLUS-33)	17:41	18:30	13 07:15 (WP EiiB-44)	20:23
17	08:24	15:36 (WP KLUS-33)	07:38	06:37	08:02 (WP EiiB-26)	06:28
	16:48	20 15:56 (WP KLUS-33)	17:43	18:32	15 07:15 (WP EiiB-44)	20:24
18	08:23	15:37 (WP KLUS-33)	07:36	06:35	08:00 (WP EiiB-26)	06:25
	16:49	19 15:56 (WP KLUS-33)	17:45	18:34	16 07:14 (WP EiiB-44)	20:26
19	08:22	15:38 (WP KLUS-33)	07:34	06:33	07:58 (WP EiiB-26)	06:23
	16:51	18 15:56 (WP KLUS-33)	17:46	18:36	17 07:12 (WP EiiB-44)	20:28
20	08:21	15:39 (WP KLUS-33)	07:32	06:31	06:56 (WP EiiB-44)	06:21
	16:53	17 15:56 (WP KLUS-33)	17:48	18:37	15 07:11 (WP EiiB-44)	20:29
21	08:20	15:41 (WP KLUS-33)	07:30	06:28	06:58 (WP EiiB-44)	06:19
	16:54	14 15:55 (WP KLUS-33)	17:50	18:39	11 07:09 (WP EiiB-44)	20:31
22	08:19	15:41 (WP KLUS-33)	07:28	06:26	07:02 (WP EiiB-44)	06:17
	16:56	13 15:54 (WP KLUS-33)	17:52	18:41	2 07:04 (WP EiiB-44)	20:33
23	08:18	15:44 (WP KLUS-33)	07:26	06:24	06:15	06:15
	16:58	9 15:53 (WP KLUS-33)	17:54	18:42	20:34	21:22
24	08:17		07:23	06:21	06:13	05:23
	16:59		17:55	18:44	20:36	21:23
25	08:15		07:21	06:19	06:11	05:22
	17:01		17:57	18:46	20:38	21:24
26	08:14		07:19	06:17	06:09	05:20
	17:03		17:59	18:47	20:39	21:25
27	08:13		07:17	06:15	06:07	05:19
	17:05		18:01	18:49	20:41	21:27
28	08:11		07:15	06:12	06:05	05:18
	17:06		18:03	18:51	20:43	21:28
29	08:10			07:10	06:03	05:17
	17:08			19:52	20:44	21:29
30	08:09			07:08	06:01	05:16
	17:10			19:54	20:46	21:30
31	08:07			07:05		05:15
	17:12			19:56		21:32
Sonnenscheinstunden	261	278	367	415	484	497
astr.max.mögl.Beschattung	435	47	118	1		
Red.Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36		
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		
Reduktion Windrichtung	0,70	0,62	0,66	0,69		
Gesamte Reduktion	0,11	0,17	0,16	0,21		
Met.wahrsch.Beschattung	48	8	19	0		

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AP - Stallbusch 18, Haaren (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	July	August	September	Oktober	November	Dezember
1	05:12 21:47	05:48 21:15	06:37 20:14	07:25 19:05	07:50 (WP EIIb-44) 17:00	08:08 15:16 (WP KLUS-33)
2	05:12 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:51 (WP EIIb-44) 16:58	08:09 15:17 (WP KLUS-33)
3	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:21 16:56	08:11 15:18 (WP KLUS-33)
4	05:14 21:45	05:52 21:10	06:41 20:07	07:30 18:59	07:23 16:55	08:12 15:19 (WP KLUS-33)
5	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:25 16:53	08:13 15:20 (WP KLUS-33)
6	05:15 21:45	05:55 21:07	06:45 20:03	07:33 18:54	07:27 16:51	08:15 15:21 (WP KLUS-33)
7	05:16 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:28 16:50	08:16 15:22 (WP KLUS-33)
8	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:30 16:48	08:17 15:23 (WP KLUS-33)
9	05:18 21:43	06:00 21:01	06:49 19:56	07:38 18:47	07:32 16:46	08:18 15:24 (WP KLUS-33)
10	05:19 21:42	06:01 21:00	06:51 19:54	07:40 18:45	07:34 16:45	08:19 15:25 (WP KLUS-33)
11	05:20 21:41	06:03 20:58	06:53 19:51	07:41 18:43	07:35 16:43	08:21 15:26 (WP KLUS-33)
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	07:37 16:42	08:22 15:27 (WP KLUS-33)
13	05:22 21:40	06:06 20:54	06:56 19:47	07:45 18:39	07:39 16:40	08:23 15:28 (WP KLUS-33)
14	05:23 21:39	06:08 20:52	06:57 19:45	07:46 18:36	07:41 16:39	08:24 15:29 (WP KLUS-33)
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	07:42 16:37	08:24 15:30 (WP KLUS-33)
16	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	07:44 16:36	08:25 15:31 (WP KLUS-33)
17	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	07:46 16:35	08:26 15:32 (WP KLUS-33)
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	07:47 16:33	08:27 15:33 (WP KLUS-33)
19	05:29 21:33	06:16 20:42	07:05 19:33	07:55 18:26	07:49 16:32	08:28 15:34 (WP KLUS-33)
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	07:51 16:31	08:28 15:35 (WP KLUS-33)
21	05:32 21:31	06:19 20:38	07:09 19:28	07:58 18:22	07:52 16:30	08:29 15:36 (WP KLUS-33)
22	05:33 21:30	06:21 20:36	07:10 19:26	08:00 18:20	07:54 16:29	08:29 15:37 (WP KLUS-33)
23	05:35 21:29	06:22 20:34	07:12 19:24	08:02 18:17	07:56 16:27	08:30 15:38 (WP KLUS-33)
24	05:36 21:27	06:24 20:32	07:13 19:21	08:04 18:15	07:57 16:26	08:30 15:39 (WP KLUS-33)
25	05:37 21:26	06:25 20:29	07:15 19:19	08:05 18:13	07:59 16:25	08:31 15:40 (WP KLUS-33)
26	05:39 21:24	06:27 20:27	07:17 19:17	08:07 18:12	08:01 16:24	08:31 15:41 (WP KLUS-33)
27	05:40 21:23	06:29 20:25	07:18 19:15	08:09 18:10	08:02 16:23	08:31 15:42 (WP KLUS-33)
28	05:42 21:22	06:30 20:23	07:20 19:12	08:11 18:08	08:04 16:22	08:31 15:43 (WP KLUS-33)
29	05:43 21:20	06:32 20:21	07:21 19:10	08:12 18:06	08:05 16:21	08:32 15:44 (WP KLUS-33)
30	05:45 21:19	06:33 20:19	07:23 19:08	08:14 18:04	08:07 16:20	08:32 15:45 (WP KLUS-33)
31	05:46 21:17	06:35 20:16		08:16 18:02	08:09 16:19	08:32 15:46 (WP KLUS-33)
Sonnenscheinstunden	500	453	381	332	268	246
astr. max. mögl. Beschattung			114	55	215	540
Red. Sonnenscheinwahrsch.			0,32	0,29	0,23	0,17
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,66	0,62	0,70	0,70
Gesamte Reduktion			0,18	0,15	0,13	0,10
Met. wahrsch. Beschattung			20	8	29	54

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen
Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AQ - Stallbusch 14, Haaren (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32 16:26	15:27 (WP KLUS-33) 17:13	08:06 17:13	07:13 18:04	07:03 19:58	05:15 21:33
2	08:32 16:27	15:27 (WP KLUS-33) 17:15	08:04 17:15	07:11 18:06	07:01 19:59	05:14 21:34
3	08:32 16:28	15:27 (WP KLUS-33) 17:17	08:02 17:17	07:09 18:08	06:59 20:01	05:13 21:35
4	08:31 16:30	15:28 (WP KLUS-33) 17:19	08:01 17:19	07:06 18:10	06:56 20:03	05:12 21:36
5	08:31 16:31	15:28 (WP KLUS-33) 17:21	07:59 17:21	07:04 18:11	06:54 20:04	05:12 21:37
6	08:31 16:32	15:29 (WP KLUS-33) 17:23	07:58 17:23	07:02 18:13	06:52 20:06	05:11 21:38
7	08:30 16:33	15:28 (WP KLUS-33) 17:24	07:56 17:24	07:00 18:15	06:50 20:08	05:10 21:39
8	08:30 16:35	15:29 (WP KLUS-33) 17:26	07:54 17:26	06:58 18:17	06:47 20:09	05:10 21:40
9	08:30 16:36	15:29 (WP KLUS-33) 17:28	07:52 17:28	06:55 18:18	06:45 20:11	05:09 21:40
10	08:29 16:37	15:29 (WP KLUS-33) 17:30	07:51 17:30	06:53 18:20	06:43 20:13	05:09 21:41
11	08:28 16:39	15:30 (WP KLUS-33) 17:32	07:49 17:32	06:51 18:22	06:41 20:14	05:09 21:42
12	08:28 16:40	15:53 (WP KLUS-33) 17:34	07:47 17:34	06:49 18:24	06:38 20:16	05:08 21:43
13	08:27 16:42	15:53 (WP KLUS-33) 17:35	07:45 17:35	06:46 18:25	06:36 20:18	05:08 21:43
14	08:26 16:43	15:31 (WP KLUS-33) 17:37	07:43 17:37	06:44 18:27	06:34 20:19	05:08 21:44
15	08:26 16:45	15:32 (WP KLUS-33) 17:39	07:41 17:39	06:42 18:29	06:32 20:21	05:08 21:44
16	08:25 16:46	15:32 (WP KLUS-33) 17:41	07:40 17:41	06:40 18:30	06:30 20:23	05:07 21:45
17	08:24 16:48	15:33 (WP KLUS-33) 17:43	07:38 17:43	06:37 18:32	06:28 20:24	05:07 21:45
18	08:23 16:49	15:53 (WP KLUS-33) 17:45	1 08:02 (WP EIIb-26) 08:03 (WP EIIb-26)	06:36 18:34	06:27 20:26	05:07 21:46
19	08:22 16:51	15:53 (WP KLUS-33) 17:46	3 08:00 (WP EIIb-26) 08:03 (WP EIIb-26)	06:35 18:36	06:26 20:28	05:07 21:46
20	08:21 16:53	15:35 (WP KLUS-33) 17:48	5 07:58 (WP EIIb-26) 08:00 (WP EIIb-26)	06:33 18:37	06:25 20:29	05:08 21:47
21	08:20 16:54	15:53 (WP KLUS-33) 17:50	7 08:03 (WP EIIb-26) 08:02 (WP EIIb-26)	06:31 18:39	06:24 20:31	05:08 21:47
22	08:19 16:56	15:38 (WP KLUS-33) 17:52	9 07:53 (WP EIIb-26) 08:01 (WP EIIb-26)	06:28 18:41	06:19 20:33	05:08 21:47
23	08:18 16:58	15:38 (WP KLUS-33) 17:54	10 08:02 (WP EIIb-26) 07:51 (WP EIIb-26)	06:26 18:42	06:17 20:34	05:08 21:47
24	08:17 16:59	15:45 (WP KLUS-33) 17:55	8 07:59 (WP EIIb-26) 17:55	06:24 18:44	06:15 20:36	05:08 21:47
25	08:15 17:01	15:47 (WP KLUS-33) 17:57	17:55 18:46	18:44 19:52	06:11 20:38	05:09 21:47
26	08:14 17:03	17:19 17:59	06:17 18:47	06:09 20:39	05:20 21:26	05:09 21:47
27	08:13 17:05	07:17 18:01	06:15 18:49	06:07 20:41	05:19 21:27	05:10 21:47
28	08:11 17:06	07:15 18:03	06:12 18:51	06:05 20:43	05:18 21:28	05:10 21:47
29	08:10 17:08	18:03	07:10 19:52	06:03 20:44	05:17 21:29	05:11 21:47
30	08:09 17:10		07:08 19:54	06:01 20:46	05:16 21:30	05:11 21:47
31	08:07 17:12		07:05 19:56	06:00 20:46	05:15 21:32	05:11 21:47
Sonnenscheinstunden		261	278	367	415	497
astr.max.mögl.Beschattung		457	43	110		
Red.Sonnenscheinwahrsch.		0,19	0,32	0,28		
Reduktion Betriebsdauer		0,84	0,84	0,84		
Reduktion Windrichtung		0,70	0,62	0,66		
Gesamte Reduktion		0,11	0,17	0,16		
Met.wahrsch.Beschattung		51	7	17		

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen
 Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ AQ - Stallbusch 14, Haaren (WA-MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Juli	August	September	Oktober	November	Dezember	
1	05:12 21:47	05:48 21:15	06:37 20:14	07:25 19:05	07:18 17:00	08:08 16:20	15:12 (WP KLUS-33)
2	05:12 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:19 16:58	08:09 16:20	23 15:35 (WP KLUS-33)
3	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:21 16:56	08:11 16:19	22 15:12 (WP KLUS-33)
4	05:14 21:45	05:52 21:10	06:41 20:07	07:30 18:59	07:23 16:55	08:12 16:19	22 15:13 (WP KLUS-33)
5	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:25 16:53	08:13 16:18	22 15:35 (WP KLUS-33)
6	05:15 21:45	05:55 21:07	06:45 20:03	07:33 18:54	07:27 16:51	08:15 16:18	22 15:36 (WP KLUS-33)
7	05:16 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:28 16:50	08:16 16:17	21 15:36 (WP KLUS-33)
8	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:30 16:48	08:17 16:17	21 15:36 (WP KLUS-33)
9	05:18 21:43	06:00 21:01	06:49 19:56	07:38 18:47	07:32 16:46	08:18 16:17	21 15:36 (WP KLUS-33)
10	05:19 21:42	06:01 21:00	06:51 19:54	07:40 18:45	07:34 16:45	08:19 16:17	20 15:37 (WP KLUS-33)
11	05:20 21:41	06:03 20:58	06:53 19:52	07:41 18:43	07:35 16:43	08:21 16:16	20 15:37 (WP KLUS-33)
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	07:37 16:42	08:22 16:16	19 15:37 (WP KLUS-33)
13	05:22 21:40	06:06 20:54	06:56 19:47	07:45 18:39	07:39 16:40	08:23 16:16	19 15:37 (WP KLUS-33)
14	05:23 21:39	06:08 20:52	06:57 19:45	07:46 18:36	07:41 16:39	08:24 16:16	19 15:38 (WP KLUS-33)
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	07:42 16:37	08:24 16:16	19 15:38 (WP KLUS-33)
16	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	07:44 16:36	08:25 16:16	18 15:38 (WP KLUS-33)
17	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	07:46 16:35	08:26 16:17	18 15:39 (WP KLUS-33)
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	07:47 16:33	08:27 16:17	17 15:38 (WP KLUS-33)
19	05:29 21:33	06:16 20:42	07:05 19:33	07:55 18:26	07:49 16:32	08:28 16:17	17 15:39 (WP KLUS-33)
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	07:51 16:31	08:29 16:17	17 15:40 (WP KLUS-33)
21	05:32 21:31	06:19 20:38	07:09 19:28	07:58 18:22	07:52 16:30	08:29 16:18	17 15:40 (WP KLUS-33)
22	05:33 21:30	06:21 20:36	07:10 19:26	08:00 18:20	07:54 16:29	08:29 16:18	17 15:40 (WP KLUS-33)
23	05:35 21:29	06:22 20:34	07:12 19:24	08:02 18:17	07:56 16:27	08:30 16:19	17 15:40 (WP KLUS-33)
24	05:36 21:27	06:24 20:32	07:13 19:22	08:04 18:15	07:57 16:26	08:30 16:19	18 15:41 (WP KLUS-33)
25	05:37 21:26	06:25 20:29	07:15 19:19	08:05 18:13	07:59 16:25	08:31 16:20	18 15:42 (WP KLUS-33)
26	05:39 21:24	06:27 20:27	07:17 19:17	08:07 18:12	08:01 16:24	08:31 16:21	17 15:42 (WP KLUS-33)
27	05:40 21:23	06:29 20:25	07:18 19:15	08:09 18:10	08:02 16:24	08:31 16:22	17 15:43 (WP KLUS-33)
28	05:42 21:22	06:30 20:23	07:20 19:12	08:11 18:08	08:04 16:23	08:31 16:22	18 15:44 (WP KLUS-33)
29	05:43 21:20	06:32 20:21	07:21 19:10	08:12 18:06	08:05 16:22	08:32 16:23	18 15:44 (WP KLUS-33)
30	05:45 21:19	06:33 20:19	07:23 19:08	08:14 18:04	08:07 16:21	08:32 16:24	19 15:45 (WP KLUS-33)
31	05:46 21:17	06:35 20:16		07:16 17:02		08:32 16:25	19 15:46 (WP KLUS-33)
Sonnenscheinstunden	500	453	381	332	268	246	
astr. max. mögl. Beschattung			109	45	221		590
Red. Sonnenscheinwahrsch.			0,32	0,29	0,23		0,17
Reduktion Betriebsdauer			0,84	0,84	0,84		0,84
Reduktion Windrichtung			0,66	0,62	0,70		0,70
Gesamte Reduktion			0,18	0,15	0,13		0,10
Met. wahrsch. Beschattung			19	7	29		59

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ B - Fürstenberger Str. 40, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32 16:26	08:06	08:38 (WP EIB-26) 07:13		07:36 (WP EIB-44) 07:03	05:59 05:15
2	08:32 16:27	08:04	08:40 (WP EIB-26) 07:11	21	07:57 (WP EIB-44) 19:58	20:48 21:33
3	08:32 16:28	08:02	08:52 (WP EIB-26) 07:09	23	07:34 (WP EIB-44) 07:01	05:57 05:14
4	08:31 16:30	08:01	08:42 (WP EIB-26) 07:09	25	07:57 (WP EIB-44) 19:59	20:49 21:34
5	08:31 16:31	07:59	08:51 (WP EIB-26) 18:08	26	07:30 (WP EIB-44) 20:01	05:55 05:13
6	08:31 16:32	07:58	07:06	26	07:56 (WP EIB-44) 20:03	20:51 21:35
7	08:30 16:33	07:56	18:10	26	07:30 (WP EIB-44) 06:56	05:53 05:12
8	08:30 16:34	07:54	18:11	26	07:56 (WP EIB-44) 20:03	20:53 21:36
9	08:30 16:36	07:52	07:04	24	07:30 (WP EIB-44) 06:54	05:52 05:12
10	08:29 16:37	07:51	18:15	24	07:56 (WP EIB-44) 20:04	20:54 21:37
11	08:28 16:39	07:49	06:55	22	07:30 (WP EIB-44) 06:52	05:50 05:11
12	08:28 16:40	07:47	18:18	24	07:56 (WP EIB-44) 20:06	20:56 21:38
13	08:27 16:41	07:45	06:58	22	07:31 (WP EIB-44) 06:50	05:48 05:10
14	08:26 16:43	07:43	18:17	22	07:55 (WP EIB-44) 20:08	20:57 21:39
15	08:26 16:44	07:41	06:58	22	07:31 (WP EIB-44) 06:47	05:46 05:10
16	08:25 16:46	07:39	18:17	22	07:53 (WP EIB-44) 20:09	20:59 21:40
17	08:24 16:48	07:38	06:55	20	07:32 (WP EIB-44) 06:45	05:45 05:09
18	08:23 16:49	07:36	18:18	20	07:52 (WP EIB-44) 20:11	21:01 21:40
19	08:22 16:51	07:34	06:53	20	07:34 (WP EIB-44) 06:43	05:43 05:09
20	08:21 16:52	07:32	18:20	17	07:51 (WP EIB-44) 20:13	21:02 21:41
21	08:20 16:54	07:30	06:51	13	07:14 (WP EIB-05) 06:41	05:41 05:09
22	08:19 16:56	07:28	18:22	13	07:48 (WP EIB-44) 20:14	21:04 21:42
23	08:18 16:58	07:26	06:49	13	07:11 (WP EIB-05) 06:38	05:40 05:08
24	08:16 16:59	07:23	18:24	3	07:14 (WP EIB-05) 20:16	21:05 21:43
25	08:15 17:01	07:21	06:46	3	07:09 (WP EIB-05) 06:36	05:38 05:08
26	08:14 17:03	07:19	18:25	6	07:15 (WP EIB-05) 20:18	21:07 21:43
27	08:13 17:04	07:17	06:44	7	07:07 (WP EIB-05) 06:34	05:36 05:08
28	08:11 17:06	07:15	18:27	7	07:14 (WP EIB-05) 20:19	21:08 21:44
29	08:10 17:08	07:13	06:42	8	07:04 (WP EIB-05) 06:32	05:35 05:08
30	08:08 17:10	07:11	18:29	8	07:12 (WP EIB-05) 20:21	21:10 21:44
31	08:07 17:12	07:09	06:40	8	07:07 (WP EIB-05) 06:30	05:33 05:07
	Sonnenscheinstunden 260	278	367	415	484	497
	astr.max.mögl.Beschattung 132	151	345			
	Red.Sonnenscheinwahrsch. 0,19	0,32	0,28			
	Reduktion Betriebsdauer 0,84	0,84	0,84			
	Reduktion Windrichtung 0,59	0,61	0,63			
	Gesamte Reduktion 0,09	0,17	0,15			
	Met.wahrsch.Beschattung 12	25	52			

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen
 Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ B - Fürstenberger Str. 40, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	July	August	September	Oktober	November	Dezember			
1	05:12	05:48	06:37	07:25	07:50 (WP EIIb-05)	07:18	08:08		
	21:47	21:15	20:14	19:05	4 07:54 (WP EIIb-05)	17:00	16:20		
2	05:12	05:49	06:38	07:26	07:51 (WP EIIb-05)	07:19	08:09		
	21:46	21:14	20:12	19:03	10 08:24 (WP EIIb-44)	16:58	16:20		
3	05:13	05:51	06:40	07:28	08:12 (WP EIIb-44)	07:21	08:11		
	21:46	21:12	20:10	19:01	16 08:28 (WP EIIb-44)	16:56	16:19		
4	05:14	05:52	06:41	07:30	08:11 (WP EIIb-44)	07:23	08:12		
	21:45	21:10	20:07	18:59	18 08:29 (WP EIIb-44)	16:55	16:19		
5	05:15	05:54	06:43	07:31	08:08 (WP EIIb-44)	07:25	08:13		
	21:45	21:09	20:05	18:56	22 08:30 (WP EIIb-44)	16:53	16:18		
6	05:15	05:55	06:45	07:33	08:07 (WP EIIb-44)	07:27	08:15		
	21:44	21:07	20:03	18:54	24 08:31 (WP EIIb-44)	16:51	16:18		
7	05:16	05:57	06:46	07:35	08:07 (WP EIIb-44)	07:28	08:16		
	21:44	21:05	20:01	18:52	25 08:32 (WP EIIb-44)	16:50	2 08:16 (WP EIIb-26)	16:17	
8	05:17	05:58	06:48	07:36	08:05 (WP EIIb-44)	07:30	08:12 (WP EIIb-26)	08:17	
	21:43	21:03	19:58	18:50	26 08:31 (WP EIIb-44)	16:48	10 08:22 (WP EIIb-26)	16:17	
9	05:18	06:00	06:49	07:38	08:05 (WP EIIb-44)	07:32	08:11 (WP EIIb-26)	08:18	
	21:43	21:01	19:56	18:47	26 08:31 (WP EIIb-44)	16:46	12 08:23 (WP EIIb-26)	16:17	
10	05:19	06:01	06:51	07:40	08:05 (WP EIIb-44)	07:34	08:09 (WP EIIb-26)	08:19	
	21:42	21:00	19:54	18:45	27 08:32 (WP EIIb-44)	16:45	15 08:24 (WP EIIb-26)	16:16	
11	05:20	06:03	06:52	07:41	08:07 (WP EIIb-44)	07:35	08:08 (WP EIIb-26)	08:21	
	21:41	20:58	19:51	18:43	25 08:32 (WP EIIb-44)	16:43	17 08:25 (WP EIIb-26)	16:16	
12	05:21	06:05	06:54	07:43	08:08 (WP EIIb-44)	07:37	08:08 (WP EIIb-26)	08:22	
	21:40	20:56	19:49	18:41	22 08:30 (WP EIIb-44)	16:42	17 08:25 (WP EIIb-26)	16:16	
13	05:22	06:06	06:56	07:34 (WP EIIb-03)	07:45	08:10 (WP EIIb-44)	07:39	08:08 (WP EIIb-26)	08:23
	21:40	20:54	19:47	5 07:39 (WP EIIb-03)	18:39	20 08:30 (WP EIIb-44)	16:40	18 08:26 (WP EIIb-26)	16:16
14	05:23	06:08	06:57	07:31 (WP EIIb-03)	07:46	08:12 (WP EIIb-44)	07:41	08:10 (WP EIIb-26)	08:23
	21:39	20:52	19:45	9 07:40 (WP EIIb-03)	18:36	17 08:29 (WP EIIb-44)	16:39	17 08:27 (WP EIIb-26)	16:16
15	05:25	06:09	06:59	07:30 (WP EIIb-03)	07:48	08:14 (WP EIIb-44)	07:42	08:12 (WP EIIb-26)	08:24
	21:38	20:50	19:42	11 07:41 (WP EIIb-03)	18:34	14 08:28 (WP EIIb-44)	16:37	15 08:27 (WP EIIb-26)	16:16
16	05:26	06:11	07:00	07:29 (WP EIIb-03)	07:50	08:15 (WP EIIb-44)	07:44	08:14 (WP EIIb-26)	08:25
	21:37	20:48	19:40	13 07:42 (WP EIIb-03)	18:32	11 08:26 (WP EIIb-44)	16:36	13 08:27 (WP EIIb-26)	16:16
17	05:27	06:13	07:02	07:28 (WP EIIb-03)	07:51	08:17 (WP EIIb-44)	07:46	08:17 (WP EIIb-26)	08:26
	21:36	20:46	19:38	13 07:41 (WP EIIb-03)	18:30	8 08:25 (WP EIIb-44)	16:35	11 08:27 (WP EIIb-26)	16:17
18	05:28	06:14	07:04	07:29 (WP EIIb-03)	07:53	08:19 (WP EIIb-44)	07:47	08:18 (WP EIIb-26)	08:27
	21:35	20:44	19:35	12 07:41 (WP EIIb-03)	18:28	10 08:32 (WP EIIb-40)	16:33	9 08:27 (WP EIIb-26)	16:17
19	05:29	06:16	07:05	07:30 (WP EIIb-03)	07:55	08:24 (WP EIIb-40)	07:49	08:19 (WP EIIb-26)	08:27
	21:33	20:42	19:33	9 07:39 (WP EIIb-03)	18:26	10 08:34 (WP EIIb-40)	16:32	7 08:26 (WP EIIb-26)	16:17
20	05:31	06:17	07:07	07:32 (WP EIIb-03)	07:57	08:24 (WP EIIb-40)	07:51	08:21 (WP EIIb-26)	08:28
	21:32	20:40	19:31	6 07:38 (WP EIIb-03)	18:24	11 08:35 (WP EIIb-40)	16:31	5 08:26 (WP EIIb-26)	16:17
21	05:32	06:19	07:08	07:58	08:25 (WP EIIb-40)	07:52	08:23 (WP EIIb-26)	08:29	
	21:31	20:38	19:28	18:22	10 08:35 (WP EIIb-40)	16:30	3 08:26 (WP EIIb-26)	16:18	
22	05:33	06:21	07:10	08:00	08:26 (WP EIIb-40)	07:54		08:29	
	21:30	20:36	19:26	18:20	8 08:34 (WP EIIb-40)	16:28		16:18	
23	05:35	06:22	07:12	08:02	08:28 (WP EIIb-40)	07:56		08:30	
	21:29	20:34	19:24	18:17	6 08:34 (WP EIIb-40)	16:27		16:19	
24	05:36	06:24	07:13	08:04	08:30 (WP EIIb-40)	07:57		08:30	
	21:27	20:32	19:21	18:15	3 08:33 (WP EIIb-40)	16:26		16:19	
25	05:37	06:25	07:15	07:05		07:59		08:31	
	21:26	20:29	19:19	17:13		16:25		16:20	
26	05:39	06:27	07:17	07:07		08:01		08:31	
	21:24	20:27	19:17	17:11		16:24		16:21	
27	05:40	06:29	07:18	07:09		08:02		08:31	
	21:23	20:25	19:15	17:10		16:24		16:21	
28	05:42	06:30	07:20	07:11		08:04		08:31	
	21:22	20:23	19:12	6 07:47 (WP EIIb-05)	17:08	16:23		16:22	
29	05:43	06:32	07:21	07:12		08:05		08:32	
	21:20	20:21	19:10	8 07:54 (WP EIIb-05)	17:06	16:22		16:23	
30	05:45	06:33	07:23	07:14		08:07		08:32	
	21:18	20:19	19:08	6 07:54 (WP EIIb-05)	17:04	16:21		16:24	
31	05:46	06:35		07:16				08:32	
	21:17	20:16		17:02				16:25	
Sonnenscheinstunden	500	453	381	332		268		246	
astr.max.mögl.Beschattung			98	373		171			
Red.Sonnenscheinwahrsch.			0,32	0,29		0,23			
Reduktion Betriebsdauer			0,84	0,84		0,84			
Reduktion Windrichtung			0,67	0,62		0,59			
Gesamte Reduktion			0,18	0,15		0,11			
Met.wahrsch.Beschattung			18	56		19			

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ C - Windmühlenweg 2, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni	
1	08:32	15:25 (WP KLUS-31) 08:06	07:13	07:36 (WP EIIIB-44)	07:03	07:32 (WP EIIIB-03) 05:59	
2	16:26	8 15:33 (WP KLUS-31) 17:13	12 08:45 (WP EIIIB-26) 07:13	18:04	23 07:59 (WP EIIIB-44)	19:57	
3	08:32	15:32 (WP KLUS-31) 08:04	08:48 (WP EIIIB-26) 07:11	07:11	08:00 (WP EIIIB-44)	07:01	
4	16:27	6 15:32 (WP KLUS-31) 17:15	8 08:56 (WP EIIIB-26) 18:06	26 08:00 (WP EIIIB-44)	19:59	13 07:45 (WP EIIIB-03) 20:49	
5	08:32	15:28 (WP KLUS-31) 08:02	07:09	07:32 (WP EIIIB-44)	06:59	07:33 (WP EIIIB-03) 05:55	
6	16:28	3 15:31 (WP KLUS-31) 17:17	18:08	28 08:00 (WP EIIIB-44)	20:01	11 07:44 (WP EIIIB-03) 20:51	
7	08:31	08:01	07:06	07:30 (WP EIIIB-44)	06:56	07:34 (WP EIIIB-03) 05:53	
8	16:30	17:19	18:10	29 07:59 (WP EIIIB-44)	20:03	9 07:43 (WP EIIIB-03) 20:53	
9	08:31	07:59	07:04	07:30 (WP EIIIB-44)	06:54	05:52	05:12
10	16:31	17:21	18:11	29 07:59 (WP EIIIB-44)	20:04	20:54	21:37
11	08:31	07:58	07:02	07:30 (WP EIIIB-44)	06:52	05:50	05:11
12	16:32	17:23	18:13	29 07:59 (WP EIIIB-44)	20:06	20:56	21:38
13	08:30	07:56	07:00	07:31 (WP EIIIB-44)	06:50	05:48	05:10
14	16:33	17:24	18:15	27 07:58 (WP EIIIB-44)	20:08	20:57	21:39
15	08:30	07:54	06:58	07:30 (WP EIIIB-44)	06:47	05:46	05:10
16	16:34	17:26	18:17	27 07:57 (WP EIIIB-44)	20:09	20:59	21:40
17	08:30	07:52	06:55	07:31 (WP EIIIB-44)	06:45	07:08 (WP EIIIB-16) 05:45	05:09
18	16:36	17:28	18:18	25 07:56 (WP EIIIB-44)	20:11	3 07:11 (WP EIIIB-16) 21:01	21:40
19	08:29	07:51	06:53	07:32 (WP EIIIB-44)	06:43	07:05 (WP EIIIB-16) 05:43	05:09
20	16:37	17:30	18:20	23 07:55 (WP EIIIB-44)	20:13	5 07:10 (WP EIIIB-16) 21:02	21:41
21	08:28	07:49	06:51	07:34 (WP EIIIB-44)	06:41	07:03 (WP EIIIB-16) 05:41	05:09
22	16:39	17:32	18:22	19 07:53 (WP EIIIB-44)	20:14	7 07:10 (WP EIIIB-16) 21:04	21:42
23	08:28	07:47	06:49	07:11 (WP EIIIB-05) 06:38	06:38	07:02 (WP EIIIB-16) 05:40	05:08
24	16:40	17:34	18:24	16 07:50 (WP EIIIB-44)	20:16	7 07:09 (WP EIIIB-16) 21:05	21:43
25	08:27	07:45	06:46	07:09 (WP EIIIB-05) 06:36	06:36	07:04 (WP EIIIB-16) 05:38	05:08
26	16:41	17:35	18:25	13 07:47 (WP EIIIB-44)	20:18	3 07:07 (WP EIIIB-16) 21:07	21:43
27	08:26	07:43	06:44	07:07 (WP EIIIB-05) 06:34	06:34	05:36	05:08
28	16:43	17:37	18:27	6 07:13 (WP EIIIB-05) 20:19	20:19	21:08	21:44
29	08:26	07:41	06:42	07:04 (WP EIIIB-05) 06:32	06:32	05:35	05:08
30	16:44	17:39	18:29	8 07:12 (WP EIIIB-05) 20:21	20:21	21:10	21:44
31	08:25	07:39	06:40	07:02 (WP EIIIB-05) 06:30	06:30	05:33	05:07
32	16:46	17:41	18:30	10 07:12 (WP EIIIB-05) 20:23	20:23	21:11	21:45
33	08:24	07:38	06:37	07:03 (WP EIIIB-05) 06:28	06:28	05:32	05:07
34	16:48	2 08:52 (WP EIIIB-26) 17:43	3 08:02 (WP EIIIB-40) 18:32	8 07:11 (WP EIIIB-05) 20:24	20:24	21:13	21:45
35	08:23	07:36	06:35	08:00 (WP EIIIB-40) 06:35	06:35	05:31	05:07
36	16:49	5 08:56 (WP EIIIB-26) 17:45	7 08:07 (WP EIIIB-40) 18:34	18:34	20:26	21:14	21:46
37	08:22	07:34	06:33	07:58 (WP EIIIB-40) 06:33	06:33	05:29	05:07
38	16:51	7 08:57 (WP EIIIB-26) 17:46	9 08:07 (WP EIIIB-40) 18:36	18:36	20:28	21:16	21:46
39	08:21	07:32	06:30	07:55 (WP EIIIB-40) 06:30	06:30	05:28	05:07
40	16:52	9 08:58 (WP EIIIB-26) 17:48	11 08:06 (WP EIIIB-40) 18:37	18:37	20:29	21:17	21:47
41	08:20	07:30	06:28	07:54 (WP EIIIB-40) 06:28	06:28	05:26	05:08
42	16:54	11 08:59 (WP EIIIB-26) 17:50	12 08:06 (WP EIIIB-40) 18:39	18:39	20:31	21:19	21:47
43	08:19	07:28	06:26	07:54 (WP EIIIB-40) 06:26	06:26	05:25	05:08
44	16:56	13 08:59 (WP EIIIB-26) 17:52	12 08:06 (WP EIIIB-40) 18:41	18:41	20:33	21:20	21:47
45	08:18	07:26	06:24	07:49 (WP EIIIB-44) 06:24	06:24	05:24	05:08
46	16:58	14 08:59 (WP EIIIB-26) 17:54	12 08:05 (WP EIIIB-40) 18:42	18:42	20:34	21:21	21:47
47	08:16	07:23	06:21	07:47 (WP EIIIB-44) 06:21	06:21	05:23	05:08
48	16:59	16 09:00 (WP EIIIB-26) 17:55	13 08:03 (WP EIIIB-40) 18:44	18:44	20:36	21:23	21:47
49	08:15	07:21	06:19	07:45 (WP EIIIB-44) 06:19	06:19	05:22	05:09
50	17:01	18 09:00 (WP EIIIB-26) 17:57	11 07:56 (WP EIIIB-44) 18:46	18:46	20:38	21:24	21:47
51	08:14	07:19	06:17	07:43 (WP EIIIB-44) 06:17	06:17	05:20	05:09
52	17:03	20 09:01 (WP EIIIB-26) 17:59	14 07:57 (WP EIIIB-44) 18:47	18:47	20:39	21:25	21:47
53	08:13	07:17	06:14	07:41 (WP EIIIB-44) 06:14	06:14	05:19	05:09
54	17:04	19 09:00 (WP EIIIB-26) 18:01	18 07:59 (WP EIIIB-44) 18:49	6 06:44 (WP EIIIB-03) 20:41	20:41	21:27	21:47
55	08:11	07:15	06:12	07:38 (WP EIIIB-44) 06:12	06:12	05:18	05:10
56	17:06	18 09:00 (WP EIIIB-26) 18:03	20 07:58 (WP EIIIB-44) 18:51	10 06:46 (WP EIIIB-03) 20:43	20:43	21:28	21:47
57	08:10	07:26	06:20	07:33 (WP EIIIB-44) 06:20	06:20	05:17	05:10
58	17:08	18 09:00 (WP EIIIB-26) 18:03	19 07:52 (WP EIIIB-44) 18:44	13 07:46 (WP EIIIB-03) 20:44	20:44	21:29	21:47
59	08:08	07:26	06:18	07:08 (WP EIIIB-44) 06:18	06:18	05:16	05:11
60	17:10	17 09:00 (WP EIIIB-26) 17:57	14 07:54 (WP EIIIB-44) 18:46	14 07:47 (WP EIIIB-03) 20:46	20:46	21:30	21:47
61	08:07	07:26	06:15	07:05 (WP EIIIB-44) 06:15	06:15	05:15	05:10
62	17:12	15 08:59 (WP EIIIB-26) 17:57	15 07:56 (WP EIIIB-44) 18:48	15 07:47 (WP EIIIB-03) 20:47	20:47	21:32	21:47
63	Sonnenscheinstunden	260	278	367	415	484	497
64	astr.max.mögl.Beschattung	219	162	404	72		
65	Red.Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36		
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		
67	Reduktion Windrichtung	0,59	0,61	0,63	0,69		
68	Gesamte Reduktion	0,09	0,17	0,15	0,21		
69	Met.wahrsch.Beschattung	20	27	61	15		

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ C - Windmühlenweg 2, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Juli		August		September		Oktober		November		Dezember	
1	05:12	05:48	06:37	07:02 (WP EIB-16)	07:25	07:50 (WP EIB-05)	07:18		08:08			
	21:47	21:15	20:14	7 07:09 (WP EIB-16)	19:05	15 08:29 (WP EIB-44)	17:00		16:20			
2	05:12	05:49	06:38	07:04 (WP EIB-16)	07:26	08:12 (WP EIB-44)	07:19		08:09			
	21:46	21:14	20:12	5 07:09 (WP EIB-16)	19:03	18 08:30 (WP EIB-44)	16:58		16:20			
3	05:13	05:51	06:40	07:05 (WP EIB-16)	07:28	08:11 (WP EIB-44)	07:21		08:11			
	21:46	21:12	20:10	3 07:08 (WP EIB-16)	19:01	21 08:32 (WP EIB-44)	16:56		16:19			
4	05:14	05:52	06:41		07:30	08:09 (WP EIB-44)	07:23		08:12			
	21:45	21:10	20:07		18:59	24 08:33 (WP EIB-44)	16:55		16:19			
5	05:15	05:54	06:43		07:31	08:08 (WP EIB-44)	07:25		08:13			
	21:45	21:09	20:05		18:56	25 08:33 (WP EIB-44)	16:53		16:18			
6	05:15	05:55	06:45		07:33	08:07 (WP EIB-44)	07:27		08:15			
	21:44	21:07	20:03		18:54	27 08:34 (WP EIB-44)	16:51		16:18			
7	05:16	05:57	06:46		07:35	08:06 (WP EIB-44)	07:28		08:16			
	21:44	21:05	20:01		18:52	28 08:34 (WP EIB-44)	16:50		16:17			
8	05:17	05:58	06:48	07:29 (WP EIB-03)	07:36	08:05 (WP EIB-44)	07:30		08:17			
	21:43	21:03	19:58	8 07:37 (WP EIB-03)	18:50	29 08:34 (WP EIB-44)	16:48		16:17			
9	05:18	06:00	06:49	07:27 (WP EIB-03)	07:38	08:05 (WP EIB-44)	07:32		08:18			
	21:43	21:01	19:56	11 07:38 (WP EIB-03)	18:47	29 08:34 (WP EIB-44)	16:46	8 08:27 (WP EIB-26)	16:17	3 15:20 (WP KLUS-31)		
10	05:19	06:01	06:51	07:25 (WP EIB-03)	07:40	08:05 (WP EIB-44)	07:34		08:19			
	21:42	21:00	19:54	13 07:38 (WP EIB-03)	18:45	29 08:34 (WP EIB-44)	16:45	12 08:28 (WP EIB-26)	16:16	6 15:22 (WP KLUS-31)		
11	05:20	06:03	06:52	07:25 (WP EIB-03)	07:41	08:07 (WP EIB-44)	07:35		08:21			
	21:41	20:58	19:51	14 07:39 (WP EIB-03)	18:43	27 08:34 (WP EIB-44)	16:43	15 08:30 (WP EIB-26)	16:16	7 15:23 (WP KLUS-31)		
12	05:21	06:05	06:54	07:24 (WP EIB-03)	07:43	08:08 (WP EIB-44)	07:37		08:22			
	21:40	20:56	19:49	14 07:38 (WP EIB-03)	18:41	25 08:33 (WP EIB-44)	16:42	17 08:31 (WP EIB-26)	16:16	9 15:24 (WP KLUS-31)		
13	05:22	06:06	06:56	07:24 (WP EIB-03)	07:45	08:10 (WP EIB-44)	07:39		08:23			
	21:40	20:54	19:47	14 07:38 (WP EIB-03)	18:39	22 08:32 (WP EIB-44)	16:40	18 08:32 (WP EIB-26)	16:16	10 15:25 (WP KLUS-31)		
14	05:23	06:08	06:57	07:24 (WP EIB-03)	07:46	08:12 (WP EIB-44)	07:41		08:23			
	21:39	20:52	19:45	13 07:37 (WP EIB-03)	18:36	19 08:31 (WP EIB-44)	16:39	18 08:32 (WP EIB-26)	16:16	9 15:25 (WP KLUS-31)		
15	05:25	06:09	06:59	07:25 (WP EIB-03)	07:48	08:14 (WP EIB-44)	07:42		08:24			
	21:38	20:50	19:42	11 07:36 (WP EIB-03)	18:34	16 08:30 (WP EIB-44)	16:37	19 08:33 (WP EIB-26)	16:16	10 15:26 (WP KLUS-31)		
16	05:26	06:11	07:00	07:27 (WP EIB-03)	07:50	08:15 (WP EIB-44)	07:44		08:25			
	21:37	20:48	19:40	7 07:34 (WP EIB-03)	18:32	13 08:28 (WP EIB-44)	16:36	19 08:33 (WP EIB-26)	16:16	11 15:27 (WP KLUS-31)		
17	05:27	06:13	07:02	07:27 (WP EIB-03)	07:51	08:17 (WP EIB-44)	07:46		08:26			
	21:36	20:46	19:38		18:30	10 08:27 (WP EIB-44)	16:35	18 08:34 (WP EIB-26)	16:17	11 15:27 (WP KLUS-31)		
18	05:28	06:14	07:04		07:53	08:19 (WP EIB-44)	07:47		08:27			
	21:35	20:44	19:35		18:28	12 08:35 (WP EIB-40)	16:33	16 08:34 (WP EIB-26)	16:17	12 15:28 (WP KLUS-31)		
19	05:29	06:16	07:05		07:55	08:26 (WP EIB-40)	07:49		08:27			
	21:33	20:42	19:33		18:26	10 08:36 (WP EIB-40)	16:32	14 08:33 (WP EIB-26)	16:17	12 15:29 (WP KLUS-31)		
20	05:31	06:17	07:07		07:57	08:25 (WP EIB-40)	07:51		08:28			
	21:32	20:40	19:31		18:24	12 08:37 (WP EIB-40)	16:31	13 08:34 (WP EIB-26)	16:17	12 15:29 (WP KLUS-31)		
21	05:32	06:19	07:08		07:58	08:25 (WP EIB-40)	07:52		08:29			
	21:31	20:38	19:28		18:22	13 08:38 (WP EIB-40)	16:30	11 08:34 (WP EIB-26)	16:18	12 15:30 (WP KLUS-31)		
22	05:33	06:20	07:10		08:00	08:26 (WP EIB-40)	07:54		08:29			
	21:30	20:36	19:26		18:19	11 08:37 (WP EIB-40)	16:28	9 08:34 (WP EIB-26)	16:18	12 15:30 (WP KLUS-31)		
23	05:35	06:22	07:12		08:02	08:28 (WP EIB-40)	07:56		08:30			
	21:29	20:34	19:24		18:17	8 08:36 (WP EIB-40)	16:27	7 08:34 (WP EIB-26)	16:19	12 15:31 (WP KLUS-31)		
24	05:36	06:24	07:13		08:04	08:30 (WP EIB-40)	07:57		08:30			
	21:27	20:32	19:21		18:15	6 08:36 (WP EIB-40)	16:26	5 08:33 (WP EIB-26)	16:19	12 15:31 (WP KLUS-31)		
25	05:37	06:25	07:15		07:05	07:32 (WP EIB-40)	07:59		08:31			
	21:26	20:29	19:19		17:13	3 07:35 (WP EIB-40)	16:25	2 08:32 (WP EIB-26)	16:20	12 15:31 (WP KLUS-31)		
26	05:39	06:27	07:17	07:45 (WP EIB-05)	07:07		08:00		08:31			
	21:24	20:27	19:17	7 07:52 (WP EIB-05)	17:11		16:24		16:21	11 15:32 (WP KLUS-31)		
27	05:40	06:29	07:18	07:44 (WP EIB-05)	07:09		08:02		08:31			
	21:23	20:25	19:15	9 07:53 (WP EIB-05)	17:10		16:24		16:21	11 15:32 (WP KLUS-31)		
28	05:42	06:30	07:20	07:45 (WP EIB-05)	07:11		08:04		08:31			
	21:22	20:23	19:12	9 07:54 (WP EIB-05)	17:08		16:23		16:22	10 15:32 (WP KLUS-31)		
29	05:43	06:32	07:21	07:46 (WP EIB-05)	07:12		08:05		08:32			
	21:20	20:21	19:10	7 07:53 (WP EIB-05)	17:06		16:22		16:23	10 15:32 (WP KLUS-31)		
30	05:45	06:33	07:23	07:48 (WP EIB-05)	07:14		08:07		08:32			
	21:18	20:19	3 07:04 (WP EIB-16)	19:08	5 07:53 (WP EIB-05)	17:04	16:21		16:24	10 15:33 (WP KLUS-31)		
31	05:46	06:35	07:25	07:02 (WP EIB-16)	07:16				08:32			
	21:17	20:16	7 07:09 (WP EIB-16)		17:02				16:25	9 15:33 (WP KLUS-31)		
Sonnenscheinstunden	500	453	381		332		268		246			
astr. max. mögl. Beschattung		10	157		452		221		233			
Red. Sonnenscheinwahrsch.		0,40	0,32		0,29		0,23		0,17			
Reduktion Betriebsdauer		0,84	0,84		0,84		0,84		0,84			
Reduktion Windrichtung		0,69	0,68		0,62		0,58		0,70			
Gesamte Reduktion		0,23	0,18		0,15		0,11		0,10			
Met. wahrsch. Beschattung		2	28		68		24		23			

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ D - Windmühlenweg 16, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni				
1	08:32	09:03 (WP EIIb-26)	08:06	07:13	07:03	07:27 (WP EIIb-08)	05:59	05:15		
2	16:26	22 15:52 (WP KLUS-31)	17:13	18:04	40 08:16 (WP EIIb-44)	19:57	25 07:53 (WP EIIb-03)	20:48	21:33	
3	08:32	09:02 (WP EIIb-26)	08:04	07:11	07:34 (WP EIIb-13)	07:01	07:29 (WP EIIb-08)	05:57	05:14	
4	16:27	25 15:53 (WP KLUS-31)	17:15	18:06	42 08:16 (WP EIIb-44)	19:59	22 07:53 (WP EIIb-03)	20:49	21:34	
5	08:32	09:02 (WP EIIb-26)	08:02	07:09	07:32 (WP EIIb-13)	06:59	07:34 (WP EIIb-03)	05:55	05:13	
6	16:28	25 15:53 (WP KLUS-31)	17:17	18:08	44 08:16 (WP EIIb-44)	20:01	20 07:54 (WP EIIb-03)	20:51	21:35	
7	08:31	09:02 (WP EIIb-26)	08:01	07:06	07:32 (WP EIIb-13)	06:56	07:33 (WP EIIb-03)	05:53	05:12	
8	16:29	26 15:54 (WP KLUS-31)	17:19	18:10	41 08:15 (WP EIIb-44)	20:03	21 07:54 (WP EIIb-03)	20:53	21:36	
9	08:31	09:01 (WP EIIb-26)	07:59	07:04	07:42 (WP EIIb-44)	06:54	07:32 (WP EIIb-03)	05:52	05:12	
10	16:31	28 15:54 (WP KLUS-31)	17:21	18:11	32 08:14 (WP EIIb-44)	20:04	21 07:53 (WP EIIb-03)	20:54	21:37	
11	08:31	09:01 (WP EIIb-26)	07:58	07:02	07:43 (WP EIIb-44)	06:52	07:33 (WP EIIb-03)	05:50	05:11	
12	16:32	29 15:55 (WP KLUS-31)	17:23	18:13	30 08:13 (WP EIIb-44)	20:06	19 07:52 (WP EIIb-03)	20:56	21:38	
13	08:30	09:00 (WP EIIb-26)	07:56	07:00	07:44 (WP EIIb-44)	06:50	07:33 (WP EIIb-03)	05:48	05:10	
14	16:33	29 15:54 (WP KLUS-31)	17:24	18:15	28 08:12 (WP EIIb-44)	20:08	18 07:51 (WP EIIb-03)	20:57	21:39	
15	08:30	09:00 (WP EIIb-26)	07:54	06:58	07:44 (WP EIIb-44)	06:47	07:34 (WP EIIb-03)	05:46	05:10	
16	16:34	30 15:55 (WP KLUS-31)	17:26	18:17	26 08:10 (WP EIIb-44)	20:09	16 07:50 (WP EIIb-03)	20:59	21:40	
17	08:30	08:59 (WP EIIb-26)	07:52	06:55	07:46 (WP EIIb-44)	06:45	07:35 (WP EIIb-03)	05:45	05:09	
18	16:36	30 15:55 (WP KLUS-31)	17:28	18:18	23 08:09 (WP EIIb-44)	20:11	14 07:49 (WP EIIb-03)	21:01	21:40	
19	08:29	08:58 (WP EIIb-26)	07:51	06:53	07:16 (WP EIIb-05)	06:43	07:36 (WP EIIb-03)	05:43	05:09	
20	16:37	31 15:55 (WP KLUS-31)	17:30	18:20	24 08:07 (WP EIIb-44)	20:13	10 07:46 (WP EIIb-03)	21:02	21:41	
21	08:28	08:58 (WP EIIb-26)	07:49	06:51	07:14 (WP EIIb-05)	06:41	07:03 (WP EIIb-16)	05:41	05:09	
22	16:39	31 15:55 (WP KLUS-31)	17:32	3 08:14 (WP EIIb-40)	18:22	20 08:03 (WP EIIb-44)	20:14	2 07:05 (WP EIIb-16)	21:04	21:42
23	08:28	08:57 (WP EIIb-26)	07:47	7 08:12 (WP EIIb-40)	06:49	10 07:11 (WP EIIb-05)	06:38	07:01 (WP EIIb-16)	05:40	05:08
24	16:40	31 15:55 (WP KLUS-31)	17:34	8 08:19 (WP EIIb-40)	18:24	10 07:21 (WP EIIb-05)	20:16	5 07:06 (WP EIIb-16)	21:05	21:43
25	08:27	08:57 (WP EIIb-26)	07:45	10 08:10 (WP EIIb-40)	06:46	13 07:09 (WP EIIb-05)	06:36	06:59 (WP EIIb-16)	05:38	05:08
26	16:41	29 15:54 (WP KLUS-31)	17:35	10 08:20 (WP EIIb-40)	18:25	13 07:22 (WP EIIb-05)	20:18	8 07:07 (WP EIIb-16)	21:07	21:43
27	08:26	08:57 (WP EIIb-26)	07:43	13 08:08 (WP EIIb-40)	06:44	16 07:08 (WP EIIb-05)	06:34	06:57 (WP EIIb-16)	05:36	05:08
28	16:43	26 15:53 (WP KLUS-31)	17:37	13 08:21 (WP EIIb-40)	18:27	13 07:21 (WP EIIb-05)	20:19	10 07:07 (WP EIIb-16)	21:08	21:44
29	08:26	08:57 (WP EIIb-26)	07:41	15 08:06 (WP EIIb-40)	06:42	17 07:08 (WP EIIb-05)	06:32	06:57 (WP EIIb-16)	05:35	05:08
30	16:44	23 09:20 (WP EIIb-26)	17:39	15 08:21 (WP EIIb-40)	18:29	12 07:20 (WP EIIb-05)	20:21	10 07:07 (WP EIIb-16)	21:10	21:44
31	08:25	08:58 (WP EIIb-26)	07:39	16 08:06 (WP EIIb-40)	06:40	17 07:09 (WP EIIb-05)	06:30	06:57 (WP EIIb-16)	05:33	05:07
32	16:46	22 09:20 (WP EIIb-26)	17:41	15 08:21 (WP EIIb-40)	18:30	10 07:19 (WP EIIb-05)	20:23	9 07:06 (WP EIIb-16)	21:11	21:45
33	08:24	08:58 (WP EIIb-26)	07:38	17 08:06 (WP EIIb-40)	06:37	17 07:12 (WP EIIb-05)	06:28	06:57 (WP EIIb-16)	05:32	05:07
34	16:48	22 09:20 (WP EIIb-26)	17:43	15 08:21 (WP EIIb-40)	18:32	4 07:16 (WP EIIb-05)	20:24	7 07:04 (WP EIIb-16)	21:13	21:45
35	08:23	08:59 (WP EIIb-26)	07:36	18 08:00 (WP EIIb-44)	06:35		06:25		05:31	05:07
36	16:49	21 09:20 (WP EIIb-26)	17:45	20 08:20 (WP EIIb-40)	18:34		20:26		21:14	21:46
37	08:22	09:00 (WP EIIb-26)	07:34	19 07:58 (WP EIIb-44)	06:33		06:23		05:29	05:07
38	16:51	20 09:20 (WP EIIb-26)	17:46	21 08:19 (WP EIIb-40)	18:36		20:28		21:16	21:46
39	08:21	09:01 (WP EIIb-26)	07:32	20 07:55 (WP EIIb-44)	06:30		06:21		05:28	05:07
40	16:52	19 09:20 (WP EIIb-26)	17:48	21 08:16 (WP EIIb-40)	18:37		20:29		21:17	21:46
41	08:20	09:01 (WP EIIb-26)	07:30	20 07:53 (WP EIIb-44)	06:28		06:19		05:26	05:08
42	16:54	18 09:19 (WP EIIb-26)	17:50	20 08:13 (WP EIIb-44)	18:39		20:31		21:19	21:47
43	08:19	09:02 (WP EIIb-26)	07:28	19 07:51 (WP EIIb-44)	06:26		06:17		05:25	05:08
44	16:56	17 09:19 (WP EIIb-26)	17:52	23 08:14 (WP EIIb-44)	18:41		20:33		21:20	21:47
45	08:18	09:04 (WP EIIb-26)	07:25	22 07:49 (WP EIIb-44)	06:24		06:15		05:24	05:08
46	16:58	15 09:19 (WP EIIb-26)	17:54	26 08:15 (WP EIIb-44)	18:42		20:34		21:21	21:47
47	08:16	09:06 (WP EIIb-26)	07:23	25 07:47 (WP EIIb-44)	06:21		06:13		05:23	05:08
48	16:59	12 09:18 (WP EIIb-26)	17:55	29 08:16 (WP EIIb-44)	18:44		20:36		21:23	21:47
49	08:15	09:07 (WP EIIb-26)	07:21	28 07:45 (WP EIIb-44)	06:19		06:11		05:21	05:09
50	17:01	9 09:16 (WP EIIb-26)	17:57	32 08:17 (WP EIIb-44)	18:46		20:38		21:24	21:47
51	08:14		07:19	31 07:43 (WP EIIb-44)	06:17		06:09		05:20	05:09
52	17:03		17:59	34 08:17 (WP EIIb-44)	18:47		20:39		21:25	21:47
53	08:13		07:17	27 07:40 (WP EIIb-13)	06:14		06:07		05:19	05:09
54	17:04		18:01	36 08:16 (WP EIIb-44)	18:49		20:41		21:27	21:47
55	08:11		07:15	28 07:38 (WP EIIb-13)	06:12		06:05		05:18	05:10
56	17:06		18:03	38 08:16 (WP EIIb-44)	18:51	1 06:35 (WP EIIb-08)	06:05		21:28	21:47
57	08:10				07:10	1 06:36 (WP EIIb-08)	20:43		05:17	05:10
58	17:08				12 07:49 (WP EIIb-03)	07:32 (WP EIIb-08)	06:03		21:29	21:47
59	08:08				07:08	07:30 (WP EIIb-08)	06:01		05:16	05:11
60	17:10				18 19:54	07:51 (WP EIIb-03)	20:46		21:30	21:47
61	08:07				07:05	07:28 (WP EIIb-08)			05:15	
62	17:12				19:56	24 07:53 (WP EIIb-03)			21:32	
63	Sonnenscheinstunden	260	278	367	415	484	497			
64	astr.max.mögl.Beschattung	590	378	467	237					
65	Red.Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36					
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84					
67	Reduktion Windrichtung	0,60	0,62	0,63	0,68					
68	Gesamte Reduktion	0,09	0,17	0,15	0,21					
69	Met.wahrsch.Beschattung	55	63	70	49					

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-4872 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ D - Windmühlenweg 16, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Juli		August		September		Oktober		November		Dezember	
1	05:12	05:48	06:37	07:02 (WP EIB-16)	07:25	07:50 (WP EIB-05)	07:18	08:08	08:40 (WP EIB-26)			
	21:47	21:15	20:14	1 07:03 (WP EIB-16)	19:05	11 08:01 (WP EIB-05)	17:00	16:20	31 15:37 (WP KLUS-31)			
2	05:12	05:49	06:38	07:35 (WP EIB-03)	07:26	07:51 (WP EIB-05)	07:19	08:09	08:41 (WP EIB-26)			
	21:46	21:14	20:12	10 07:45 (WP EIB-03)	19:03	17 08:39 (WP EIB-44)	16:58	16:20	32 15:38 (WP KLUS-31)			
3	05:13	05:51	06:40	07:32 (WP EIB-03)	07:28	07:53 (WP EIB-05)	07:21	08:11	08:42 (WP EIB-26)			
	21:46	21:12	20:10	14 07:46 (WP EIB-03)	19:01	22 08:43 (WP EIB-44)	16:56	16:19	30 15:39 (WP KLUS-31)			
4	05:14	05:52	06:41	07:31 (WP EIB-03)	07:30	07:55 (WP EIB-05)	07:23	08:12	08:43 (WP EIB-26)			
	21:45	21:10	20:07	16 07:47 (WP EIB-03)	18:59	24 08:46 (WP EIB-44)	16:55	16:19	30 15:39 (WP KLUS-31)			
5	05:15	05:54	06:43	07:29 (WP EIB-03)	07:31	07:56 (WP EIB-05)	07:25	08:13	08:44 (WP EIB-26)			
	21:45	21:09	20:05	19 07:48 (WP EIB-03)	18:56	24 08:46 (WP EIB-44)	16:53	16:18	30 15:40 (WP KLUS-31)			
6	05:15	05:55	06:44	07:29 (WP EIB-03)	07:33	07:56 (WP EIB-05)	07:27	08:15	08:44 (WP EIB-26)			
	21:44	21:07	20:03	19 07:48 (WP EIB-03)	18:54	28 08:48 (WP EIB-44)	16:51	16:18	29 15:41 (WP KLUS-31)			
7	05:16	05:57	06:46	07:29 (WP EIB-03)	07:35	07:56 (WP EIB-05)	07:28	08:16	08:44 (WP EIB-26)			
	21:44	21:05	20:01	20 07:49 (WP EIB-03)	18:52	30 08:49 (WP EIB-44)	16:50	16:17	28 15:41 (WP KLUS-31)			
8	05:17	05:58	06:48	07:28 (WP EIB-03)	07:36	07:56 (WP EIB-05)	07:30	08:17	08:44 (WP EIB-26)			
	21:43	21:03	19:58	20 07:48 (WP EIB-03)	18:50	31 08:49 (WP EIB-44)	16:48	16:17	27 15:41 (WP KLUS-31)			
9	05:18	06:00	06:49	07:28 (WP EIB-03)	07:38	08:08 (WP EIB-13)	07:32	08:18	08:44 (WP EIB-26)			
	21:43	21:01	19:56	20 07:48 (WP EIB-03)	18:47	39 08:50 (WP EIB-44)	16:46	16:17	25 15:42 (WP KLUS-31)			
10	05:19	06:01	06:51	07:27 (WP EIB-03)	07:40	08:06 (WP EIB-13)	07:34	08:19	08:44 (WP EIB-26)			
	21:42	21:00	19:54	20 07:47 (WP EIB-03)	18:45	43 08:50 (WP EIB-44)	16:45	16:16	24 15:43 (WP KLUS-31)			
11	05:20	06:03	06:52	07:21 (WP EIB-08)	07:41	08:07 (WP EIB-13)	07:35	08:20	08:44 (WP EIB-26)			
	21:41	20:58	19:51	24 07:46 (WP EIB-03)	18:43	43 08:50 (WP EIB-44)	16:43	16:16	23 15:42 (WP KLUS-31)			
12	05:21	06:05	06:54	07:19 (WP EIB-08)	07:43	08:08 (WP EIB-13)	07:37	08:22	08:44 (WP EIB-26)			
	21:40	20:56	19:49	24 07:44 (WP EIB-03)	18:41	42 08:50 (WP EIB-44)	16:42	16:16	22 15:42 (WP KLUS-31)			
13	05:22	06:06	06:56	07:21 (WP EIB-08)	07:45	08:10 (WP EIB-13)	07:39	08:23	08:44 (WP EIB-26)			
	21:39	20:54	19:47	20 07:43 (WP EIB-03)	18:39	40 08:50 (WP EIB-44)	16:40	16:16	20 15:42 (WP KLUS-31)			
14	05:23	06:08	06:57	07:22 (WP EIB-08)	07:46	08:12 (WP EIB-13)	07:41	08:23	08:44 (WP EIB-26)			
	21:39	20:52	19:45	13 07:40 (WP EIB-03)	18:36	38 08:50 (WP EIB-44)	16:39	16:16	19 15:42 (WP KLUS-31)			
15	05:25	06:09	06:59	07:24 (WP EIB-08)	07:48	08:14 (WP EIB-13)	07:42	08:24	08:44 (WP EIB-26)			
	21:38	20:50	19:42	1 07:25 (WP EIB-08)	18:34	35 08:49 (WP EIB-44)	16:37	16:16	17 15:42 (WP KLUS-31)			
16	05:26	06:11	07:00		07:50	08:15 (WP EIB-13)	07:44	08:25	08:44 (WP EIB-26)			
	21:37	20:48	19:40		18:32	33 08:48 (WP EIB-44)	16:36	16:16	16 15:42 (WP KLUS-31)			
17	05:27	06:13	07:02		07:51	08:17 (WP EIB-13)	07:46	08:26	08:44 (WP EIB-26)			
	21:36	20:46	19:38		18:30	31 08:48 (WP EIB-44)	16:35	9 08:41 (WP EIB-26)	16:17	16 15:42 (WP KLUS-31)		
18	05:28	06:14	07:04		07:53	08:19 (WP EIB-13)	07:47	08:27	08:44 (WP EIB-26)			
	21:35	20:44	19:35		18:28	28 08:47 (WP EIB-44)	16:33	12 08:52 (WP EIB-26)	16:17	15 15:42 (WP KLUS-31)		
19	05:29	06:16	07:05		07:55	08:21 (WP EIB-13)	07:49	08:27	08:44 (WP EIB-26)			
	21:33	20:42	19:33		18:26	25 08:46 (WP EIB-44)	16:32	15 08:53 (WP EIB-26)	16:17	15 15:43 (WP KLUS-31)		
20	05:31	06:17	07:07		07:57	08:23 (WP EIB-13)	07:51	08:27	08:44 (WP EIB-26)			
	21:32	20:40	19:31		18:24	22 08:45 (WP EIB-44)	16:31	17 08:54 (WP EIB-26)	16:17	13 15:42 (WP KLUS-31)		
21	05:32	06:19	07:08		07:58	08:25 (WP EIB-13)	07:52	08:27	08:44 (WP EIB-26)			
	21:31	20:38	19:28		18:22	19 08:44 (WP EIB-44)	16:30	18 08:55 (WP EIB-26)	16:18	13 15:43 (WP KLUS-31)		
22	05:33	06:20	07:10		08:00	08:26 (WP EIB-13)	07:54	08:27	08:44 (WP EIB-26)			
	21:30	20:36	19:26		18:19	21 08:47 (WP EIB-44)	16:28	19 08:56 (WP EIB-26)	16:18	13 15:43 (WP KLUS-31)		
23	05:35	06:22	07:12		08:02	08:28 (WP EIB-13)	07:56	08:27	08:44 (WP EIB-26)			
	21:28	20:34	19:24		18:17	21 08:49 (WP EIB-44)	16:27	20 08:57 (WP EIB-26)	16:19	13 15:44 (WP KLUS-31)		
24	05:36	06:24	07:13		08:04	08:30 (WP EIB-13)	07:57	08:27	08:44 (WP EIB-26)			
	21:27	20:31	19:21		18:15	20 08:50 (WP EIB-44)	16:26	21 08:57 (WP EIB-26)	16:19	14 15:45 (WP KLUS-31)		
25	05:37	06:25	07:15		07:05	07:36 (WP EIB-40)	07:59	08:27	08:44 (WP EIB-26)			
	21:26	20:29	19:19		17:13	14 07:50 (WP EIB-40)	16:25	22 08:58 (WP EIB-26)	16:20	15 15:45 (WP KLUS-31)		
26	05:39	06:27	07:17		07:07	07:36 (WP EIB-40)	08:00	08:27	08:44 (WP EIB-26)			
	21:24	20:27	7 07:07 (WP EIB-16)	19:17	17:11	14 07:50 (WP EIB-40)	16:24	22 08:59 (WP EIB-26)	16:21	15 15:46 (WP KLUS-31)		
27	05:40	06:28	07:18		07:52 (WP EIB-05)	07:09	07:36 (WP EIB-40)	08:02	08:36 (WP EIB-26)			
	21:23	20:25	9 07:08 (WP EIB-16)	19:15	8 08:00 (WP EIB-05)	17:10	14 07:50 (WP EIB-40)	16:23	23 08:59 (WP EIB-26)	16:21	17 15:47 (WP KLUS-31)	
28	05:42	06:30	06:57 (WP EIB-16)	07:20	07:50 (WP EIB-05)	07:11	07:38 (WP EIB-40)	08:04	08:37 (WP EIB-26)			
	21:22	20:23	11 07:08 (WP EIB-16)	19:12	11 08:01 (WP EIB-05)	17:08	12 07:50 (WP EIB-40)	16:23	27 15:33 (WP KLUS-31)	16:22	17 15:48 (WP KLUS-31)	
29	05:43	06:32	06:58 (WP EIB-16)	07:21	07:48 (WP EIB-05)	07:12	07:39 (WP EIB-40)	08:05	08:38 (WP EIB-26)			
	21:20	20:21	10 07:08 (WP EIB-16)	19:10	13 08:01 (WP EIB-05)	17:06	9 07:48 (WP EIB-40)	16:22	29 15:35 (WP KLUS-31)	16:23	19 15:49 (WP KLUS-31)	
30	05:45	06:33	06:59 (WP EIB-16)	07:23	07:48 (WP EIB-05)	07:14	07:41 (WP EIB-40)	08:07	08:38 (WP EIB-26)			
	21:18	20:19	8 07:07 (WP EIB-16)	19:08	13 08:01 (WP EIB-05)	17:04	6 07:47 (WP EIB-40)	16:21	31 15:36 (WP KLUS-31)	16:24	20 15:50 (WP KLUS-31)	
31	05:46	06:35	07:01 (WP EIB-16)		07:16	07:43 (WP EIB-40)		08:07	08:38 (WP EIB-26)			
	21:17	20:16	5 07:06 (WP EIB-16)		17:02	2 07:45 (WP EIB-40)		268	16:25	21 15:51 (WP KLUS-31)		
Sonnenscheinstunden	500	453	381		332				246			
astr.max.mögl.Beschattung		50	286		758			285			639	
Red.Sonnenscheinwahrsch.		0,40	0,32		0,29			0,23			0,17	
Reduktion Betriebsdauer		0,84	0,84		0,84			0,84			0,84	
Reduktion Windrichtung		0,70	0,68		0,62			0,57			0,64	
Gesamte Reduktion		0,23	0,18		0,15			0,11			0,09	
Met.wahrsch.Beschattung		12	51		113			30			57	

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ E - Windmühlenweg 20, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar		Februar		März		April		Mai		Juni		
1	08:32		09:10 (WP EIIb-26)	08:06		07:13		07:36 (WP EIIb-41)	07:03		07:28 (WP EIIb-08)	05:59	
	16:26	25	09:35 (WP EIIb-26)	17:13		18:04		08:32 (WP EIIb-44)	19:57	31	08:06 (WP EIIb-03)	20:48	
2	08:32		09:10 (WP EIIb-26)	08:04		07:11		07:34 (WP EIIb-41)	07:01		07:30 (WP EIIb-08)	05:57	
	16:27	24	09:34 (WP EIIb-26)	17:15		18:06	51	08:31 (WP EIIb-44)	19:59	30	08:07 (WP EIIb-03)	20:49	
3	08:32		09:11 (WP EIIb-26)	08:02		07:09		07:32 (WP EIIb-41)	06:59		07:42 (WP EIIb-03)	05:55	
	16:28	24	09:35 (WP EIIb-26)	17:17		18:08	53	08:31 (WP EIIb-44)	20:01	26	08:08 (WP EIIb-03)	20:51	
4	08:31		09:12 (WP EIIb-26)	08:01		07:06		07:30 (WP EIIb-41)	06:56		07:42 (WP EIIb-03)	05:53	
	16:29	24	09:36 (WP EIIb-26)	17:19		18:10	51	08:29 (WP EIIb-44)	20:03	27	08:09 (WP EIIb-03)	20:53	
5	08:31		09:12 (WP EIIb-26)	07:59		07:04		07:31 (WP EIIb-41)	06:54		07:40 (WP EIIb-03)	05:52	
	16:31	23	09:35 (WP EIIb-26)	17:21	1	08:26 (WP EIIb-40)	18:11	45	08:27 (WP EIIb-44)	20:04	28	08:08 (WP EIIb-03)	20:54
6	08:31		09:13 (WP EIIb-26)	07:58		07:02		07:25 (WP EIIb-05)	06:52		07:40 (WP EIIb-03)	05:50	
	16:32	23	09:36 (WP EIIb-26)	17:23	6	08:29 (WP EIIb-40)	18:13	44	08:26 (WP EIIb-44)	20:06	28	08:08 (WP EIIb-03)	20:56
7	08:30		09:13 (WP EIIb-26)	07:56		07:00		07:23 (WP EIIb-05)	06:50		07:40 (WP EIIb-03)	05:48	
	16:33	23	09:36 (WP EIIb-26)	17:24	10	08:31 (WP EIIb-40)	18:15	41	08:24 (WP EIIb-44)	20:08	28	08:08 (WP EIIb-03)	20:57
8	08:30		09:14 (WP EIIb-26)	07:54		06:58		07:20 (WP EIIb-05)	06:47		07:40 (WP EIIb-03)	05:46	
	16:34	22	09:36 (WP EIIb-26)	17:26	13	08:32 (WP EIIb-40)	18:17	29	08:20 (WP EIIb-44)	20:09	28	08:08 (WP EIIb-03)	20:59
9	08:30		09:14 (WP EIIb-26)	07:52		06:55		07:18 (WP EIIb-05)	06:45		07:40 (WP EIIb-03)	05:45	
	16:36	22	09:36 (WP EIIb-26)	17:28	15	08:32 (WP EIIb-40)	18:18	23	08:16 (WP EIIb-44)	20:11	27	08:07 (WP EIIb-03)	21:01
10	08:29		09:15 (WP EIIb-26)	07:51		06:53		07:17 (WP EIIb-05)	06:43		07:40 (WP EIIb-03)	05:43	
	16:37	21	09:36 (WP EIIb-26)	17:30	18	08:33 (WP EIIb-40)	18:20	15	07:32 (WP EIIb-05)	20:13	25	08:05 (WP EIIb-03)	21:02
11	08:28		09:16 (WP EIIb-26)	07:49		06:51		07:17 (WP EIIb-05)	06:41		07:40 (WP EIIb-03)	05:41	
	16:39	21	09:37 (WP EIIb-26)	17:32	20	08:33 (WP EIIb-40)	18:22	15	07:32 (WP EIIb-05)	20:14	25	08:05 (WP EIIb-03)	21:04
12	08:28		09:17 (WP EIIb-26)	07:47		06:49		07:16 (WP EIIb-05)	06:38		07:41 (WP EIIb-03)	05:40	
	16:40	19	09:36 (WP EIIb-26)	17:34	22	08:34 (WP EIIb-40)	18:24	15	07:31 (WP EIIb-05)	20:16	22	08:03 (WP EIIb-03)	21:05
13	08:27		09:18 (WP EIIb-26)	07:45		06:46		07:17 (WP EIIb-05)	06:36		06:59 (WP EIIb-16)	05:38	
	16:41	18	09:36 (WP EIIb-26)	17:35	23	08:33 (WP EIIb-40)	18:25	13	07:30 (WP EIIb-05)	20:18	24	08:02 (WP EIIb-03)	21:07
14	08:26		09:19 (WP EIIb-26)	07:43		06:44		07:18 (WP EIIb-05)	06:34		06:57 (WP EIIb-16)	05:36	
	16:43	16	09:35 (WP EIIb-26)	17:37	24	08:32 (WP EIIb-40)	18:27	11	07:29 (WP EIIb-05)	20:19	24	08:00 (WP EIIb-03)	21:08
15	08:26		09:20 (WP EIIb-26)	07:41		06:42		07:19 (WP EIIb-05)	06:32		06:55 (WP EIIb-16)	05:35	
	16:44	15	09:35 (WP EIIb-26)	17:39	25	08:31 (WP EIIb-40)	18:29	7	07:26 (WP EIIb-05)	20:21	23	07:58 (WP EIIb-03)	21:10
16	08:25		09:22 (WP EIIb-26)	07:39		06:40		08:04 (WP EIIb-44)	06:30		06:54 (WP EIIb-16)	05:33	
	16:46	12	09:34 (WP EIIb-26)	17:41	27	08:31 (WP EIIb-44)	18:30		20:23	12	07:06 (WP EIIb-16)	21:11	
17	08:24		09:24 (WP EIIb-26)	07:38		06:37		08:02 (WP EIIb-44)	06:28		06:53 (WP EIIb-16)	05:32	
	16:48	8	09:32 (WP EIIb-26)	17:43	30	08:32 (WP EIIb-44)	18:32		20:24	12	07:05 (WP EIIb-16)	21:13	
18	08:23			07:36		06:35		08:00 (WP EIIb-44)	06:25		06:53 (WP EIIb-16)	05:30	
	16:49			17:45	33	08:33 (WP EIIb-44)	18:34		20:26	12	07:05 (WP EIIb-16)	21:14	
19	08:22			07:34		06:33		07:58 (WP EIIb-44)	06:23		06:54 (WP EIIb-16)	05:29	
	16:51			17:46	35	08:33 (WP EIIb-44)	18:36		20:28	10	07:04 (WP EIIb-16)	21:16	
20	08:21			07:32		06:30		08:04 (WP EIIb-44)	06:21		06:55 (WP EIIb-16)	05:28	
	16:52			17:48	37	08:33 (WP EIIb-44)	18:37		20:29	8	07:03 (WP EIIb-16)	21:17	
21	08:20			07:30		06:28		08:04 (WP EIIb-44)	06:19		06:57 (WP EIIb-16)	05:26	
	16:54			17:50	38	08:33 (WP EIIb-44)	18:39		20:31	2	06:59 (WP EIIb-16)	21:19	
22	08:19			07:28		06:26		08:04 (WP EIIb-44)	06:17			05:25	
	16:56			17:52	39	08:34 (WP EIIb-44)	18:41		20:33			21:20	
23	08:18			07:25		06:24		08:04 (WP EIIb-44)	06:15			05:24	
	16:58			17:54	41	08:34 (WP EIIb-44)	18:42		20:34			21:21	
24	08:16			07:23		06:21		08:04 (WP EIIb-44)	06:13			05:23	
	16:59			17:55	44	08:34 (WP EIIb-44)	18:44		20:36			21:23	
25	08:15			07:21		06:19		08:04 (WP EIIb-44)	06:11			05:21	
	17:01			17:57	46	08:34 (WP EIIb-44)	18:46		20:38			21:24	
26	08:14			07:19		06:17		08:04 (WP EIIb-44)	06:09			05:20	
	17:03			17:59	49	08:34 (WP EIIb-44)	18:47		20:39			21:25	
27	08:13			07:17		06:14		08:04 (WP EIIb-44)	06:07			05:19	
	17:04			18:01	51	08:33 (WP EIIb-44)	18:49		20:41			21:27	
28	08:11			07:15		06:12		07:38 (WP EIIb-41)	06:05			05:18	
	17:06			18:03	52	08:33 (WP EIIb-44)	18:51	3	06:35 (WP EIIb-08)	20:43		21:28	
29	08:10					06:10		07:32 (WP EIIb-08)	06:03			05:17	
	17:08					19:52	15	08:01 (WP EIIb-03)	20:44	1	06:28 (WP EIIb-01)	21:29	
30	08:08					07:08		07:30 (WP EIIb-08)	06:01		06:25 (WP EIIb-01)	05:16	
	17:10					19:54	24	08:04 (WP EIIb-03)	20:46	1	06:26 (WP EIIb-01)	21:30	
31	08:07					07:05		07:29 (WP EIIb-08)				05:15	
	17:12					19:56	29	08:06 (WP EIIb-03)				21:32	
Sonnenscheinstunden	260		278		367		415		484		497		
astr.max.mögl.Beschattung	340		699		535		454						
Red.Sonnenscheinwahrsch.	0,19		0,32		0,28		0,36						
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84						
Reduktion Windrichtung	0,56		0,61		0,63		0,68						
Gesamte Reduktion	0,09		0,16		0,15		0,20						
Met.wahrsch.Beschattung	30		115		79		93						

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ E - Windmühlenweg 20, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Juli		August		September		Oktober		November		Dezember	
1	05:12	05:48			06:36	07:39 (WP EIB-03)	07:25	07:56 (WP EIB-05)	07:18		07:45 (WP EIB-14)	08:08
	21:47	21:15			20:14	25 08:04 (WP EIB-03)	19:05	14 08:10 (WP EIB-05)	17:00	17 08:02 (WP EIB-40)	16:20	20 09:19 (WP EIB-26)
2	05:12	05:49			06:38	07:39 (WP EIB-03)	07:26	07:55 (WP EIB-05)	07:19		07:47 (WP EIB-14)	08:09
	21:46	21:14			20:12	25 08:04 (WP EIB-03)	19:03	15 08:10 (WP EIB-05)	16:58	15 08:02 (WP EIB-40)	16:20	21 09:19 (WP EIB-26)
3	05:13	05:51			06:40	07:37 (WP EIB-03)	07:28	07:55 (WP EIB-05)	07:21		07:49 (WP EIB-40)	08:11
	21:46	21:12			20:10	27 08:04 (WP EIB-03)	19:01	15 08:10 (WP EIB-05)	16:56	12 08:01 (WP EIB-40)	16:19	21 09:20 (WP EIB-26)
4	05:14	05:52			06:41	07:37 (WP EIB-03)	07:30	07:55 (WP EIB-05)	07:23		07:51 (WP EIB-40)	08:12
	21:45	21:10			20:07	28 08:05 (WP EIB-03)	18:59	15 08:10 (WP EIB-05)	16:55	9 08:00 (WP EIB-40)	16:19	23 09:21 (WP EIB-26)
5	05:15	05:54			06:43	07:36 (WP EIB-03)	07:31	07:56 (WP EIB-05)	07:25		07:53 (WP EIB-40)	08:13
	21:45	21:09			20:05	28 08:04 (WP EIB-03)	18:56	27 08:56 (WP EIB-44)	16:53	6 07:59 (WP EIB-40)	16:18	23 09:21 (WP EIB-26)
6	05:15	05:55			06:44	07:36 (WP EIB-03)	07:33	07:58 (WP EIB-05)	07:27		08:15	08:15
	21:44	21:07			20:03	28 08:04 (WP EIB-03)	18:54	37 08:59 (WP EIB-44)	16:51		16:18	23 09:22 (WP EIB-26)
7	05:16	05:57			06:46	07:37 (WP EIB-03)	07:35	08:00 (WP EIB-05)	07:28		08:00	08:16
	21:44	21:05			20:01	27 08:04 (WP EIB-03)	18:52	43 09:01 (WP EIB-44)	16:50		16:17	23 09:22 (WP EIB-26)
8	05:17	05:58			06:48	07:36 (WP EIB-03)	07:36	08:07 (WP EIB-41)	07:30		08:07	08:17
	21:43	21:03			19:58	27 08:03 (WP EIB-03)	18:50	44 09:02 (WP EIB-44)	16:48		16:17	24 09:23 (WP EIB-26)
9	05:18	06:00			06:49	07:37 (WP EIB-03)	07:38	08:06 (WP EIB-41)	07:32		08:08	08:18
	21:43	21:01			19:56	25 08:02 (WP EIB-03)	18:47	48 09:03 (WP EIB-44)	16:46		16:17	24 09:24 (WP EIB-26)
10	05:19	06:01			06:51	07:23 (WP EIB-08)	07:40	08:05 (WP EIB-41)	07:34		08:09	08:19
	21:42	21:00			19:54	31 08:01 (WP EIB-03)	18:45	51 09:04 (WP EIB-44)	16:45		16:16	24 09:24 (WP EIB-26)
11	05:20	06:03			06:52	07:22 (WP EIB-08)	07:41	08:07 (WP EIB-41)	07:35		08:20	09:00
	21:41	20:58			19:51	30 08:00 (WP EIB-03)	18:43	52 09:05 (WP EIB-44)	16:43		16:16	25 09:25 (WP EIB-26)
12	05:21	06:05			06:54	07:20 (WP EIB-08)	07:43	08:08 (WP EIB-41)	07:37		08:22	09:01
	21:40	20:56			19:49	30 07:58 (WP EIB-03)	18:41	52 09:05 (WP EIB-44)	16:42		16:16	24 09:25 (WP EIB-26)
13	05:22	06:06		06:34 (WP EIB-01)	06:56	07:21 (WP EIB-08)	07:45	08:10 (WP EIB-41)	07:39		08:23	09:01
	21:39	20:54	1	06:35 (WP EIB-01)	19:47	25 07:56 (WP EIB-03)	18:39	51 09:05 (WP EIB-44)	16:40		16:16	25 09:26 (WP EIB-26)
14	05:23	06:08			06:57	07:22 (WP EIB-08)	07:46	08:12 (WP EIB-41)	07:41		08:23	09:02
	21:39	20:52			19:45	17 07:52 (WP EIB-03)	18:36	50 09:06 (WP EIB-44)	16:39		16:16	24 09:26 (WP EIB-26)
15	05:25	06:09			06:59	07:24 (WP EIB-08)	07:48	08:14 (WP EIB-41)	07:42		08:24	09:02
	21:38	20:50			19:42	4 07:28 (WP EIB-08)	18:34	50 09:06 (WP EIB-44)	16:37		16:16	25 09:27 (WP EIB-26)
16	05:26	06:11			07:00		07:50	08:15 (WP EIB-41)	07:44		08:25	09:03
	21:37	20:48			19:40		18:32	48 09:05 (WP EIB-44)	16:36		16:16	24 09:27 (WP EIB-26)
17	05:27	06:13			07:02		07:51	08:17 (WP EIB-41)	07:46		08:26	09:02
	21:36	20:46			19:38		18:30	46 09:05 (WP EIB-44)	16:35		16:17	25 09:27 (WP EIB-26)
18	05:28	06:14			07:04		07:53	08:19 (WP EIB-41)	07:47		08:27	09:03
	21:35	20:44			19:35		18:28	43 09:05 (WP EIB-44)	16:33		16:17	25 09:28 (WP EIB-26)
19	05:29	06:16			07:05		07:55	08:21 (WP EIB-41)	07:49		08:27	09:04
	21:33	20:42			19:33		18:26	40 09:05 (WP EIB-44)	16:32		16:17	25 09:29 (WP EIB-26)
20	05:31	06:17			07:07		07:57	08:27 (WP EIB-41)	07:51		08:28	09:04
	21:32	20:40			19:31		18:24	38 09:05 (WP EIB-44)	16:31		16:17	24 09:28 (WP EIB-26)
21	05:32	06:19			07:08		07:58	08:27 (WP EIB-41)	07:52		08:29	09:05
	21:31	20:38			19:28		18:22	38 09:05 (WP EIB-44)	16:30		16:18	24 09:29 (WP EIB-26)
22	05:33	06:20		07:01 (WP EIB-16)	07:10		08:00	08:26 (WP EIB-41)	07:54		08:29	09:05
	21:30	20:36	4	07:05 (WP EIB-16)	19:26		18:19	37 09:03 (WP EIB-44)	16:28		16:18	24 09:29 (WP EIB-26)
23	05:35	06:22		06:59 (WP EIB-16)	07:12		08:02	08:28 (WP EIB-41)	07:56		08:30	09:06
	21:28	20:34	8	07:07 (WP EIB-16)	19:24		18:17	35 09:03 (WP EIB-44)	16:27		16:19	24 09:30 (WP EIB-26)
24	05:36	06:24		06:57 (WP EIB-16)	07:13		08:04	08:30 (WP EIB-41)	07:57		08:30	09:06
	21:27	20:31	11	07:08 (WP EIB-16)	19:21		18:15	32 09:02 (WP EIB-44)	16:26		16:19	25 09:31 (WP EIB-26)
25	05:37	06:25		06:57 (WP EIB-16)	07:15		07:05	07:32 (WP EIB-44)	07:59		08:31	09:06
	21:26	20:29	12	07:09 (WP EIB-16)	19:19		17:13	29 08:01 (WP EIB-44)	16:25	8 09:10 (WP EIB-26)	16:20	25 09:31 (WP EIB-26)
26	05:39	06:27		06:56 (WP EIB-16)	07:17		07:07	07:34 (WP EIB-44)	08:00		09:01	09:07
	21:24	20:27	12	07:08 (WP EIB-16)	19:17		17:11	26 08:00 (WP EIB-44)	16:24	12 09:13 (WP EIB-26)	16:21	25 09:32 (WP EIB-26)
27	05:40	06:28		06:56 (WP EIB-16)	07:18		07:09	07:36 (WP EIB-44)	08:02		09:00	09:08
	21:23	20:25	13	07:54 (WP EIB-03)	19:15		17:09	25 08:01 (WP EIB-40)	16:23	14 09:14 (WP EIB-26)	16:21	24 09:32 (WP EIB-26)
28	05:42	06:30		06:56 (WP EIB-16)	07:20		07:11	07:38 (WP EIB-44)	08:04		08:59	09:08
	21:22	20:23	24	07:59 (WP EIB-03)	19:12	4 08:06 (WP EIB-05)	17:08	24 08:02 (WP EIB-40)	16:23	16 09:15 (WP EIB-26)	16:22	25 09:33 (WP EIB-26)
29	05:43	06:32		06:58 (WP EIB-16)	07:21		07:12	07:39 (WP EIB-44)	08:05		08:59	09:08
	21:20	20:21	25	08:01 (WP EIB-03)	19:10	10 08:08 (WP EIB-05)	17:06	23 08:02 (WP EIB-40)	16:22	18 09:17 (WP EIB-26)	16:23	25 09:33 (WP EIB-26)
30	05:45	06:33		06:59 (WP EIB-16)	07:23		07:14	07:41 (WP EIB-44)	08:07		08:58	09:09
	21:18	20:18	24	08:02 (WP EIB-03)	19:08	13 08:10 (WP EIB-05)	17:04	21 08:02 (WP EIB-40)	16:21	19 09:17 (WP EIB-26)	16:24	24 09:33 (WP EIB-26)
31	05:46	06:35		07:41 (WP EIB-03)	07:24		07:16	07:43 (WP EIB-44)	08:07		08:59	09:09
	21:17	20:16	22	08:03 (WP EIB-03)	19:07		17:02	19 08:02 (WP EIB-40)	16:20		16:25	25 09:34 (WP EIB-26)
Sonnenscheinstunden	500	453			381		332		268		246	
astr. max. mögl. Beschattung		156			404		1088		146		742	
Red. Sonnenscheinwahrsch.		0,40			0,32		0,29		0,23		0,17	
Reduktion Betriebsdauer		0,84			0,84		0,84		0,84		0,84	
Reduktion Windrichtung		0,69			0,67		0,62		0,58		0,56	
Gesamte Reduktion		0,23			0,18		0,15		0,11		0,08	
Met. wahrsch. Beschattung		36			72		160		16		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	Zeitpunkt (SS:MM) Schattenende
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ F - Windmühlenweg 24, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32 16:26 71	09:03 (WP EIB-42) 17:13 08:04	08:05 17:13 08:04	09:17 (WP EIB-44) 18:04 07:11	07:54 (WP EIB-41) 19:57 07:01	07:03 20:48 90
2	08:32 16:27 74	09:02 (WP EIB-42) 17:15 08:02	08:04 17:15 08:02	09:18 (WP EIB-44) 18:06 07:09	07:58 (WP EIB-41) 19:59 07:01	07:03 20:49 90
3	08:31 16:28 75	09:02 (WP EIB-42) 17:16 08:01	08:02 17:16 08:01	09:18 (WP EIB-44) 18:06 07:06	07:58 (WP EIB-41) 19:59 07:01	07:03 20:51 92
4	08:31 16:29 77	09:02 (WP EIB-42) 17:17 07:59	08:01 17:17 07:59	09:19 (WP EIB-44) 18:07 07:04	07:58 (WP EIB-41) 19:59 07:01	07:03 20:52 90
5	08:31 16:31 78	09:01 (WP EIB-42) 17:21 07:58	08:01 17:21 07:58	09:20 (WP EIB-44) 18:10 07:04	07:58 (WP EIB-41) 19:59 07:01	07:03 20:54 90
6	08:31 16:32 81	09:01 (WP EIB-42) 17:21 07:58	08:01 17:21 07:58	09:20 (WP EIB-44) 18:11 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:54 90
7	08:30 16:33 81	09:01 (WP EIB-42) 17:24 07:54	08:01 17:24 07:54	09:21 (WP EIB-44) 18:15 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:54 90
8	08:30 16:34 82	09:02 (WP EIB-42) 17:26 07:52	08:02 17:26 07:52	09:21 (WP EIB-44) 18:17 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:55 90
9	08:29 16:36 81	09:02 (WP EIB-42) 17:28 07:51	08:02 17:28 07:51	09:22 (WP EIB-44) 18:18 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:56 90
10	08:29 16:37 80	09:02 (WP EIB-42) 17:30 07:51	08:02 17:30 07:51	09:22 (WP EIB-44) 18:20 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:56 90
11	08:28 16:39 75	09:03 (WP EIB-42) 17:32 07:49	08:03 17:32 07:49	09:23 (WP EIB-44) 18:22 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:57 90
12	08:28 16:40 75	09:04 (WP EIB-42) 17:34 07:47	08:04 17:34 07:47	09:23 (WP EIB-44) 18:24 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:57 90
13	08:27 16:41 75	09:04 (WP EIB-42) 17:35 07:45	08:04 17:35 07:45	09:24 (WP EIB-44) 18:25 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:58 90
14	08:26 16:43 77	09:04 (WP EIB-42) 17:37 07:43	08:05 17:37 07:43	09:24 (WP EIB-44) 18:27 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:58 90
15	08:26 16:44 78	09:04 (WP EIB-42) 17:39 07:41	08:05 17:39 07:41	09:25 (WP EIB-44) 18:29 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:59 90
16	08:25 16:46 80	09:05 (WP EIB-42) 17:41 07:39	08:06 17:41 07:39	09:25 (WP EIB-44) 18:30 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 20:59 90
17	08:24 16:48 80	09:05 (WP EIB-42) 17:43 07:37	08:06 17:43 07:37	09:26 (WP EIB-44) 18:32 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:00 90
18	08:23 16:49 81	09:05 (WP EIB-42) 17:44 07:36	08:06 17:44 07:36	09:26 (WP EIB-44) 18:34 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:00 90
19	08:22 16:51 82	09:06 (WP EIB-42) 17:46 07:34	08:07 17:46 07:34	09:27 (WP EIB-44) 18:36 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:01 90
20	08:21 16:52 81	09:06 (WP EIB-42) 17:48 07:32	08:07 17:48 07:32	09:27 (WP EIB-44) 18:37 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:01 90
21	08:20 16:54 82	09:07 (WP EIB-42) 17:50 07:30	08:08 17:50 07:30	09:28 (WP EIB-44) 18:39 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:02 90
22	08:19 16:56 85	09:07 (WP EIB-42) 17:52 07:28	08:08 17:52 07:28	09:28 (WP EIB-44) 18:41 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:02 90
23	08:18 16:57 85	09:08 (WP EIB-42) 17:54 07:25	08:09 17:54 07:25	09:29 (WP EIB-44) 18:42 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:03 90
24	08:16 16:59 86	09:08 (WP EIB-42) 17:55 07:23	08:09 17:55 07:23	09:29 (WP EIB-44) 18:43 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:03 90
25	08:15 17:01 86	09:09 (WP EIB-42) 17:57 07:21	08:10 17:57 07:21	09:30 (WP EIB-44) 18:44 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:04 90
26	08:14 17:03 85	09:09 (WP EIB-42) 17:59 07:19	08:10 17:59 07:19	09:30 (WP EIB-44) 18:45 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:04 90
27	08:13 17:04 83	09:10 (WP EIB-42) 18:01 07:17	08:11 18:01 07:17	09:31 (WP EIB-44) 18:46 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:05 90
28	08:11 17:06 82	09:10 (WP EIB-42) 18:02 07:15	08:11 18:02 07:15	09:31 (WP EIB-44) 18:47 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:05 90
29	08:10 17:08 78	09:11 (WP EIB-42) 18:04 07:14	08:12 18:04 07:14	09:32 (WP EIB-44) 18:48 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:06 90
30	08:08 17:10 72	09:11 (WP EIB-42) 18:06 07:12	08:12 18:06 07:12	09:32 (WP EIB-44) 18:49 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:06 90
31	08:07 17:12 69	09:12 (WP EIB-42) 18:08 07:11	08:13 18:08 07:11	09:33 (WP EIB-44) 18:50 07:02	07:58 (WP EIB-41) 19:59 07:01	07:03 21:07 90
Sonnenscheinstunden	260	278	367	415	484	497
astr. max. mögl. Beschattung	2457	1893	983	2188	809	
Red. Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36	0,43	
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	
Reduktion Windrichtung	0,56	0,58	0,68	0,70	0,71	
Gesamte Reduktion	0,09	0,15	0,16	0,21	0,25	
Met. wahrsch. Beschattung	213	293	156	454	201	

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

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

Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:

Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:

Power of Nature - Windenergie

Aulendorf 40

DE-48727 Billerbeck

02543 9304674

Fürtges / joerg.fuertges@powernature.de

Berechnet:

07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ F - Windmühlenweg 24, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

Juli		August		September		Oktober		November		Dezember	
1	05:12	05:48	06:33 (WP EIB-16) 06:36	17:05 (WP EIB-03) 07:25	07:53 (WP EIB-07) 07:18	07:45 (WP EIB-13) 08:08	08:08	08:46 (WP EIB-42)			
	21:46	21:15	26 06:59 (WP EIB-16) 20:14	76 18:21 (WP EIB-03) 19:05	17 08:10 (WP EIB-07) 17:00	79 09:51 (WP EIB-44) 16:20	74 10:00 (WP EIB-44)				
2	05:12	05:49	06:33 (WP EIB-16) 06:38	17:05 (WP EIB-03) 07:26	07:51 (WP EIB-07) 07:19	07:47 (WP EIB-13) 08:09	08:45 (WP EIB-42)				
	21:46	21:14	25 06:58 (WP EIB-16) 20:12	76 18:21 (WP EIB-03) 19:03	18 08:09 (WP EIB-07) 16:58	78 09:52 (WP EIB-44) 16:20	80 15:43 (WP Hirsch-02)				
3	05:13	05:51	06:34 (WP EIB-16) 06:40	17:04 (WP EIB-03) 07:28	07:53 (WP EIB-07) 07:21	07:49 (WP EIB-13) 08:11	08:46 (WP EIB-42)				
	21:46	21:12	24 06:58 (WP EIB-16) 20:10	76 18:22 (WP EIB-03) 19:06	16 07:59 (WP EIB-07) 16:58	77 09:53 (WP EIB-44) 16:16	81 15:42 (WP Hirsch-02)				
4	05:14	05:52	06:34 (WP EIB-16) 06:41	17:04 (WP EIB-03) 07:30	07:55 (WP EIB-07) 07:23	07:51 (WP EIB-13) 08:12	08:46 (WP EIB-42)				
	21:45	21:10	23 06:57 (WP EIB-16) 20:07	76 18:20 (WP EIB-03) 18:59	14 08:09 (WP EIB-07) 16:55	75 09:53 (WP EIB-44) 16:19	82 15:45 (WP Hirsch-02)				
5	05:15	05:54	06:35 (WP EIB-16) 06:43	17:03 (WP EIB-03) 07:31	07:56 (WP EIB-07) 07:25	07:53 (WP EIB-13) 08:13	08:46 (WP EIB-42)				
	21:45	21:09	38 18:03 (WP EIB-03) 20:05	82 18:19 (WP EIB-03) 18:56	12 08:08 (WP EIB-07) 16:53	74 09:54 (WP EIB-44) 16:18	81 15:44 (WP Hirsch-02)				
6	05:15	05:55	06:35 (WP EIB-16) 06:44	17:03 (WP EIB-03) 07:33	07:58 (WP EIB-07) 07:27	07:55 (WP EIB-13) 08:15	08:47 (WP EIB-42)				
	21:44	21:07	45 18:06 (WP EIB-03) 20:03	87 18:19 (WP EIB-03) 18:54	9 08:07 (WP EIB-07) 16:51	72 09:55 (WP EIB-44) 16:18	81 15:44 (WP Hirsch-02)				
7	05:16	05:57	06:36 (WP EIB-16) 06:45	17:03 (WP EIB-03) 07:35	07:29 (WP EIB-07) 07:48	07:57 (WP EIB-13) 08:16	08:48 (WP EIB-42)				
	21:44	21:05	50 18:09 (WP EIB-03) 20:01	90 18:19 (WP EIB-03) 18:52	6 08:06 (WP EIB-07) 16:50	69 09:55 (WP EIB-44) 16:17	78 15:43 (WP Hirsch-02)				
8	05:17	05:58	06:37 (WP EIB-16) 06:48	17:02 (WP EIB-03) 07:36	07:28 (WP EIB-07) 07:30	08:49 (WP EIB-44) 16:17	08:49 (WP EIB-42)				
	21:43	21:03	51 18:10 (WP EIB-03) 19:58	90 18:17 (WP EIB-03) 18:50	2 08:03 (WP EIB-07) 16:48	67 09:56 (WP EIB-44) 16:17	77 15:43 (WP Hirsch-02)				
9	05:18	06:00	06:39 (WP EIB-16) 06:49	17:02 (WP EIB-03) 07:38	07:27 (WP EIB-07) 07:38	08:48 (WP EIB-44) 16:18	08:51 (WP EIB-42)				
	21:43	21:01	52 18:13 (WP EIB-03) 19:56	91 18:17 (WP EIB-03) 18:47	16:46	69 09:57 (WP EIB-44) 16:17	75 15:43 (WP Hirsch-02)				
10	05:19	06:01	06:40 (WP EIB-16) 06:51	17:02 (WP EIB-03) 07:40	07:34	08:47 (WP EIB-44) 16:19	08:52 (WP EIB-42)				
	21:42	21:00	52 18:14 (WP EIB-03) 19:54	91 18:16 (WP EIB-03) 18:45	16:45	69 09:56 (WP EIB-44) 16:16	74 15:43 (WP Hirsch-02)				
11	05:20	06:03	17:30 (WP EIB-03) 06:52	07:25 (WP EIB-07) 07:41	07:35	08:47 (WP EIB-44) 16:16	08:53 (WP EIB-42)				
	21:41	20:58	45 18:15 (WP EIB-03) 19:51	89 18:15 (WP EIB-03) 18:43	16:43	69 09:56 (WP EIB-44) 16:16	71 15:42 (WP Hirsch-02)				
12	05:21	06:05	17:28 (WP EIB-03) 06:54	07:25 (WP EIB-07) 07:43	08:29 (WP EIB-41) 07:37	08:23 (WP EIB-14) 08:21	08:54 (WP EIB-42)				
	21:40	20:56	48 18:16 (WP EIB-03) 19:49	87 18:13 (WP EIB-03) 18:41	23 09:06 (WP EIB-05) 16:42	73 09:57 (WP EIB-44) 16:16	71 15:42 (WP Hirsch-02)				
13	05:22	06:06	17:27 (WP EIB-03) 06:56	07:25 (WP EIB-07) 07:45	08:26 (WP EIB-41) 07:39	08:21 (WP EIB-14) 08:22	08:55 (WP EIB-42)				
	21:39	20:54	51 18:18 (WP EIB-03) 19:47	86 18:13 (WP EIB-03) 18:38	33 09:08 (WP EIB-05) 16:40	78 09:57 (WP EIB-44) 16:16	70 15:42 (WP Hirsch-02)				
14	05:23	06:08	17:25 (WP EIB-03) 06:57	07:25 (WP EIB-07) 07:46	08:25 (WP EIB-41) 07:41	08:20 (WP EIB-14) 08:23	08:56 (WP EIB-42)				
	21:39	20:57	53 18:18 (WP EIB-03) 19:45	82 18:11 (WP EIB-03) 18:36	40 09:10 (WP EIB-05) 16:39	82 09:58 (WP EIB-44) 16:16	68 15:42 (WP Hirsch-02)				
15	05:25	06:09	17:23 (WP EIB-03) 06:59	07:27 (WP EIB-07) 07:48	08:24 (WP EIB-41) 07:42	08:19 (WP EIB-14) 08:24	08:57 (WP EIB-42)				
	21:38	20:50	56 18:19 (WP EIB-03) 19:42	76 18:10 (WP EIB-03) 18:34	45 09:12 (WP EIB-05) 16:37	84 09:58 (WP EIB-44) 16:16	68 15:42 (WP Hirsch-02)				
16	05:26	06:11	17:21 (WP EIB-03) 07:00	07:29 (WP EIB-07) 07:50	08:22 (WP EIB-41) 07:44	08:19 (WP EIB-14) 08:25	08:58 (WP EIB-42)				
	21:37	20:48	58 18:19 (WP EIB-03) 19:40	69 18:08 (WP EIB-03) 18:32	49 09:12 (WP EIB-05) 16:36	85 09:58 (WP EIB-44) 16:16	66 15:42 (WP Hirsch-02)				
17	05:27	06:12	17:20 (WP EIB-03) 07:02	17:06 (WP EIB-07) 07:51	08:21 (WP EIB-41) 07:46	08:19 (WP EIB-14) 08:26	08:58 (WP EIB-42)				
	21:36	20:46	61 18:21 (WP EIB-03) 19:38	61 18:07 (WP EIB-03) 18:30	51 09:12 (WP EIB-05) 16:35	86 09:59 (WP EIB-44) 16:17	66 15:42 (WP Hirsch-02)				
18	05:28	06:14	17:19 (WP EIB-03) 07:04	17:07 (WP EIB-07) 07:53	08:21 (WP EIB-41) 07:47	08:19 (WP EIB-14) 08:27	08:59 (WP EIB-42)				
	21:34	20:44	62 18:21 (WP EIB-03) 19:35	59 18:06 (WP EIB-03) 18:28	52 09:13 (WP EIB-05) 16:33	86 09:59 (WP EIB-44) 16:17	65 15:42 (WP Hirsch-02)				
19	05:29	06:16	17:18 (WP EIB-03) 07:05	17:08 (WP EIB-07) 07:55	08:21 (WP EIB-41) 07:49	08:19 (WP EIB-14) 08:27	09:00 (WP EIB-42)				
	21:33	20:42	64 18:22 (WP EIB-03) 19:33	55 18:03 (WP EIB-03) 18:26	53 09:14 (WP EIB-05) 16:32	85 09:58 (WP EIB-44) 16:17	65 15:43 (WP Hirsch-02)				
20	05:31	06:17	17:16 (WP EIB-03) 07:07	17:09 (WP EIB-07) 07:57	08:23 (WP EIB-41) 07:51	08:21 (WP EIB-14) 08:28	09:00 (WP EIB-42)				
	21:32	20:40	65 18:21 (WP EIB-03) 19:31	53 18:02 (WP EIB-03) 18:24	51 09:14 (WP EIB-05) 16:31	85 09:59 (WP EIB-44) 16:17	64 15:42 (WP Hirsch-02)				
21	05:32	06:19	17:15 (WP EIB-03) 07:08	17:10 (WP EIB-07) 07:58	08:25 (WP EIB-41) 07:52	08:23 (WP EIB-14) 08:29	09:01 (WP EIB-42)				
	21:31	20:38	67 18:22 (WP EIB-03) 19:28	49 17:59 (WP EIB-03) 18:22	64 10:29 (WP EIB-05) 16:30	82 09:59 (WP EIB-44) 16:18	64 15:42 (WP Hirsch-02)				
22	05:33	06:20	17:14 (WP EIB-03) 07:10	17:12 (WP EIB-07) 08:00	08:26 (WP EIB-41) 07:54	08:25 (WP EIB-14) 08:29	09:01 (WP EIB-42)				
	21:30	20:36	68 18:22 (WP EIB-03) 19:26	45 17:57 (WP EIB-03) 18:19	72 10:33 (WP EIB-05) 16:28	81 09:59 (WP EIB-44) 16:18	64 15:42 (WP Hirsch-02)				
23	05:35	06:22	17:13 (WP EIB-03) 07:12	17:15 (WP EIB-07) 08:02	08:28 (WP EIB-41) 07:56	08:26 (WP EIB-14) 08:30	09:02 (WP EIB-42)				
	21:28	20:34	70 18:23 (WP EIB-03) 19:24	39 17:54 (WP EIB-03) 18:17	76 10:36 (WP EIB-05) 16:27	82 09:59 (WP EIB-44) 16:19	64 15:42 (WP Hirsch-02)				
24	05:36	06:24	17:11 (WP EIB-03) 07:13	17:17 (WP EIB-07) 08:04	08:30 (WP EIB-41) 07:57	08:28 (WP EIB-14) 08:30	09:02 (WP EIB-42)				
	21:27	20:31	71 18:22 (WP EIB-03) 19:21	33 17:50 (WP EIB-03) 18:15	80 10:39 (WP EIB-05) 16:26	81 09:59 (WP EIB-44) 16:19	65 15:45 (WP Hirsch-02)				
25	05:37	06:25	17:11 (WP EIB-03) 07:15	17:21 (WP EIB-07) 08:05	07:32 (WP EIB-41) 07:59	08:30 (WP EIB-14) 08:31	09:02 (WP EIB-42)				
	21:26	20:29	72 18:23 (WP EIB-03) 19:19	25 17:46 (WP EIB-03) 17:13	80 09:59 (WP EIB-05) 16:25	80 09:59 (WP EIB-44) 16:20	65 15:45 (WP Hirsch-02)				
26	05:39	06:27	17:09 (WP EIB-03) 07:17	17:26 (WP EIB-07) 08:07	07:34 (WP EIB-41) 08:00	08:32 (WP EIB-14) 08:31	09:03 (WP EIB-42)				
	21:24	20:27	73 18:22 (WP EIB-03) 19:17	13 17:39 (WP EIB-03) 17:11	79 09:44 (WP EIB-05) 16:24	80 10:00 (WP EIB-44) 16:21	64 15:45 (WP Hirsch-02)				
27	05:40	06:28	17:09 (WP EIB-03) 07:18	17:27 (WP EIB-07) 08:08	07:36 (WP EIB-41) 08:02	08:33 (WP EIB-14) 08:31	09:03 (WP EIB-42)				
	21:23	20:25	74 18:23 (WP EIB-03) 19:15	17:09	76 09:45 (WP EIB-05) 16:23	78 09:59 (WP EIB-44) 16:21	66 15:47 (WP Hirsch-02)				
28	05:42	06:30	17:08 (WP EIB-03) 07:20	17:28 (WP EIB-07) 08:09	07:37 (WP EIB-41) 08:04	08:35 (WP EIB-14) 08:31	09:03 (WP EIB-42)				
	21:21	20:23	74 18:22 (WP EIB-03) 19:12	10 18:07 (WP EIB-03) 17:08	77 09:47 (WP EIB-05) 16:23	77 10:00 (WP EIB-44) 16:22	67 15:48 (WP Hirsch-02)				
29	05:43	06:32	17:07 (WP EIB-03) 07:21	17:29 (WP EIB-07) 08:10	07:38 (WP EIB-41) 08:05	08:36 (WP EIB-14) 08:32	09:04 (WP EIB-42)				
	21:20	20:21	76 18:23 (WP EIB-03) 19:10	13 18:08 (WP EIB-07) 17:06	78 09:47 (WP EIB-05) 16:22	74 10:00 (WP EIB-44) 16:23	68 15:49 (WP Hirsch-02)				
30	05:45	06:33	17:06 (WP EIB-03) 07:23	17:30 (WP EIB-07) 08:11	07:43 (WP EIB-13) 08:06	08:45 (WP EIB-42) 16:23	09:03 (WP EIB-42)				
	21:18	20:18	76 18:22 (WP EIB-03) 19:08	16 18:09 (WP EIB-07) 17:04	80 09:49 (WP EIB-05) 16:21	75 10:00 (WP EIB-44) 16:24	70 15:50 (WP Hirsch-02)				
31	05:46	06:35	17:06 (WP EIB-03) 07:24	17:31 (WP EIB-07) 08:12	07:44 (WP EIB-13) 08:07	08:46 (WP EIB-42) 16:24	09:03 (WP EIB-42)				
	21:17	20:16	76 18:22 (WP EIB-03) 19:07	17:02	80 09:50 (WP EIB-05) 16:21	16:25	70 15:51 (WP Hirsch-02)				
Sonnenscheinstunden		500	453	381	332	268	246				
astr. max. mögl. Beschattung	348	1746	1795	1333	2332	2184					
Red. Sonnenscheinwahrsch.	0,39	0,40	0,32	0,29	0,23	0,17					
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84					
Reduktion Windrichtung	0,71	0,70	0,69	0,60	0,56	0,56					
Gesamte Reduktion	0,23	0,23	0,18	0,14	0,10	0,08					
Met. wahrsch. Beschattung	79	400	325	188	243	170					

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: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ G - Grüner Weg 1, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32	15:34 (WP KLUS-33) 08:06	07:13	07:03	05:59	05:15
	16:26	17 15:51 (WP KLUS-33) 17:13	18:04	19:58	20:48	21:33
2	08:32	15:34 (WP KLUS-33) 08:04	07:11	07:01	05:57	05:14
	16:27	17 15:51 (WP KLUS-33) 17:15	18:06	19:59	2 07:23 (WP EIB-03) 20:49	21:34
3	08:32	15:34 (WP KLUS-33) 08:02	07:09	06:59	07:21 (WP EIB-03) 05:55	05:13
	16:28	18 15:52 (WP KLUS-33) 17:17	18:08	20:01	2 07:23 (WP EIB-03) 20:51	21:35
4	08:31	15:35 (WP KLUS-33) 08:01	07:06	06:56	05:53	05:12
	16:30	18 15:53 (WP KLUS-33) 17:19	18:10	20:03	20:53	21:36
5	08:31	15:34 (WP KLUS-33) 07:59	07:04	06:54	05:52	05:12
	16:31	19 15:53 (WP KLUS-33) 17:21	18:11	20:04	20:54	21:37
6	08:31	15:35 (WP KLUS-33) 07:58	07:02	06:52	05:50	05:11
	16:32	19 15:54 (WP KLUS-33) 17:23	18:13	20:06	20:56	21:38
7	08:30	15:35 (WP KLUS-33) 07:56	07:00	06:50	05:48	05:10
	16:33	19 15:54 (WP KLUS-33) 17:24	18:15	20:08	20:57	21:39
8	08:30	15:36 (WP KLUS-33) 07:54	06:58	07:20 (WP EIB-44) 06:47	05:46	05:10
	16:34	19 15:55 (WP KLUS-33) 17:26	18:17	1 07:21 (WP EIB-44) 20:09	20:59	21:40
9	08:30	15:36 (WP KLUS-33) 07:52	06:55	07:18 (WP EIB-44) 06:45	05:45	05:09
	16:36	19 15:55 (WP KLUS-33) 17:28	18:18	5 07:23 (WP EIB-44) 20:11	21:01	21:40
10	08:29	15:36 (WP KLUS-33) 07:51	06:53	07:16 (WP EIB-44) 06:43	05:43	05:09
	16:37	20 15:56 (WP KLUS-33) 17:30	18:20	8 07:24 (WP EIB-44) 20:13	21:02	21:41
11	08:28	15:37 (WP KLUS-33) 07:49	08:14 (WP EIB-26) 06:51	07:14 (WP EIB-44) 06:41	05:41	05:09
	16:39	20 15:57 (WP KLUS-33) 17:32	2 08:16 (WP EIB-26) 18:22	10 07:24 (WP EIB-44) 20:14	21:04	21:42
12	08:28	15:37 (WP KLUS-33) 07:47	08:12 (WP EIB-26) 06:49	07:11 (WP EIB-44) 06:38	05:40	05:08
	16:40	20 15:57 (WP KLUS-33) 17:34	5 08:17 (WP EIB-26) 18:24	12 07:23 (WP EIB-44) 20:16	21:05	21:43
13	08:27	15:37 (WP KLUS-33) 07:45	08:10 (WP EIB-26) 06:46	07:09 (WP EIB-44) 06:36	05:38	05:08
	16:41	20 15:57 (WP KLUS-33) 17:35	7 08:17 (WP EIB-26) 18:25	14 07:23 (WP EIB-44) 20:18	21:07	21:43
14	08:26	15:38 (WP KLUS-33) 07:43	08:08 (WP EIB-26) 06:44	07:07 (WP EIB-44) 06:34	05:36	05:08
	16:43	19 15:57 (WP KLUS-33) 17:37	8 08:16 (WP EIB-26) 18:27	16 07:23 (WP EIB-44) 20:19	21:08	21:44
15	08:26	15:38 (WP KLUS-33) 07:41	08:06 (WP EIB-26) 06:42	07:04 (WP EIB-44) 06:32	05:35	05:08
	16:45	19 15:57 (WP KLUS-33) 17:39	10 08:16 (WP EIB-26) 18:29	18 07:22 (WP EIB-44) 20:21	21:10	21:44
16	08:25	15:39 (WP KLUS-33) 07:40	08:04 (WP EIB-26) 06:40	07:03 (WP EIB-44) 06:30	05:33	05:07
	16:46	19 15:58 (WP KLUS-33) 17:41	11 08:15 (WP EIB-26) 18:30	18 07:21 (WP EIB-44) 20:23	21:11	21:45
17	08:24	15:40 (WP KLUS-33) 07:38	08:04 (WP EIB-26) 06:37	07:04 (WP EIB-44) 06:28	05:32	05:07
	16:48	18 15:58 (WP KLUS-33) 17:43	10 08:14 (WP EIB-26) 18:32	16 07:20 (WP EIB-44) 20:24	21:13	21:45
18	08:23	15:41 (WP KLUS-33) 07:36	08:07 (WP EIB-26) 06:35	07:06 (WP EIB-44) 06:25	05:31	05:07
	16:49	17 15:58 (WP KLUS-33) 17:45	4 08:11 (WP EIB-26) 18:34	12 07:18 (WP EIB-44) 20:26	21:14	21:46
19	08:22	15:42 (WP KLUS-33) 07:34	08:09 (WP EIB-26) 06:33	07:09 (WP EIB-44) 06:23	05:29	05:07
	16:51	15 15:57 (WP KLUS-33) 17:46	18:36	4 07:13 (WP EIB-44) 20:28	21:16	21:46
20	08:21	15:43 (WP KLUS-33) 07:32	08:08 (WP EIB-26) 06:31	07:08 (WP EIB-44) 06:21	05:28	05:08
	16:53	14 15:57 (WP KLUS-33) 17:48	18:37	20:29	21:17	21:47
21	08:20	15:45 (WP KLUS-33) 07:30	08:06 (WP EIB-26) 06:28	07:06 (WP EIB-44) 06:19	05:26	05:08
	16:54	12 15:57 (WP KLUS-33) 17:50	18:39	20:31	21:19	21:47
22	08:19	15:46 (WP KLUS-33) 07:28	08:04 (WP EIB-26) 06:26	07:04 (WP EIB-44) 06:17	05:25	05:08
	16:56	9 15:55 (WP KLUS-33) 17:52	18:41	20:33	21:20	21:47
23	08:18	15:50 (WP KLUS-33) 07:26	08:02 (WP EIB-26) 06:24	07:02 (WP EIB-44) 06:15	05:24	05:08
	16:58	1 15:51 (WP KLUS-33) 17:54	18:42	20:34	21:22	21:47
24	08:17	07:23	08:01 (WP EIB-26) 06:21	07:01 (WP EIB-44) 06:13	05:23	05:08
	16:59	17:55	18:44	20:36	21:23	21:47
25	08:15	07:21	08:00 (WP EIB-26) 06:19	07:00 (WP EIB-44) 06:11	05:22	05:09
	17:01	17:57	18:46	20:38	21:24	21:47
26	08:14	07:19	08:00 (WP EIB-26) 06:17	07:00 (WP EIB-44) 06:09	05:20	05:09
	17:03	17:59	18:47	20:39	21:25	21:47
27	08:13	07:17	08:00 (WP EIB-26) 06:15	07:00 (WP EIB-44) 06:07	05:19	05:10
	17:05	18:01	18:49	20:41	21:27	21:47
28	08:11	07:15	08:00 (WP EIB-26) 06:12	07:00 (WP EIB-44) 06:05	05:18	05:10
	17:06	18:03	18:51	20:43	21:28	21:47
29	08:10	07:10	08:00 (WP EIB-26) 06:10	07:00 (WP EIB-44) 06:03	05:17	05:11
	17:08	18:00	18:52	20:44	21:29	21:47
30	08:09	07:08	08:00 (WP EIB-26) 06:08	07:00 (WP EIB-44) 06:01	05:16	05:11
	17:10	18:00	18:54	20:46	21:30	21:47
31	08:07	07:05	08:00 (WP EIB-26) 06:05	07:00 (WP EIB-44) 06:00	05:15	05:11
	17:12	18:00	18:56	20:46	21:32	21:47
Sonnenscheinstunden	261	278	367	415	484	497
astr. max. mögl. Beschattung	388	57	134	4		
Red. Sonnenscheinwahrsch.	0,19	0,32	0,28	0,36		
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		
Reduktion Windrichtung	0,70	0,61	0,65	0,69		
Gesamte Reduktion	0,11	0,17	0,16	0,21		
Met. wahrsch. Beschattung	43	10	21	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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg
 Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
 An der Grotte 17
 D-33181 Bad Wünnenberg
 Bundesland des Projekts: Nordrhein-Westfalen
 Lizenzierter Anwender: Power of Nature - Windenergie
 Aulendorf 40
 DE-48727 Billerbeck
 02543 9304674
 Fürtges / joerg.fuertges@powernature.de
 Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ G - Grüner Weg 1, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
 261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Juli	August	September	Oktober	November	Dezember
1	05:12 21:47	05:48 21:15	06:37 20:14	07:25 19:05	07:50 (WP EIIb-44) 17:00	08:08 15:19 (WP KLUS-33)
2	05:12 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:51 (WP EIIb-44) 16:58	08:09 15:19 (WP KLUS-33)
3	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:53 (WP EIIb-44) 16:56	08:11 15:20 (WP KLUS-33)
4	05:14 21:45	05:52 21:10	06:41 20:07	07:30 18:59	07:55 (WP EIIb-44) 16:55	08:12 15:20 (WP KLUS-33)
5	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:56 (WP EIIb-44) 16:53	08:13 15:21 (WP KLUS-33)
6	05:15 21:45	05:55 21:07	06:45 20:03	07:33 18:54	07:57 (WP EIIb-44) 16:51	08:15 15:21 (WP KLUS-33)
7	05:16 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:58 (WP EIIb-44) 16:50	08:16 15:22 (WP KLUS-33)
8	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:59 (WP EIIb-44) 16:48	08:17 15:22 (WP KLUS-33)
9	05:18 21:43	06:00 21:01	06:49 19:56	07:38 18:47	07:59 (WP EIIb-44) 16:46	08:18 15:23 (WP KLUS-33)
10	05:19 21:42	06:01 21:00	06:51 19:54	07:40 18:45	08:00 (WP EIIb-44) 16:45	08:19 15:24 (WP KLUS-33)
11	05:20 21:41	06:03 20:58	06:53 19:51	07:41 18:43	08:01 (WP EIIb-44) 16:43	08:20 15:24 (WP KLUS-33)
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	08:02 (WP EIIb-44) 16:42	08:21 15:25 (WP KLUS-33)
13	05:22 21:40	06:06 20:54	06:56 19:47	07:45 18:39	08:03 (WP EIIb-44) 16:40	08:22 15:26 (WP KLUS-33)
14	05:23 21:39	06:08 20:52	06:57 19:45	07:46 18:36	08:04 (WP EIIb-44) 16:39	08:23 15:26 (WP KLUS-33)
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	08:05 (WP EIIb-44) 16:37	08:24 15:27 (WP KLUS-33)
16	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	08:06 (WP EIIb-44) 16:36	08:25 15:28 (WP KLUS-33)
17	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	08:07 (WP EIIb-44) 16:35	08:26 15:28 (WP KLUS-33)
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	08:08 (WP EIIb-44) 16:33	08:27 15:29 (WP KLUS-33)
19	05:29 21:33	06:16 20:42	07:05 19:33	07:55 18:26	08:09 (WP EIIb-44) 16:32	08:28 15:29 (WP KLUS-33)
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	08:10 (WP EIIb-44) 16:31	08:29 15:30 (WP KLUS-33)
21	05:32 21:31	06:19 20:38	07:09 19:28	07:58 18:22	08:11 (WP EIIb-44) 16:30	08:30 15:30 (WP KLUS-33)
22	05:33 21:30	06:21 20:36	07:10 19:26	08:00 18:20	08:12 (WP EIIb-44) 16:29	08:31 15:31 (WP KLUS-33)
23	05:35 21:29	06:22 20:34	07:12 19:24	08:02 18:17	08:13 (WP EIIb-44) 16:27	08:32 15:31 (WP KLUS-33)
24	05:36 21:27	06:24 20:32	07:13 19:21	08:04 18:15	08:14 (WP EIIb-44) 16:26	08:33 15:32 (WP KLUS-33)
25	05:37 21:26	06:25 20:29	07:15 19:19	08:05 (WP EIIb-44) 17:13	08:15 (WP EIIb-44) 16:25	08:34 15:33 (WP KLUS-33)
26	05:39 21:24	06:27 20:27	07:17 19:17	08:07 (WP EIIb-44) 17:11	08:16 (WP EIIb-44) 16:24	08:35 15:34 (WP KLUS-33)
27	05:40 21:23	06:29 20:25	07:18 19:15	08:08 (WP EIIb-44) 17:10	08:17 (WP EIIb-44) 16:23	08:36 15:35 (WP KLUS-33)
28	05:42 21:22	06:30 20:23	07:20 19:12	08:10 (WP EIIb-44) 17:08	08:18 (WP EIIb-44) 16:22	08:37 15:36 (WP KLUS-33)
29	05:43 21:20	06:32 20:21	07:21 19:10	08:11 (WP EIIb-44) 17:06	08:19 (WP EIIb-44) 16:21	08:38 15:37 (WP KLUS-33)
30	05:45 21:19	06:33 20:19	07:23 19:08	08:12 (WP EIIb-44) 17:04	08:20 (WP EIIb-44) 16:20	08:39 15:38 (WP KLUS-33)
31	05:46 21:17	06:35 20:16		08:13 (WP EIIb-44) 17:02	08:21 (WP EIIb-44) 16:19	08:40 15:39 (WP KLUS-33)
Sonneneinstrahlung	500	453	381	332	268	246
astr. max. mögl. Beschattung			96	100	184	494
Red. Sonneneinstrahlung			0,32	0,29	0,23	0,17
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,65	0,63	0,70	0,70
Gesamte Reduktion			0,18	0,15	0,13	0,10
Met. wahrsch. Beschattung			17	15	25	50

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ H - Kermelsgrund 1, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

Januar		Februar		März		April		Mai		Juni	
1	08:32	09:32 (WP Hirsch-4N)	08:06	08:31 (WP Hirsch-11)	07:13	17:09 (WP KLUS-21)	07:03	05:59	05:15		
	16:26	88 15:14 (WP KLUS-24)	17:14	63 14:41 (WP KLUS-33)	18:04	16 17:25 (WP KLUS-21)	19:58	20:48	21:33		
2	08:32	09:32 (WP Hirsch-4N)	08:04	08:30 (WP Hirsch-11)	07:11	17:09 (WP KLUS-21)	07:01	05:57	05:14		
	16:27	88 15:14 (WP KLUS-24)	17:15	66 14:42 (WP KLUS-33)	18:06	16 17:25 (WP KLUS-21)	19:59	20:49	21:34		
3	08:32	09:34 (WP Hirsch-4N)	08:02	08:28 (WP Hirsch-11)	07:09	17:10 (WP KLUS-21)	06:59	05:55	05:13		
	16:28	85 15:15 (WP KLUS-24)	17:17	66 14:41 (WP KLUS-33)	18:08	14 17:24 (WP KLUS-21)	20:01	20:51	21:35		
4	08:31	09:35 (WP Hirsch-4N)	08:01	08:26 (WP Hirsch-11)	07:06	17:11 (WP KLUS-21)	06:56	05:54	05:12		
	16:30	82 15:16 (WP KLUS-24)	17:19	68 14:40 (WP KLUS-33)	18:10	13 17:24 (WP KLUS-21)	20:03	20:53	21:36		
5	08:31	09:36 (WP Hirsch-4N)	07:59	08:25 (WP Hirsch-11)	07:04	17:11 (WP KLUS-21)	06:54	05:52	05:12		
	16:31	75 15:16 (WP KLUS-24)	17:21	69 14:41 (WP KLUS-33)	18:11	10 17:21 (WP KLUS-21)	20:04	20:54	21:37		
6	08:31	09:38 (WP Hirsch-4N)	07:58	08:23 (WP Hirsch-11)	07:02	17:14 (WP KLUS-21)	06:52	05:50	05:11		
	16:32	76 15:18 (WP KLUS-24)	17:23	70 14:40 (WP KLUS-33)	18:13	5 17:19 (WP KLUS-21)	20:06	20:56	21:38		
7	08:30	09:39 (WP Hirsch-4N)	07:56	08:22 (WP Hirsch-11)	07:00		06:50	05:48	05:10		
	16:33	74 15:18 (WP KLUS-24)	17:24	69 14:39 (WP KLUS-33)	18:15		20:08	20:57	21:39		
8	08:30	13:46 (WP KLUS-33)	07:54	08:22 (WP Hirsch-11)	06:58		06:47	05:46	05:10		
	16:35	67 15:19 (WP KLUS-24)	17:26	71 16:29 (WP KLUS-19)	18:17		20:09	20:59	21:40		
9	08:30	13:46 (WP KLUS-33)	07:52	08:22 (WP Hirsch-11)	06:55		06:45	05:45	05:09		
	16:36	68 15:19 (WP KLUS-24)	17:28	74 16:32 (WP KLUS-19)	18:18		20:11	21:01	21:40		
10	08:29	13:47 (WP KLUS-33)	07:51	08:22 (WP Hirsch-11)	06:53		06:43	05:43	05:09		
	16:37	70 15:21 (WP KLUS-24)	17:30	74 16:34 (WP KLUS-19)	18:20		20:13	21:02	21:41		
11	08:28	13:46 (WP KLUS-33)	07:49	08:23 (WP Hirsch-11)	06:51		06:41	05:41	05:09		
	16:39	72 15:21 (WP KLUS-24)	17:32	72 16:36 (WP KLUS-19)	18:22		20:14	21:04	21:42		
12	08:28	13:46 (WP KLUS-33)	07:47	08:23 (WP Hirsch-11)	06:49		06:38	05:40	05:08		
	16:40	72 15:21 (WP KLUS-24)	17:34	69 16:37 (WP KLUS-19)	18:24		20:16	21:05	21:43		
13	08:27	13:46 (WP KLUS-33)	07:45	08:24 (WP Hirsch-11)	06:46		06:36	05:38	05:06		
	16:42	73 15:22 (WP KLUS-24)	17:35	61 16:38 (WP KLUS-19)	18:25		20:18	21:07	21:43		
14	08:26	13:46 (WP KLUS-33)	07:43	08:25 (WP Hirsch-11)	06:44		06:34	05:37	05:08		
	16:43	73 15:22 (WP KLUS-24)	17:37	43 16:38 (WP KLUS-19)	18:27		20:19	21:08	21:44		
15	08:26	13:46 (WP KLUS-33)	07:41	08:26 (WP Hirsch-11)	06:42		06:32	05:35	05:08		
	16:45	74 15:22 (WP KLUS-24)	17:39	41 16:38 (WP KLUS-19)	18:29		20:21	21:10	21:44		
16	08:25	13:46 (WP KLUS-33)	07:40	08:27 (WP Hirsch-11)	06:40		06:30	05:34	05:08		
	16:46	74 15:23 (WP KLUS-24)	17:41	38 16:38 (WP KLUS-19)	18:31		20:23	21:11	21:45		
17	08:24	13:46 (WP KLUS-33)	07:38	08:29 (WP Hirsch-11)	06:37		06:28	05:32	05:07		
	16:48	75 15:23 (WP KLUS-24)	17:43	34 16:38 (WP KLUS-19)	18:32		20:24	21:13	21:45		
18	08:23	13:47 (WP KLUS-33)	07:36	08:33 (WP Hirsch-11)	06:35		06:25	05:31	05:07		
	16:49	74 15:23 (WP KLUS-24)	17:45	26 16:38 (WP KLUS-19)	18:34		20:26	21:14	21:46		
19	08:22	13:47 (WP KLUS-33)	07:34	16:18 (WP KLUS-19)	06:33		06:23	05:29	05:07		
	16:51	74 15:23 (WP KLUS-24)	17:46	19 16:37 (WP KLUS-19)	18:36		20:28	21:16	21:46		
20	08:21	13:47 (WP KLUS-33)	07:32	16:19 (WP KLUS-19)	06:31		06:21	05:28	05:08		
	16:53	75 15:24 (WP KLUS-24)	17:48	17 16:36 (WP KLUS-19)	18:37		20:29	21:17	21:47		
21	08:20	13:48 (WP KLUS-33)	07:30	16:19 (WP KLUS-19)	06:28		06:19	05:27	05:08		
	16:54	74 15:24 (WP KLUS-24)	17:50	15 16:34 (WP KLUS-19)	18:39		20:31	21:19	21:47		
22	08:19	13:47 (WP KLUS-33)	07:28	16:21 (WP KLUS-19)	06:26		06:17	05:25	05:08		
	16:56	73 15:23 (WP KLUS-24)	17:52	12 16:33 (WP KLUS-19)	18:41		20:33	21:20	21:47		
23	08:18	13:48 (WP KLUS-33)	07:26	16:24 (WP KLUS-19)	06:24		06:15	05:24	05:08		
	16:58	71 15:23 (WP KLUS-24)	17:54	5 16:29 (WP KLUS-19)	18:42		20:34	21:22	21:47		
24	08:17	13:48 (WP KLUS-33)	07:23		06:21		06:13	05:23	05:08		
	16:59	70 15:22 (WP KLUS-24)	17:55		18:44		20:36	21:23	21:47		
25	08:15	13:48 (WP KLUS-33)	07:21	17:14 (WP KLUS-21)	06:19		06:11	05:22	05:09		
	17:01	67 15:21 (WP KLUS-24)	17:57	7 17:21 (WP KLUS-21)	18:46		20:38	21:24	21:47		
26	08:14	13:49 (WP KLUS-33)	07:19	17:12 (WP KLUS-21)	06:17		06:09	05:20	05:09		
	17:03	62 15:19 (WP KLUS-24)	17:59	11 17:23 (WP KLUS-21)	18:47		20:39	21:26	21:47		
27	08:13	13:49 (WP KLUS-33)	07:17	17:11 (WP KLUS-21)	06:15		06:07	05:19	05:10		
	17:05	53 14:42 (WP KLUS-33)	18:01	14 17:25 (WP KLUS-21)	18:49		20:41	21:27	21:47		
28	08:11	13:49 (WP KLUS-33)	07:15	17:10 (WP KLUS-21)	06:12		06:05	05:18	05:10		
	17:06	53 14:42 (WP KLUS-33)	18:03	14 17:24 (WP KLUS-21)	18:51		20:43	21:28	21:47		
29	08:10	08:36 (WP Hirsch-11)			07:10		06:03	05:17	05:11		
	17:08	55 14:42 (WP KLUS-33)			19:53		20:44	21:29	21:47		
30	08:09	08:35 (WP Hirsch-11)			07:08		06:01	05:16	05:11		
	17:10	57 14:42 (WP KLUS-33)			19:54		20:46	21:30	21:47		
31	08:07	08:33 (WP Hirsch-11)			07:05			05:15			
	17:12	61 14:42 (WP KLUS-33)			19:56			21:32			
	Sonnenscheinstunden	261	278		367		415	484	497		
	astr.max.mögl.Beschattung	2205	1188		74						
	Red.Sonnenscheinwahrsch.	0,19	0,32		0,28						
	Reduktion Betriebsdauer	0,84	0,84		0,84						
	Reduktion Windrichtung	0,67	0,66		0,71						
	Gesamte Reduktion	0,11	0,18		0,17						
	Met.wahrsch.Beschattung	232	212		12						

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender: Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet: 07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ H - Kermelsgrund 1, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	July	August	September	Oktober	November	Dezember
1	05:12	05:48	06:37	07:25	07:18	07:51 (WP Hirsch-11) 08:08
	21:47	21:15	20:14	19:05	17:00	16:03 (WP KLUS-19) 16:20
2	05:12	05:49	06:38	07:26	07:20	07:51 (WP Hirsch-11) 08:09
	21:46	21:14	20:12	19:03	16:58	16:01 (WP KLUS-19) 16:20
3	05:13	05:51	06:40	07:28	07:21	07:51 (WP Hirsch-11) 08:11
	21:46	21:12	20:10	19:01	16:57	16:01 (WP KLUS-19) 16:19
4	05:14	05:52	06:41	07:30	07:23	07:52 (WP Hirsch-11) 08:12
	21:46	21:10	20:07	18:59	16:55	16:08 (WP KLUS-33) 16:19
5	05:15	05:54	06:43	07:31	07:25	07:53 (WP Hirsch-11) 08:13
	21:45	21:09	20:05	18:56	16:53	16:09 (WP KLUS-33) 16:18
6	05:16	05:55	06:45	07:33	07:27	07:55 (WP Hirsch-11) 08:15
	21:45	21:07	20:03	18:54	16:51	16:10 (WP KLUS-33) 16:18
7	05:16	05:57	06:46	07:35	07:28	07:57 (WP Hirsch-11) 08:16
	21:44	21:05	20:01	18:52	16:50	16:11 (WP KLUS-33) 16:17
8	05:17	05:58	06:48	07:36	17:48 (WP KLUS-21) 07:30	07:59 (WP Hirsch-11) 08:17
	21:43	21:03	19:58	18:50	17:56 (WP KLUS-21) 16:48	16:12 (WP KLUS-33) 16:17
9	05:18	06:00	06:49	07:38	17:45 (WP KLUS-21) 07:32	08:01 (WP Hirsch-11) 08:18
	21:43	21:02	19:56	18:47	17:57 (WP KLUS-21) 16:46	16:13 (WP KLUS-33) 16:17
10	05:19	06:02	06:51	07:40	17:44 (WP KLUS-21) 07:34	08:03 (WP Hirsch-11) 08:19
	21:42	21:00	19:54	18:45	17:58 (WP KLUS-21) 16:45	16:13 (WP KLUS-33) 16:17
11	05:20	06:03	06:53	07:41	17:44 (WP KLUS-21) 07:35	08:04 (WP Hirsch-11) 08:21
	21:41	20:58	19:52	18:43	17:59 (WP KLUS-21) 16:43	16:13 (WP KLUS-33) 16:16
12	05:21	06:05	06:54	07:43	17:43 (WP KLUS-21) 07:37	08:06 (WP Hirsch-11) 08:22
	21:40	20:56	19:49	18:41	17:58 (WP KLUS-21) 16:42	16:13 (WP KLUS-33) 16:16
13	05:22	06:06	06:56	07:45	17:43 (WP KLUS-21) 07:39	08:08 (WP Hirsch-11) 08:23
	21:40	20:54	19:47	18:39	17:58 (WP KLUS-21) 16:40	16:14 (WP KLUS-33) 16:16
14	05:24	06:08	06:57	07:46	17:43 (WP KLUS-21) 07:41	13:21 (WP KLUS-33) 08:24
	21:39	20:52	19:45	18:36	17:57 (WP KLUS-21) 16:39	16:14 (WP KLUS-33) 16:16
15	05:25	06:09	06:59	07:48	17:44 (WP KLUS-21) 07:42	13:21 (WP KLUS-33) 08:24
	21:38	20:50	19:42	18:34	17:56 (WP KLUS-21) 16:37	16:15 (WP KLUS-33) 16:16
16	05:26	06:11	07:01	07:50	17:45 (WP KLUS-21) 07:44	13:22 (WP KLUS-33) 08:25
	21:37	20:48	19:40	18:32	17:55 (WP KLUS-21) 16:36	16:15 (WP KLUS-33) 16:16
17	05:27	06:13	07:02	07:52	17:47 (WP KLUS-21) 07:46	13:22 (WP KLUS-33) 08:26
	21:36	20:46	19:38	18:30	17:51 (WP KLUS-21) 16:35	16:17 (WP KLUS-33) 16:17
18	05:28	06:14	07:04	07:53	07:47	13:22 (WP KLUS-33) 08:27
	21:35	20:44	19:35	18:28	16:33	16:17 (WP KLUS-33) 16:17
19	05:30	06:16	07:05	07:55	16:54 (WP KLUS-19) 07:49	13:22 (WP KLUS-33) 08:28
	21:33	20:42	19:33	18:26	17:02 (WP KLUS-19) 16:32	16:17 (WP KLUS-33) 16:17
20	05:31	06:17	07:07	07:57	16:51 (WP KLUS-19) 07:51	13:22 (WP KLUS-33) 08:28
	21:32	20:40	19:31	18:24	17:05 (WP KLUS-19) 16:31	16:18 (WP KLUS-33) 16:18
21	05:32	06:19	07:09	07:58	16:50 (WP KLUS-19) 07:53	13:23 (WP KLUS-33) 08:29
	21:31	20:38	19:28	18:22	17:06 (WP KLUS-19) 16:30	16:18 (WP KLUS-33) 16:18
22	05:33	06:21	07:10	08:00	16:48 (WP KLUS-19) 07:54	13:23 (WP KLUS-33) 08:29
	21:30	20:36	19:26	18:20	17:06 (WP KLUS-19) 16:29	16:18 (WP KLUS-33) 16:18
23	05:35	06:22	07:12	08:02	16:47 (WP KLUS-19) 07:56	13:24 (WP KLUS-33) 08:30
	21:29	20:34	19:24	18:18	17:07 (WP KLUS-19) 16:27	16:19 (WP KLUS-33) 16:19
24	05:36	06:24	07:13	08:04	09:01 (WP Hirsch-11) 07:57	13:24 (WP KLUS-33) 08:30
	21:27	20:32	19:22	18:16	17:07 (WP KLUS-19) 16:26	16:20 (WP KLUS-33) 16:20
25	05:38	06:25	07:15	07:05	07:58 (WP Hirsch-11) 07:59	13:24 (WP KLUS-33) 08:31
	21:26	20:29	19:19	17:14	16:08 (WP KLUS-19) 16:25	16:20 (WP KLUS-33) 16:20
26	05:39	06:27	07:17	07:07	07:56 (WP Hirsch-11) 08:01	13:25 (WP KLUS-33) 08:31
	21:24	20:27	19:17	17:12	16:08 (WP KLUS-19) 16:25	16:21 (WP KLUS-33) 16:21
27	05:40	06:29	07:18	07:09	07:55 (WP Hirsch-11) 08:02	13:25 (WP KLUS-33) 08:31
	21:23	20:25	19:15	17:10	16:08 (WP KLUS-19) 16:24	16:22 (WP KLUS-33) 16:22
28	05:42	06:30	07:20	07:11	07:54 (WP Hirsch-11) 08:04	13:26 (WP KLUS-33) 08:31
	21:22	20:23	19:12	17:08	16:07 (WP KLUS-19) 16:23	16:22 (WP KLUS-33) 16:22
29	05:43	06:32	07:22	07:12	07:53 (WP Hirsch-11) 08:05	13:27 (WP KLUS-33) 08:32
	21:20	20:21	19:10	17:06	16:07 (WP KLUS-19) 16:22	16:23 (WP KLUS-33) 16:23
30	05:45	06:33	07:23	07:14	07:52 (WP Hirsch-11) 08:07	13:27 (WP KLUS-33) 08:32
	21:19	20:19	19:08	17:04	16:05 (WP KLUS-19) 16:21	16:24 (WP KLUS-33) 16:24
31	05:46	06:35	07:24	07:16	07:52 (WP Hirsch-11) 08:08	13:28 (WP KLUS-33) 08:32
	21:17	20:16	19:07	17:02	16:05 (WP KLUS-19) 16:21	16:25 (WP KLUS-33) 16:25
Sonnenscheinstunden	500	453	381	332	268	246
astr.max.mögl.Beschattung				594	2044	2638
Red.Sonnenscheinwahrsch.				0,29	0,23	0,17
Reduktion Betriebsdauer				0,84	0,84	0,84
Reduktion Windrichtung				0,68	0,66	0,64
Gesamte Reduktion				0,16	0,13	0,09
Met.wahrsch.Beschattung				97	256	239

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtgtes / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ I - Bürener Str. 45, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

Januar		Februar		März		April		Mai		Juni	
1	08:32	09:03 (WP Hirsch-11)	08:06	16:25 (WP KLUS-21)	07:13	07:03	05:59	05:15			
	16:26	38 15:34 (WP KLUS-19)	17:14	13 16:38 (WP KLUS-21)	18:04	19:58	20:48	21:33			
2	08:32	09:02 (WP Hirsch-11)	08:04	16:25 (WP KLUS-21)	07:11	07:01	05:57	05:14			
	16:27	38 15:33 (WP KLUS-19)	17:15	14 16:39 (WP KLUS-21)	18:06	19:59	20:49	21:34			
3	08:32	09:02 (WP Hirsch-11)	08:02	16:26 (WP KLUS-21)	07:09	06:59	05:55	05:13			
	16:28	39 15:34 (WP KLUS-19)	17:17	12 16:38 (WP KLUS-21)	18:08	20:01	20:51	21:35			
4	08:31	09:02 (WP Hirsch-11)	08:01	16:26 (WP KLUS-21)	07:06	06:56	05:54	05:12			
	16:30	40 15:35 (WP KLUS-19)	17:19	12 16:38 (WP KLUS-21)	18:10	20:03	20:53	21:36			
5	08:31	09:01 (WP Hirsch-11)	07:59	16:28 (WP KLUS-21)	07:04	06:54	05:52	05:12			
	16:31	41 15:35 (WP KLUS-19)	17:21	10 16:38 (WP KLUS-21)	18:11	20:04	20:54	21:37			
6	08:31	09:02 (WP Hirsch-11)	07:58	16:29 (WP KLUS-21)	07:02	06:52	05:50	05:11			
	16:32	41 15:36 (WP KLUS-19)	17:23	7 16:36 (WP KLUS-21)	18:13	20:06	20:56	21:38			
7	08:30	09:02 (WP Hirsch-11)	07:56		07:00	06:50	05:48	05:10			
	16:33	39 15:35 (WP KLUS-19)	17:24		18:15	20:08	20:57	21:39			
8	08:30	09:03 (WP Hirsch-11)	07:54		06:58	06:47	05:46	05:10			
	16:35	39 15:36 (WP KLUS-19)	17:26		18:17	20:09	20:59	21:40			
9	08:30	09:03 (WP Hirsch-11)	07:52		06:55	06:45	05:45	05:09			
	16:36	39 15:36 (WP KLUS-19)	17:28		18:18	20:11	21:01	21:40			
10	08:29	09:05 (WP Hirsch-11)	07:51		06:53	06:43	05:43	05:09			
	16:37	38 15:37 (WP KLUS-19)	17:30		18:20	20:13	21:02	21:41			
11	08:29	09:05 (WP Hirsch-11)	07:49		06:51	06:41	05:41	05:09			
	16:39	36 15:37 (WP KLUS-19)	17:32		18:22	20:14	21:04	21:42			
12	08:28	09:06 (WP Hirsch-11)	07:47		06:49	06:38	05:40	05:08			
	16:40	35 15:37 (WP KLUS-19)	17:34		18:24	20:16	21:05	21:43			
13	08:27	09:06 (WP Hirsch-11)	07:45		06:46	06:36	05:38	05:08			
	16:42	33 15:36 (WP KLUS-19)	17:35		18:25	20:18	21:07	21:43			
14	08:26	09:07 (WP Hirsch-11)	07:43		06:44	06:34	05:37	05:08			
	16:43	31 15:36 (WP KLUS-19)	17:37		18:27	20:19	21:08	21:44			
15	08:26	09:08 (WP Hirsch-11)	07:41		06:42	06:32	05:35	05:08			
	16:45	27 15:35 (WP KLUS-19)	17:39		18:29	20:21	21:10	21:45			
16	08:25	09:09 (WP Hirsch-11)	07:40		06:40	06:30	05:34	05:08			
	16:46	23 15:34 (WP KLUS-19)	17:41		18:31	20:23	21:12	21:45			
17	08:24	09:11 (WP Hirsch-11)	07:38		06:37	06:28	05:32	05:07			
	16:48	13 09:24 (WP Hirsch-11)	17:43		18:32	20:24	21:13	21:45			
18	08:23	09:13 (WP Hirsch-11)	07:36		06:35	06:25	05:31	05:07			
	16:49	10 09:23 (WP Hirsch-11)	17:45		18:34	20:26	21:14	21:46			
19	08:22	09:16 (WP Hirsch-11)	07:34		06:33	06:23	05:29	05:07			
	16:51	5 09:21 (WP Hirsch-11)	17:46		18:36	20:28	21:16	21:46			
20	08:21		07:32		06:31	06:21	05:28	05:08			
	16:53		17:48		18:37	20:29	21:17	21:47			
21	08:20		07:30		06:28	06:19	05:27	05:08			
	16:54		17:50		18:39	20:31	21:19	21:47			
22	08:19		07:28		06:26	06:17	05:25	05:08			
	16:56		17:52		18:41	20:33	21:20	21:47			
23	08:18		07:26		06:24	06:15	05:24	05:08			
	16:58		17:54		18:42	20:34	21:22	21:47			
24	08:17		07:24		06:21	06:13	05:23	05:08			
	16:59		17:55		18:44	20:36	21:23	21:47			
25	08:15		07:21		06:19	06:11	05:22	05:09			
	17:01		17:57		18:46	20:38	21:24	21:47			
26	08:14		07:19		06:17	06:09	05:20	05:09			
	17:03		17:59		18:47	20:39	21:26	21:47			
27	08:13	16:29 (WP KLUS-21)	07:17		06:15	06:07	05:19	05:10			
	17:05	3 16:32 (WP KLUS-21)	18:01		18:49	20:41	21:27	21:47			
28	08:11	16:27 (WP KLUS-21)	07:15		06:12	06:05	05:18	05:10			
	17:06	8 16:35 (WP KLUS-21)	18:03		18:51	20:43	21:28	21:47			
29	08:10	16:26 (WP KLUS-21)			07:10	06:03	05:17	05:11			
	17:08	10 16:36 (WP KLUS-21)			19:53	20:44	21:29	21:47			
30	08:09	16:26 (WP KLUS-21)			07:08	06:01	05:16	05:11			
	17:10	12 16:38 (WP KLUS-21)			19:54	20:46	21:30	21:47			
31	08:07	16:25 (WP KLUS-21)			07:05		05:15				
	17:12	13 16:38 (WP KLUS-21)			19:56		21:32				
Sonnenscheinstunden		261	278		367	415	484	497			
astr.max.mögl.Beschattung		651	68								
Red.Sonnenscheinwahrsch.		0,19	0,32								
Reduktion Betriebsdauer		0,84	0,84								
Reduktion Windrichtung		0,62	0,72								
Gesamte Reduktion		0,10	0,19								
Met.wahrsch.Beschattung		63	13								

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ I - Bürener Str. 45, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	July	August	September	Oktober	November	Dezember
1	05:12 21:47	05:48 21:15	06:37 20:14	07:25 19:05	07:18 17:00	08:08 16:20
2	05:12 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:20 16:58	08:09 16:20
3	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:21 16:57	08:11 16:19
4	05:14 21:46	05:52 21:10	06:41 20:07	07:30 18:59	07:23 16:55	16:01 (WP KLUS-21) 16:03 (WP KLUS-21)
5	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:25 16:53	08:13 16:18
6	05:16 21:45	05:55 21:07	06:45 20:03	07:33 18:54	07:27 16:51	08:15 16:18
7	05:16 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:28 16:50	08:16 16:17
8	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:30 16:48	08:17 16:17
9	05:18 21:43	06:00 21:02	06:49 19:56	07:38 18:47	07:32 16:46	08:18 16:17
10	05:19 21:42	06:02 21:00	06:51 19:54	07:40 18:45	07:34 16:45	08:19 16:17
11	05:20 21:41	06:03 20:58	06:53 19:52	07:41 18:43	07:35 16:43	08:21 16:16
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	07:37 16:42	08:22 16:16
13	05:22 21:40	06:06 20:54	06:56 19:47	07:45 18:39	07:39 16:40	08:23 16:16
14	05:23 21:39	06:08 20:52	06:57 19:45	07:46 18:36	07:41 16:39	08:24 16:16
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	07:42 16:37	08:24 16:16
16	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	07:44 16:36	08:25 16:16
17	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	07:46 16:35	08:26 16:17
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	07:48 16:33	08:27 16:17
19	05:29 21:33	06:16 20:42	07:05 19:33	07:55 18:26	07:49 16:32	08:28 16:17
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	07:51 16:31	08:28 16:18
21	05:32 21:31	06:19 20:38	07:09 19:28	07:58 18:22	07:53 16:30	08:29 16:18
22	05:33 21:30	06:21 20:36	07:10 19:26	08:00 18:20	07:54 16:29	08:29 16:18
23	05:35 21:29	06:22 20:34	07:12 19:24	08:02 18:18	07:56 16:27	08:30 16:19
24	05:36 21:27	06:24 20:32	07:13 19:22	08:04 18:16	07:57 16:26	08:30 16:20
25	05:38 21:26	06:25 20:29	07:15 19:19	07:05 17:14	07:59 16:25	08:31 16:20
26	05:39 21:24	06:27 20:27	07:17 19:17	07:07 17:12	08:01 16:24	08:31 16:21
27	05:40 21:23	06:29 20:25	07:18 19:15	07:09 17:10	08:02 16:24	08:31 16:22
28	05:42 21:22	06:30 20:23	07:20 19:12	07:11 17:08	08:04 16:23	08:31 16:22
29	05:43 21:20	06:32 20:21	07:22 19:10	07:12 17:06	08:05 16:22	08:32 16:23
30	05:45 21:19	06:33 20:19	07:23 19:08	07:14 17:04	08:07 16:21	08:32 16:24
31	05:46 21:17	06:35 20:16		07:16 17:02		08:32 16:25
Sonnenscheinstunden	500	453	381	332	268	246
astr.max.mögl.Beschattung					294	1122
Red.Sonnenscheinwahrsch.					0,23	0,17
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,65	0,62
Gesamte Reduktion					0,12	0,09
Met.wahrsch.Beschattung					36	98

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
--	---	--

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ J - Bürener Str. 51, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

Januar		Februar		März	April	Mai	Juni				
1	08:32	14:31 (WP KLUS-19)	08:06	08:37 (WP Hirsch-11)	07:13	07:03	05:59				
	16:26	13 14:44 (WP KLUS-19)	17:14	16:16 (WP KLUS-21)	18:04	19:58	20:48				
2	08:32	14:31 (WP KLUS-19)	08:04	08:39 (WP Hirsch-11)	07:11	07:01	05:57				
	16:27	12 14:43 (WP KLUS-19)	17:15	16:16 (WP KLUS-21)	18:06	19:59	20:49				
3	08:32	14:32 (WP KLUS-19)	08:03	08:40 (WP Hirsch-11)	07:09	06:59	05:55				
	16:28	11 14:43 (WP KLUS-19)	17:17	16:15 (WP KLUS-21)	18:08	20:01	20:51				
4	08:31	14:34 (WP KLUS-19)	08:01	08:42 (WP Hirsch-11)	07:06	06:56	05:54				
	16:30	9 14:43 (WP KLUS-19)	17:19	16:12 (WP KLUS-21)	18:10	20:03	20:53				
5	08:31	14:35 (WP KLUS-19)	07:59	08:46 (WP Hirsch-11)	07:04	06:54	05:52				
	16:31	7 14:42 (WP KLUS-19)	17:21	08:49 (WP Hirsch-11)	18:11	20:04	20:54				
6	08:31	14:38 (WP KLUS-19)	07:58		07:02	06:52	05:50				
	16:32	3 14:41 (WP KLUS-19)	17:23		18:13	20:06	20:56				
7	08:30		07:56		07:00	06:50	05:48				
	16:33		17:24		18:15	20:08	20:57				
8	08:30		07:54		06:58	06:47	05:46				
	16:35		17:26		18:17	20:09	20:59				
9	08:30		07:52		06:55	06:45	05:45				
	16:36		17:28		18:18	20:11	21:01				
10	08:29		07:51		06:53	06:43	05:43				
	16:37		17:30		18:20	20:13	21:02				
11	08:29		07:49		06:51	06:41	05:41				
	16:39		17:32		18:22	20:14	21:04				
12	08:28		07:47		06:49	06:39	05:40				
	16:40		17:34		18:24	20:16	21:05				
13	08:27		07:45		06:46	06:36	05:38				
	16:42		17:35		18:25	20:18	21:07				
14	08:26		07:43		06:44	06:34	05:37				
	16:43		17:37		18:27	20:19	21:08				
15	08:26		07:41		06:42	06:32	05:35				
	16:45		17:39		18:29	20:21	21:10				
16	08:25		07:40		06:40	06:30	05:34				
	16:46		17:41		18:31	20:23	21:12				
17	08:24		07:38		06:37	06:28	05:32				
	16:48		17:43		18:32	20:24	21:13				
18	08:23		07:36		06:35	06:26	05:31				
	16:49		17:45		18:34	20:26	21:14				
19	08:22		07:34		06:33	06:23	05:29				
	16:51		17:46		18:36	20:28	21:16				
20	08:21	08:49 (WP Hirsch-11)	07:32		06:31	06:21	05:28				
	16:53	5 16:08 (WP KLUS-21)	17:48		18:37	20:29	21:17				
21	08:20	08:48 (WP Hirsch-11)	07:30		06:28	06:19	05:27				
	16:54	13 16:12 (WP KLUS-21)	17:50		18:39	20:31	21:19				
22	08:19	08:46 (WP Hirsch-11)	07:28		06:26	06:17	05:25				
	16:56	18 16:13 (WP KLUS-21)	17:52		18:41	20:33	21:20				
23	08:18	08:45 (WP Hirsch-11)	07:26		06:24	06:15	05:24				
	16:58	22 16:14 (WP KLUS-21)	17:54		18:42	20:34	21:22				
24	08:17	08:44 (WP Hirsch-11)	07:24		06:21	06:13	05:23				
	16:59	25 16:15 (WP KLUS-21)	17:55		18:44	20:36	21:23				
25	08:15	08:42 (WP Hirsch-11)	07:21		06:19	06:11	05:22				
	17:01	29 16:16 (WP KLUS-21)	17:57		18:46	20:38	21:24				
26	08:14	08:41 (WP Hirsch-11)	07:19		06:17	06:09	05:20				
	17:03	31 16:17 (WP KLUS-21)	17:59		18:47	20:39	21:26				
27	08:13	08:39 (WP Hirsch-11)	07:17		06:15	06:07	05:19				
	17:05	34 16:17 (WP KLUS-21)	18:01		18:49	20:41	21:27				
28	08:11	08:38 (WP Hirsch-11)	07:15		06:12	06:05	05:18				
	17:06	35 16:18 (WP KLUS-21)	18:03		18:51	20:43	21:28				
29	08:10	08:36 (WP Hirsch-11)			07:10	06:03	05:17				
	17:08	36 16:17 (WP KLUS-21)			19:53	20:44	21:29				
30	08:09	08:36 (WP Hirsch-11)			07:08	06:01	05:16				
	17:10	37 16:18 (WP KLUS-21)			19:54	20:46	21:30				
31	08:07	08:37 (WP Hirsch-11)			07:05		05:15				
	17:12	34 16:17 (WP KLUS-21)			19:56		21:32				
Sonnenscheinstunden	261		278		367	415	484	497			
astr.max.mögl.Beschattung		374		101							
Red.Sonnenscheinwahrsch.		0,19		0,32							
Reduktion Betriebsdauer		0,84		0,84							
Reduktion Windrichtung		0,65		0,63							
Gesamte Reduktion		0,10		0,17							
Met.wahrsch.Beschattung		39		17							

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ J - Bürener Str. 51, Haaren (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Juli	August	September	Oktober	November	Dezember
1	05:12 21:47	05:48 21:15	06:37 20:14	07:25 19:05	07:18 17:00	08:08 16:20
2	05:12 21:46	05:49 21:14	06:38 20:12	07:26 19:03	07:20 16:58	08:09 16:20
3	05:13 21:46	05:51 21:12	06:40 20:10	07:28 19:01	07:21 16:57	08:11 16:19
4	05:14 21:46	05:52 21:10	06:41 20:07	07:30 18:59	07:23 16:55	08:12 16:19
5	05:15 21:45	05:54 21:09	06:43 20:05	07:31 18:56	07:25 16:53	08:14 16:18
6	05:16 21:45	05:55 21:07	06:45 20:03	07:33 18:54	07:27 16:51	08:15 (WP Hirsch-11) 16:18
7	05:16 21:44	05:57 21:05	06:46 20:01	07:35 18:52	07:28 16:50	4 08:19 (WP Hirsch-11) 16:18 1 14:26 (WP KLUS-19)
8	05:17 21:43	05:58 21:03	06:48 19:58	07:36 18:50	07:30 16:48	16 15:43 (WP KLUS-21) 16:17 7 14:29 (WP KLUS-19)
9	05:18 21:43	06:00 21:02	06:49 19:56	07:38 18:47	07:32 16:46	28 08:11 (WP Hirsch-11) 08:17 9 14:30 (WP KLUS-19)
10	05:19 21:42	06:02 21:00	06:51 19:54	07:40 18:45	07:34 16:45	32 08:10 (WP Hirsch-11) 08:18 11 14:21 (WP KLUS-19)
11	05:20 21:41	06:03 20:58	06:53 19:52	07:41 18:43	07:35 16:43	34 08:09 (WP Hirsch-11) 08:20 12 14:33 (WP KLUS-19)
12	05:21 21:40	06:05 20:56	06:54 19:49	07:43 18:41	07:37 16:42	37 15:48 (WP KLUS-21) 16:16 13 14:34 (WP KLUS-19)
13	05:22 21:40	06:06 20:54	06:56 19:47	07:45 18:39	07:39 16:40	37 08:08 (WP Hirsch-11) 08:23 14 14:35 (WP KLUS-19)
14	05:24 21:39	06:08 20:52	06:57 19:45	07:46 18:36	07:41 16:39	34 15:49 (WP KLUS-21) 16:16 14 14:21 (WP KLUS-19)
15	05:25 21:38	06:09 20:50	06:59 19:42	07:48 18:34	07:42 16:37	34 08:10 (WP Hirsch-11) 08:24 16 14:37 (WP KLUS-19)
16	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	07:44 16:36	31 08:14 (WP Hirsch-11) 08:25 16 14:22 (WP KLUS-19)
17	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	07:46 16:35	31 15:50 (WP KLUS-21) 16:16 16 14:38 (WP KLUS-19)
18	05:28 21:35	06:14 20:44	07:04 19:35	07:53 18:28	07:48 16:33	25 08:16 (WP Hirsch-11) 08:26 17 14:21 (WP KLUS-19)
19	05:30 21:33	06:16 20:42	07:05 19:33	07:55 18:26	07:49 16:32	22 08:18 (WP Hirsch-11) 08:27 17 14:39 (WP KLUS-19)
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	07:51 16:31	18 08:19 (WP Hirsch-11) 08:28 18 14:22 (WP KLUS-19)
21	05:32 21:31	06:19 20:38	07:09 19:28	07:58 18:22	07:53 16:30	13 15:48 (WP KLUS-21) 16:18 18 14:40 (WP KLUS-19)
22	05:33 21:30	06:21 20:36	07:10 19:26	08:00 18:20	07:54 16:29	5 08:23 (WP Hirsch-11) 08:29 18 14:23 (WP KLUS-19)
23	05:35 21:29	06:22 20:34	07:12 19:24	08:02 18:18	07:56 16:27	18 15:44 (WP KLUS-21) 16:18 18 14:41 (WP KLUS-19)
24	05:36 21:27	06:24 20:32	07:13 19:22	08:04 18:16	07:57 16:26	18 08:30 16:19 18 14:42 (WP KLUS-19)
25	05:38 21:26	06:25 20:29	07:15 19:19	08:05 17:14	07:59 16:25	17 08:31 16:20 17 14:42 (WP KLUS-19)
26	05:39 21:24	06:27 20:27	07:17 19:17	08:07 17:12	08:01 16:25	17 08:31 16:21 17 14:43 (WP KLUS-19)
27	05:40 21:23	06:29 20:25	07:18 19:15	08:09 17:10	08:02 16:24	17 08:31 16:22 17 14:43 (WP KLUS-19)
28	05:42 21:22	06:30 20:23	07:20 19:12	08:11 17:08	08:04 16:23	16 08:31 16:22 16 14:43 (WP KLUS-19)
29	05:43 21:20	06:32 20:21	07:22 19:10	08:12 17:06	08:05 16:22	15 08:32 16:23 15 14:43 (WP KLUS-19)
30	05:45 21:19	06:33 20:19	07:23 19:08	08:14 17:04	08:07 16:21	16 08:32 16:24 16 14:44 (WP KLUS-19)
31	05:46 21:17	06:35 20:16	07:25 17:02	08:16 17:02	08:09 16:20	16 08:32 16:25 15 14:44 (WP KLUS-19)
Sonnenscheinstunden	500	453	381	332	268	246
astr.max.mögl.Beschattung					423	385
Red.Sonnenscheinwahrsch.					0,23	0,17
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,65	0,68
Gesamte Reduktion					0,12	0,10
Met.wahrsch.Beschattung					52	38

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ K - Im Sintfeld 1, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April		Mai	Juni
1	08:32	08:06	07:13	07:03		05:59	05:15
	16:27	17:14	18:04	19:58		20:48	21:33
2	08:32	08:04	07:11	07:01		05:57	05:14
	16:28	17:15	18:06	19:59		20:49	21:34
3	08:31	08:02	07:09	06:59		05:56	05:13
	16:29	17:17	18:08	20:01		20:51	21:35
4	08:31	08:01	07:06	06:56		05:54	05:13
	16:30	17:19	18:10	20:03		20:53	21:36
5	08:31	07:59	07:04	06:54		05:52	05:12
	16:31	17:21	18:12	20:04		20:54	21:37
6	08:31	07:58	07:02	06:52		05:50	05:11
	16:32	17:23	18:13	20:06		20:56	21:38
7	08:30	07:56	07:00	06:50		05:48	05:11
	16:33	17:25	18:15	20:08		20:57	21:39
8	08:30	07:54	06:58	06:47		05:47	05:10
	16:35	17:26	18:17	20:09		20:59	21:40
9	08:29	07:52	06:55	06:45		05:45	05:10
	16:36	17:28	18:19	20:11		21:01	21:40
10	08:29	07:51	06:53	06:43	19:38 (WP KLUS-12)	05:43	05:09
	16:37	17:30	18:20	20:13	5 19:43 (WP KLUS-12)	21:02	21:41
11	08:28	07:49	06:51	06:41	9 19:35 (WP KLUS-12)	05:42	05:09
	16:39	17:32	18:22	20:14	9 19:44 (WP KLUS-12)	21:04	21:42
12	08:28	07:47	06:49	06:39	11 19:34 (WP KLUS-12)	05:40	05:09
	16:40	17:34	18:24	20:16	11 19:45 (WP KLUS-12)	21:05	21:43
13	08:27	07:45	06:46	06:36	13 19:33 (WP KLUS-12)	05:38	05:08
	16:42	17:36	18:25	20:18	13 19:46 (WP KLUS-12)	21:07	21:43
14	08:26	07:43	06:44	06:34	12 19:33 (WP KLUS-12)	05:37	05:08
	16:43	17:37	18:27	20:19	12 19:45 (WP KLUS-12)	21:08	21:44
15	08:26	07:41	06:42	06:32	12 19:33 (WP KLUS-12)	05:35	05:08
	16:45	17:39	18:29	20:21	12 19:45 (WP KLUS-12)	21:10	21:44
16	08:25	07:40	06:40	06:30	10 19:34 (WP KLUS-12)	05:34	05:08
	16:46	17:41	18:31	20:23	10 19:44 (WP KLUS-12)	21:11	21:45
17	08:24	07:38	06:37	06:28	8 19:35 (WP KLUS-12)	05:32	05:08
	16:48	17:43	18:32	20:24	8 19:43 (WP KLUS-12)	21:13	21:45
18	08:23	07:36	06:35	06:26	2 19:38 (WP KLUS-12)	05:31	05:08
	16:49	17:45	18:34	20:26	2 19:40 (WP KLUS-12)	21:14	21:46
19	08:22	07:34	06:33	06:23		05:29	05:08
	16:51	17:47	18:36	20:28		21:16	21:46
20	08:21	07:32	06:31	06:21		05:28	05:08
	16:53	17:48	18:37	20:29		21:17	21:46
21	08:20	07:30	06:28	06:19		05:27	05:08
	16:54	17:50	18:39	20:31		21:19	21:47
22	08:19	07:28	06:26	06:17		05:25	05:08
	16:56	17:52	18:41	20:33		21:20	21:47
23	08:18	07:26	06:24	06:15		05:24	05:08
	16:58	17:54	18:42	20:34		21:21	21:47
24	08:16	07:23	06:21	06:13		05:23	05:09
	16:59	17:56	18:44	20:36		21:23	21:47
25	08:15	07:21	06:19	06:11		05:22	05:09
	17:01	17:57	18:46	20:38		21:24	21:47
26	08:14	07:19	06:17	06:09		05:21	05:09
	17:03	17:59	18:48	20:39		21:25	21:47
27	08:13	07:17	06:15	06:07		05:20	05:10
	17:05	18:01	18:49	20:41		21:27	21:47
28	08:11	07:15	06:12	06:05		05:19	05:10
	17:06	18:03	18:51	20:43		21:28	21:47
29	08:10		07:10	06:03		05:18	05:11
	17:08		19:53	20:44		21:29	21:47
30	08:08		07:08	06:01		05:17	05:11
	17:10		19:54	20:46		21:30	21:47
31	08:07		07:05			05:16	
	17:12		19:56			21:32	
Sonnenscheinstunden	261	278	367	415		483	497
astr.max.mögl.Beschattung				82			
Red.Sonnenscheinwahrsch.				0,36			
Reduktion Betriebsdauer				0,84			
Reduktion Windrichtung				0,65			
Gesamte Reduktion				0,20			
Met.wahrsch.Beschattung				16			

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ K - Im Sintfeld 1, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	July	August	September	Oktober	November	Dezember
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1	05:12 21:46	05:48 21:15		06:37 20:14		19:35 (WP KLUS-12) 20:14	07:25 19:06	07:18 17:00	08:08 16:21		
2	05:13 21:46	05:49 21:14		06:38 20:12		19:36 (WP KLUS-12) 19:41 (WP KLUS-12)	07:26 19:03	07:19 16:58	08:09 16:20		
3	05:13 21:46	05:51 21:12		06:40 20:10		07:28 19:01	07:28 19:01	07:21 16:57	08:11 16:19		
4	05:14 21:45	05:52 21:10		06:41 20:07		07:30 18:59	07:30 18:59	07:23 16:55	08:12 16:19		
5	05:15 21:45	05:54 21:09		06:43 20:05		07:31 18:56	07:31 18:56	07:25 16:53	08:13 16:18		
6	05:16 21:44	05:55 21:07		06:45 20:03		07:33 18:54	07:33 18:54	07:27 16:51	08:15 16:18		
7	05:17 21:44	05:57 21:05		06:46 20:01		07:35 18:52	07:35 18:52	07:28 16:50	08:16 16:18		
8	05:18 21:43	05:59 21:03		06:48 19:58		07:36 18:50	07:36 18:50	07:30 16:48	08:17 16:17		
9	05:18 21:43	06:00 21:01		06:49 19:56		07:38 18:47	07:38 18:47	07:32 16:47	08:18 16:17		
10	05:19 21:42	06:02 21:00		06:51 19:54		07:40 18:45	07:40 18:45	07:34 16:45	08:19 16:17		
11	05:20 21:41	06:03 20:58		06:53 19:52		07:41 18:43	07:41 18:43	07:35 16:43	08:20 16:17		
12	05:22 21:40	06:05 20:56		06:54 19:49		07:43 18:41	07:43 18:41	07:37 16:42	08:21 16:16		
13	05:23 21:39	06:06 20:54		06:56 19:47		07:45 18:39	07:45 18:39	07:39 16:40	08:22 16:16		
14	05:24 21:39	06:08 20:52		06:57 19:45		07:46 18:37	07:46 18:37	07:41 16:39	08:23 16:16		
15	05:25 21:38	06:10 20:50		06:59 19:42		07:48 18:34	07:48 18:34	07:42 16:38	08:24 16:17		
16	05:26 21:37	06:11 20:48		07:01 19:40		07:50 18:32	07:50 18:32	07:44 16:36	08:25 16:17		
17	05:27 21:36	06:13 20:46		07:02 19:38		07:52 18:30	07:52 18:30	07:46 16:35	08:26 16:17		
18	05:28 21:34	06:14 20:44		07:04 19:35		07:53 18:28	07:53 18:28	07:47 16:34	08:27 16:17		
19	05:30 21:33	06:16 20:42		07:05 19:33		07:55 18:26	07:55 18:26	07:49 16:32	08:27 16:17		
20	05:31 21:32	06:18 20:40		07:07 19:31		07:57 18:24	07:57 18:24	07:51 16:31	08:28 16:18		
21	05:32 21:31	06:19 20:38		07:09 19:29		07:58 18:22	07:58 18:22	07:52 16:30	08:29 16:18		
22	05:34 21:30	06:21 20:36		07:10 19:26		08:00 18:20	08:00 18:20	07:54 16:29	08:29 16:19		
23	05:35 21:28	06:22 20:34		07:12 19:24		08:02 18:18	08:02 18:18	07:56 16:28	08:30 16:19		
24	05:36 21:27	06:24 20:32		07:13 19:22		08:04 18:16	08:04 18:16	07:57 16:27	08:30 16:20		
25	05:38 21:26	06:25 20:29		07:15 19:19		07:05 17:14	07:05 17:14	07:59 16:26	08:31 16:20		
26	05:39 21:24	06:27 20:27	3	19:40 (WP KLUS-12) 19:36 (WP KLUS-12)	07:17 19:17	07:07 17:12	07:07 17:12	08:00 16:25	08:31 16:21		
27	05:41 21:23	06:29 20:25	9	19:35 (WP KLUS-12) 19:46 (WP KLUS-12)	07:18 19:15	07:09 17:10	07:09 17:10	08:02 16:24	08:31 16:22		
28	05:42 21:21	06:30 20:23	11	19:34 (WP KLUS-12) 19:46 (WP KLUS-12)	07:20 19:12	07:11 17:08	07:11 17:08	08:04 16:23	08:31 16:23		
29	05:43 21:20	06:32 20:21	12	19:34 (WP KLUS-12) 19:46 (WP KLUS-12)	07:22 19:10	07:12 17:06	07:12 17:06	08:05 16:22	08:32 16:23		
30	05:45 21:18	06:33 20:19	12	19:33 (WP KLUS-12) 19:45 (WP KLUS-12)	07:23 19:08	07:14 17:04	07:14 17:04	08:06 16:21	08:32 16:24		
31	05:46 21:17	06:35 20:16	11	19:34 (WP KLUS-12) 19:45 (WP KLUS-12)	07:23 19:08	07:16 17:02	07:16 17:02	08:07 16:25	08:32 16:25		
Sonnenscheinstunden	500	453		381		332		268	246		
astr.max.mögl.Beschattung		70		14							
Red.Sonnenscheinwahrsch.		0,40		0,32							
Reduktion Betriebsdauer		0,84		0,84							
Reduktion Windrichtung		0,65		0,65							
Gesamte Reduktion		0,22		0,17							
Met.wahrsch.Beschattung		15		2							

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ L - Im Sintfeld 2, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:32	08:05	07:13	07:03	05:59	05:15	05:12	05:48	06:37	07:25	07:18	08:08
	16:26	17:14	18:04	19:58	20:48	21:33	21:46	21:15	20:14	19:05	17:00	16:21
2	08:32	08:04	07:11	07:01	05:57	05:14	05:13	05:49	06:38	07:26	07:19	08:09
	16:28	17:15	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:58	16:20
3	08:31	08:02	07:09	06:59	05:55	05:13	05:13	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:19
4	08:31	08:01	07:06	06:56	05:54	05:12	05:14	05:52	06:41	07:30	07:23	08:12
	16:30	17:19	18:10	20:03	20:53	21:36	21:45	21:10	20:07	18:59	16:55	16:19
5	08:31	07:59	07:04	06:54	05:52	05:12	05:15	05:54	06:43	07:31	07:25	08:13
	16:31	17:21	18:12	20:04	20:54	21:37	21:45	21:09	20:05	18:56	16:53	16:18
6	08:31	07:58	07:02	06:52	05:50	05:11	05:16	05:55	06:45	07:33	07:27	08:15
	16:32	17:23	18:13	20:06	20:56	21:38	21:44	21:07	20:03	18:54	16:51	16:18
7	08:30	07:56	07:00	06:50	05:48	05:11	05:17	05:57	06:46	07:35	07:28	08:16
	16:33	17:25	18:15	20:08	20:57	21:39	21:44	21:05	20:01	18:52	16:50	16:18
8	08:30	07:54	06:58	06:47	05:47	05:10	05:17	05:59	06:48	07:36	07:30	08:17
	16:35	17:26	18:17	20:09	20:59	21:39	21:43	21:03	19:58	18:50	16:48	16:17
9	08:29	07:52	06:55	06:45	05:45	05:10	05:18	06:00	06:49	07:38	07:32	08:18
	16:36	17:28	18:18	20:11	21:01	21:40	21:43	21:01	19:56	18:47	16:46	16:17
10	08:29	07:51	06:53	06:43	05:43	05:09	05:19	06:02	06:51	07:40	07:34	08:19
	16:37	17:30	18:20	20:13	21:02	21:41	21:42	21:00	19:54	18:45	16:45	16:17
11	08:28	07:49	06:51	06:41	05:41	05:09	05:20	06:03	06:53	07:41	07:35	08:20
	16:39	17:32	18:22	20:14	21:04	21:42	21:41	20:58	19:52	18:43	16:43	16:17
12	08:28	07:47	06:49	06:39	05:40	05:08	05:21	06:05	06:54	07:43	07:37	08:21
	16:40	17:34	18:24	20:16	21:05	21:43	21:40	20:56	19:49	18:41	16:42	16:16
13	08:27	07:45	06:46	06:36	05:38	05:08	05:23	06:06	06:56	07:45	07:39	08:22
	16:42	17:36	18:25	20:18	21:07	21:43	21:39	20:54	19:47	18:39	16:40	16:16
14	08:26	07:43	06:44	06:34	05:37	05:08	05:24	06:08	06:57	07:46	07:41	08:23
	16:43	17:37	18:27	20:19	21:08	21:44	21:39	20:52	19:45	18:36	16:39	16:16
15	08:26	07:41	06:42	06:32	05:35	05:08	05:25	06:10	06:59	07:48	07:42	08:24
	16:45	17:39	18:29	20:21	21:10	21:44	21:38	20:50	19:42	18:34	16:37	16:16
16	08:25	07:39	06:40	06:30	05:34	05:08	05:26	06:11	07:01	07:50	07:44	08:25
	16:46	17:41	18:31	20:23	21:11	21:45	21:37	20:48	19:40	18:32	16:36	16:17
17	08:24	07:38	06:37	06:28	05:32	05:08	05:27	06:13	07:02	07:52	07:46	08:26
	16:48	17:43	18:32	20:24	21:13	21:45	21:36	20:46	19:38	18:30	16:35	16:17
18	08:23	07:36	06:35	06:26	05:31	05:08	05:28	06:14	07:04	07:53	07:47	08:27
	16:49	17:45	18:34	20:26	21:14	21:46	21:34	20:44	19:35	18:28	16:33	16:17
19	08:22	07:34	06:33	06:23	05:29	05:08	05:30	06:16	07:05	07:55	07:49	08:27
	16:51	17:47	18:36	20:28	21:16	21:46	21:33	20:42	19:33	18:26	16:32	16:17
20	08:21	07:32	06:31	06:21	05:28	05:08	05:31	06:17	07:07	07:57	07:51	08:28
	16:53	17:48	18:37	20:29	21:17	21:46	21:32	20:40	19:31	18:24	16:31	16:18
21	08:20	07:30	06:28	06:19	05:27	05:08	05:32	06:19	07:09	07:58	07:52	08:29
	16:54	17:50	18:39	20:31	21:19	21:47	21:31	20:38	19:28	18:22	16:30	16:18
22	08:19	07:28	06:26	06:17	05:25	05:08	05:34	06:21	07:10	08:00	07:54	08:29
	16:56	17:52	18:41	20:33	21:20	21:47	21:30	20:36	19:26	18:20	16:29	16:19
23	08:18	07:26	06:24	06:15	05:24	05:08	05:35	06:22	07:12	08:02	07:56	08:30
	16:58	17:54	18:42	20:34	21:21	21:47	21:28	20:34	19:24	18:18	16:28	16:19
24	08:16	07:23	06:21	06:13	05:23	05:09	05:36	06:24	07:13	08:04	07:57	08:30
	16:59	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	16:20
25	08:15	07:21	06:19	06:11	05:22	05:09	05:38	06:25	07:15	07:05	07:59	08:31
	17:01	17:57	18:46	20:38	21:24	21:47	21:26	20:29	19:19	17:14	16:26	16:20
26	08:14	07:19	06:17	06:09	05:21	05:09	05:39	06:27	07:17	07:07	08:00	08:31
	17:03	17:59	18:47	20:39	21:25	21:47	21:24	20:27	19:17	17:12	16:25	16:21
27	08:13	07:17	06:15	06:07	05:20	05:10	05:40	06:29	07:18	07:09	08:02	08:31
	17:05	18:01	18:49	20:41	21:27	21:47	21:23	20:25	19:15	17:10	16:24	16:22
28	08:11	07:15	06:12	06:05	05:18	05:10	05:42	06:30	07:20	07:11	08:03	08:31
	17:06	18:03	18:51	20:43	21:28	21:47	21:21	20:23	19:12	17:08	16:23	16:23
29	08:10		07:10	06:03	05:18	05:11	05:43	06:32	07:22	07:12	08:05	08:31
	17:08		19:53	20:44	21:29	21:47	21:20	20:21	19:10	17:06	16:22	16:23
30	08:08		07:08	06:01	05:17	05:11	05:45	06:33	07:23	07:14	08:06	08:32
	17:10		19:54	20:46	21:30	21:47	21:18	20:19	19:08	17:04	16:21	16:24
31	08:07		07:05	06:05	05:16	05:16	05:46	06:35	07:16	07:16	08:02	08:32
	17:12		19:56		21:31		21:17	20:16		17:02		16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ M - Im Sintfeld 3, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni						
1	08:32	08:06	07:13	07:03	05:59	19:53 (WP KLUS-13)	05:15					
	16:26	17:14	18:04	19:58	4	19:57 (WP KLUS-13)	21:33					
2	08:32	08:04	07:11	07:01	05:57		05:14					
	16:28	17:15	18:06	19:59	20:49		21:34					
3	08:31	08:02	07:09	06:59	05:56		05:13					
	16:29	17:17	18:08	20:01	20:51		21:35					
4	08:31	08:01	07:06	06:56	05:54		05:12			20:57 (WP KLUS-10)		
	16:30	17:19	18:10	20:03	20:53		21:36	4		21:01 (WP KLUS-10)		
5	08:31	07:59	07:04	06:54	05:52		05:12			20:56 (WP KLUS-10)		
	16:31	17:21	18:12	20:04	20:54		21:37	7		21:03 (WP KLUS-10)		
6	08:31	07:58	07:02	06:52	05:50		05:11			20:55 (WP KLUS-10)		
	16:32	17:23	18:13	20:06	20:56		21:38	8		21:03 (WP KLUS-10)		
7	08:30	07:56	07:00	06:50	05:48		05:11			20:55 (WP KLUS-10)		
	16:33	17:25	18:15	20:08	20:57		21:39	9		21:04 (WP KLUS-10)		
8	08:30	07:54	06:58	06:47	05:47		05:10			20:55 (WP KLUS-10)		
	16:35	17:26	18:17	20:09	20:59		21:40	9		21:04 (WP KLUS-10)		
9	08:29	07:52	06:55	06:45	05:45		05:10			20:55 (WP KLUS-10)		
	16:36	17:28	18:18	20:11	21:01		21:40	10		21:05 (WP KLUS-10)		
10	08:29	07:51	06:53	06:43	05:43		05:09			20:54 (WP KLUS-10)		
	16:37	17:30	18:20	20:13	21:02		21:41	11		21:05 (WP KLUS-10)		
11	08:28	07:49	06:51	06:41	05:41		05:09			20:54 (WP KLUS-10)		
	16:39	17:32	18:22	20:14	21:04		21:42	11		21:05 (WP KLUS-10)		
12	08:28	07:47	06:49	06:39	05:40		05:08			20:55 (WP KLUS-10)		
	16:40	17:34	18:24	20:16	21:05		21:43	11		21:06 (WP KLUS-10)		
13	08:27	07:45	06:46	06:36	05:38		05:08			20:55 (WP KLUS-10)		
	16:42	17:36	18:25	20:18	21:07		21:43	12		21:07 (WP KLUS-10)		
14	08:26	07:43	06:44	06:34	05:37		05:08			20:55 (WP KLUS-10)		
	16:43	17:37	18:27	20:19	21:08		21:44	12		21:07 (WP KLUS-10)		
15	08:26	07:41	06:42	06:32	05:35		05:08			20:55 (WP KLUS-10)		
	16:45	17:39	18:29	20:21	21:10		21:44	12		21:07 (WP KLUS-10)		
16	08:25	07:40	06:40	06:30	05:34		05:08			20:55 (WP KLUS-10)		
	16:46	17:41	18:31	20:23	21:11		21:45	12		21:07 (WP KLUS-10)		
17	08:24	07:38	06:37	06:28	05:32		05:08			20:55 (WP KLUS-10)		
	16:48	17:43	18:32	20:24	21:13		21:45	12		21:07 (WP KLUS-10)		
18	08:23	07:36	06:35	06:26	05:31		05:08			20:56 (WP KLUS-10)		
	16:49	17:45	18:34	20:26	21:14		21:46	12		21:08 (WP KLUS-10)		
19	08:22	07:34	06:33	06:23	05:29		05:08			20:56 (WP KLUS-10)		
	16:51	17:47	18:36	20:28	21:16		21:46	12		21:08 (WP KLUS-10)		
20	08:21	07:32	06:31	06:21	05:28		05:08			20:56 (WP KLUS-10)		
	16:53	17:48	18:37	20:29	21:17		21:46	12		21:08 (WP KLUS-10)		
21	08:20	07:30	06:28	06:19	19:55 (WP KLUS-13)	05:27	05:08			20:56 (WP KLUS-10)		
	16:54	17:50	18:39	20:31	3	19:58 (WP KLUS-13)	21:19			21:08 (WP KLUS-10)		
22	08:19	07:28	06:26	06:17	19:52 (WP KLUS-13)	05:25	05:08			20:56 (WP KLUS-10)		
	16:56	17:52	18:41	20:33	9	20:01 (WP KLUS-13)	21:20			21:08 (WP KLUS-10)		
23	08:18	07:26	06:24	06:15	19:51 (WP KLUS-13)	05:24	05:08			20:56 (WP KLUS-10)		
	16:58	17:54	18:42	20:34	11	20:02 (WP KLUS-13)	21:21			21:08 (WP KLUS-10)		
24	08:16	07:23	06:21	06:13	19:50 (WP KLUS-13)	05:23	05:09			20:57 (WP KLUS-10)		
	16:59	17:56	18:44	20:36	12	20:02 (WP KLUS-13)	21:23			21:09 (WP KLUS-10)		
25	08:15	07:21	06:19	06:11	19:50 (WP KLUS-13)	05:22	05:09			20:57 (WP KLUS-10)		
	17:01	17:57	18:46	20:38	14	20:04 (WP KLUS-13)	21:24			21:09 (WP KLUS-10)		
26	08:14	07:19	06:17	06:09	19:50 (WP KLUS-13)	05:21	05:09			20:58 (WP KLUS-10)		
	17:03	17:59	18:47	20:39	13	20:03 (WP KLUS-13)	21:25			21:10 (WP KLUS-10)		
27	08:13	07:17	06:15	06:07	19:50 (WP KLUS-13)	05:20	05:10			20:57 (WP KLUS-10)		
	17:05	18:01	18:49	20:41	13	20:03 (WP KLUS-13)	21:27			21:09 (WP KLUS-10)		
28	08:11	07:15	06:12	06:05	19:50 (WP KLUS-13)	05:18	05:10			20:58 (WP KLUS-10)		
	17:06	18:03	18:51	20:43	12	20:02 (WP KLUS-13)	21:28			21:10 (WP KLUS-10)		
29	08:10		07:10	06:03	19:50 (WP KLUS-13)	05:18	05:11			20:58 (WP KLUS-10)		
	17:08		19:53	20:44	11	20:01 (WP KLUS-13)	21:29			21:10 (WP KLUS-10)		
30	08:08		07:08	06:01	19:51 (WP KLUS-13)	05:17	05:11			20:59 (WP KLUS-10)		
	17:10		19:54	20:46	9	20:00 (WP KLUS-13)	21:30			21:10 (WP KLUS-10)		
31	08:07		07:05			05:16						
	17:12		19:56			21:32						
Sonnenscheinstunden	261	278	367	415		483		497				
astr.max.mögl.Beschattung				107				295				
Red.Sonnenscheinwahrsch.				0,36		4		0,34				
Reduktion Betriebsdauer				0,84		0,43		0,84				
Reduktion Windrichtung				0,62		0,84		0,60				
Gesamte Reduktion				0,19		0,22		0,17				
Met.wahrsch.Beschattung				20		1		50				

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

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
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Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ M - Im Sintfeld 3, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

Juli	August	September	Oktober	November	Dezember
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1	05:12		20:58 (WP KLUS-10)	05:48		06:37	07:25	07:18	08:08
	21:46	12	21:10 (WP KLUS-10)	21:15		20:14	19:05	17:00	16:21
2	05:13		20:59 (WP KLUS-10)	05:49		06:38	07:26	07:19	08:09
	21:46	11	21:10 (WP KLUS-10)	21:14		20:12	19:03	16:58	16:20
3	05:13		21:00 (WP KLUS-10)	05:51		06:40	07:28	07:21	08:11
	21:46	10	21:10 (WP KLUS-10)	21:12		20:10	19:01	16:57	16:19
4	05:14		21:00 (WP KLUS-10)	05:52		06:41	07:30	07:23	08:12
	21:45	10	21:10 (WP KLUS-10)	21:10		20:07	18:59	16:55	16:19
5	05:15		21:00 (WP KLUS-10)	05:54		06:43	07:31	07:25	08:13
	21:45	10	21:10 (WP KLUS-10)	21:09		20:05	18:56	16:53	16:18
6	05:16		21:01 (WP KLUS-10)	05:55		06:45	07:33	07:27	08:15
	21:44	9	21:10 (WP KLUS-10)	21:07		20:03	18:54	16:51	16:18
7	05:17		21:02 (WP KLUS-10)	05:57		06:46	07:35	07:28	08:16
	21:44	7	21:09 (WP KLUS-10)	21:05		20:01	18:52	16:50	16:18
8	05:17		21:03 (WP KLUS-10)	05:59		06:48	07:36	07:30	08:17
	21:43	6	21:09 (WP KLUS-10)	21:03		19:58	18:50	16:48	16:17
9	05:18		21:05 (WP KLUS-10)	06:00		06:49	07:38	07:32	08:18
	21:43	2	21:07 (WP KLUS-10)	21:01		19:56	18:47	16:46	16:17
10	05:19			06:02		06:51	07:40	07:34	08:19
	21:42			21:00		19:54	18:45	16:45	16:17
11	05:20			06:03		06:53	07:41	07:35	08:20
	21:41			20:58		19:52	18:43	16:43	16:17
12	05:21			06:05	6	20:01 (WP KLUS-13)	06:54	07:43	07:37
	21:40			20:56		20:07 (WP KLUS-13)	19:49	18:41	16:42
13	05:23			06:06	10	20:09 (WP KLUS-13)	06:56	07:45	07:39
	21:39			20:54		19:59 (WP KLUS-13)	06:56	07:45	07:39
14	05:24			06:08		20:09 (WP KLUS-13)	06:57	07:46	07:41
	21:39			20:52	12	20:09 (WP KLUS-13)	19:45	18:37	16:39
15	05:25			06:10		19:57 (WP KLUS-13)	06:59	07:48	07:42
	21:38			20:50	13	20:10 (WP KLUS-13)	19:42	18:34	16:37
16	05:26			06:11		19:56 (WP KLUS-13)	07:01	07:50	07:44
	21:37			20:48	14	20:10 (WP KLUS-13)	19:40	18:32	16:36
17	05:27			06:13		19:56 (WP KLUS-13)	07:02	07:52	07:46
	21:36			20:46	14	20:10 (WP KLUS-13)	19:38	18:30	16:35
18	05:28			06:14		19:56 (WP KLUS-13)	07:04	07:53	07:47
	21:34			20:44	13	20:09 (WP KLUS-13)	19:35	18:28	16:33
19	05:30			06:16		19:56 (WP KLUS-13)	07:05	07:55	07:49
	21:33			20:42	13	20:09 (WP KLUS-13)	19:33	18:26	16:32
20	05:31			06:17		19:57 (WP KLUS-13)	07:07	07:57	07:51
	21:32			20:40	10	20:07 (WP KLUS-13)	19:31	18:24	16:31
21	05:32			06:19		19:58 (WP KLUS-13)	07:09	07:58	07:52
	21:31			20:38	8	20:06 (WP KLUS-13)	19:28	18:22	16:30
22	05:34			06:21			07:10	08:00	07:54
	21:30			20:36			19:26	18:20	16:29
23	05:35			06:22			07:12	08:02	07:56
	21:28			20:34			19:24	18:18	16:28
24	05:36			06:24			07:13	08:04	07:57
	21:27			20:32			19:22	18:16	16:27
25	05:38			06:25			07:15	07:05	07:59
	21:26			20:29			19:19	17:14	16:26
26	05:39			06:27			07:17	07:07	08:00
	21:24			20:27			19:17	17:12	16:25
27	05:40			06:29			07:18	07:09	08:02
	21:23			20:25			19:15	17:10	16:24
28	05:42			06:30			07:20	07:11	08:04
	21:21			20:23			19:12	17:08	16:23
29	05:43			06:32			07:22	07:12	08:05
	21:20			20:21			19:10	17:06	16:22
30	05:45			06:33			07:23	07:14	08:06
	21:18			20:19			19:08	17:04	16:21
31	05:46			06:35				07:16	08:32
	21:17			20:16				17:02	16:25
	Sonnenscheinstunden	500		453		381	332	268	246
	astr.max.mögl.Beschattung	77		113					
	Red.Sonnenscheinwahrsch.	0,39		0,40					
	Reduktion Betriebsdauer	0,84		0,84					
	Reduktion Windrichtung	0,60		0,62					
	Gesamte Reduktion	0,19		0,21					
	Met.wahrsch.Beschattung	15		24					

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ N - Im Sintfeld 5, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32 16:26	08:06 17:14	07:13 18:04	07:03 19:58	19:15 (WP KLUS-13) 05:59	19:42 (WP KLUS-14) 05:15
2	08:32 16:28	08:04 17:15	07:11 18:06	07:01 19:59	19:14 (WP KLUS-13) 05:57	19:41 (WP KLUS-14) 05:14
3	08:31 16:29	08:02 17:17	07:09 18:08	06:59 20:01	19:14 (WP KLUS-13) 05:55	19:40 (WP KLUS-14) 05:13
4	08:31 16:30	08:01 17:19	07:06 18:10	06:56 20:03	19:14 (WP KLUS-13) 05:54	19:39 (WP KLUS-14) 05:12
5	08:31 16:31	07:59 17:21	07:04 18:12	06:54 20:04	19:14 (WP KLUS-13) 05:52	19:38 (WP KLUS-14) 05:12
6	08:31 16:32	07:58 17:23	07:02 18:13	06:52 20:06	19:26 (WP KLUS-13) 05:50	20:21 (WP KLUS-10) 05:11
7	08:30 16:33	07:56 17:25	07:00 18:15	06:50 20:08	19:23 (WP KLUS-13) 05:48	20:23 (WP KLUS-10) 05:11
8	08:30 16:35	07:54 17:26	06:58 18:17	06:47 20:09	19:20 (WP KLUS-13) 05:47	20:23 (WP KLUS-10) 05:10
9	08:30 16:36	07:52 17:28	06:55 18:18	06:45 20:11	20:59 05:45	20:23 (WP KLUS-10) 05:10
10	08:29 16:37	07:51 17:30	06:53 18:20	06:43 20:13	21:01 05:43	20:23 (WP KLUS-10) 05:09
11	08:28 16:39	07:49 17:32	06:51 18:22	06:41 20:14	21:02 05:41	20:22 (WP KLUS-10) 05:09
12	08:28 16:40	07:47 17:34	06:49 18:24	06:39 20:16	21:04 05:40	20:23 (WP KLUS-10) 05:08
13	08:27 16:42	07:45 17:36	06:46 18:25	06:36 20:18	21:05 05:38	20:21 (WP KLUS-10) 05:08
14	08:26 16:43	07:43 17:37	06:44 18:27	06:34 20:19	21:07 05:37	20:21 (WP KLUS-10) 05:08
15	08:26 16:45	07:41 17:39	06:42 18:29	06:32 20:21	21:08 05:35	20:19 (WP KLUS-10) 05:08
16	08:25 16:46	07:40 17:41	06:40 18:31	06:30 20:23	21:10 05:34	19:58 (WP KLUS-14) 05:08
17	08:24 16:48	07:38 17:43	06:37 18:32	06:28 20:24	21:11 05:32	19:42 (WP KLUS-14) 05:08
18	08:23 16:49	07:36 17:45	06:35 18:34	06:26 20:26	21:13 05:31	19:55 (WP KLUS-14) 05:08
19	08:22 16:51	07:34 17:47	06:33 18:36	06:23 20:28	21:14 05:29	19:45 (WP KLUS-14) 05:08
20	08:21 16:53	07:32 17:48	06:31 18:37	06:21 20:29	21:16 05:28	19:54 (WP KLUS-14) 05:08
21	08:20 16:54	07:30 17:50	06:28 18:39	06:19 20:31	21:17 05:27	19:51 (WP KLUS-14) 05:08
22	08:19 16:56	07:28 17:52	06:26 18:41	06:17 20:33	21:19 05:25	05:08 21:47
23	08:18 16:58	07:26 17:54	06:24 18:42	06:15 20:34	21:20 05:24	05:08 21:47
24	08:16 16:59	07:23 17:56	06:21 18:44	06:13 20:36	21:21 05:23	21:47 05:09
25	08:15 17:01	07:21 17:57	06:19 18:46	06:11 20:38	21:23 05:22	21:47 05:09
26	08:14 17:03	07:19 17:59	06:17 18:47	06:09 20:39	21:24 05:21	21:47 05:09
27	08:13 17:05	07:17 18:01	06:15 18:49	06:07 20:41	21:25 05:20	21:47 05:10
28	08:11 17:06	07:15 18:03	06:12 18:51	06:05 20:43	21:27 05:18	21:47 05:10
29	08:10 17:08		07:10 19:53	06:03 20:44	21:28 05:17	21:47 05:11
30	08:08 17:10		07:08 19:54	19:18 (WP KLUS-13) 06:01	6 19:53 (WP KLUS-14) 05:17	21:47 05:11
31	08:07 17:12		07:05 19:56	7 19:25 (WP KLUS-13) 20:46	12 19:56 (WP KLUS-14) 05:16	21:47 05:11
Sonnenscheinstunden	261	278	367	415	483	497
astr.max.mögl.Beschattung			17	90	463	
Red.Sonnenscheinwahrsch.			0,28	0,36	0,43	
Reduktion Betriebsdauer			0,84	0,84	0,84	
Reduktion Windrichtung			0,68	0,66	0,62	
Gesamte Reduktion			0,16	0,20	0,22	
Met.wahrsch.Beschattung			3	18	104	

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ N - Im Sintfeld 5, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Juli	August	September	Oktober	November	Dezember
1	05:12 21:46	05:48 21:15 32	19:49 (WP KLUS-14) 20:32 (WP KLUS-10) 20:14	06:37 20:14	07:25 19:05	07:18 17:00 16:21
2	05:13 21:46	05:49 21:14 34	19:49 (WP KLUS-14) 20:33 (WP KLUS-10) 20:12	06:38 20:12	07:26 19:03	07:19 16:58 16:20
3	05:13 21:46	05:51 21:12 36	19:48 (WP KLUS-14) 20:33 (WP KLUS-10) 20:10	06:40 20:10	07:28 19:01	07:21 16:57 16:19
4	05:14 21:45	05:52 21:10 36	19:48 (WP KLUS-14) 20:34 (WP KLUS-10) 20:07	06:41 20:07	07:30 18:59	07:23 16:55 16:19
5	05:15 21:45	05:54 21:09 36	19:48 (WP KLUS-14) 20:33 (WP KLUS-10) 20:05	06:43 20:05	19:15 (WP KLUS-13) 19:17 (WP KLUS-13) 18:56	07:31 16:53 16:18
6	05:16 21:44	05:55 21:07 35	19:47 (WP KLUS-14) 20:32 (WP KLUS-10) 20:03	06:45 20:03	19:11 (WP KLUS-13) 19:19 (WP KLUS-13) 18:54	07:33 16:51 16:18
7	05:17 21:44	05:57 21:05 33	19:48 (WP KLUS-14) 20:32 (WP KLUS-10) 20:01	06:46 20:01	19:10 (WP KLUS-13) 19:21 (WP KLUS-13) 18:52	07:35 16:50 16:18
8	05:17 21:43	05:59 21:03 31	19:48 (WP KLUS-14) 20:31 (WP KLUS-10) 19:58	06:48 19:58	19:08 (WP KLUS-13) 19:21 (WP KLUS-13) 18:50	07:36 16:48 16:17
9	05:18 21:43	06:00 21:01 26	19:49 (WP KLUS-14) 20:29 (WP KLUS-10) 19:56	06:49 19:56	19:08 (WP KLUS-13) 19:21 (WP KLUS-13) 18:47	07:38 16:46 16:17
10	05:19 21:42	06:02 21:00 19	19:49 (WP KLUS-14) 20:08 (WP KLUS-14) 19:54	06:51 19:54	19:07 (WP KLUS-13) 19:20 (WP KLUS-13) 18:45	07:40 16:45 16:17
11	05:20 21:41	06:03 20:58 17	19:50 (WP KLUS-14) 20:07 (WP KLUS-14) 19:52	06:53 19:52	19:07 (WP KLUS-13) 19:20 (WP KLUS-13) 18:43	07:41 16:43 16:17
12	05:21 21:40	06:05 20:56 14	19:51 (WP KLUS-14) 20:05 (WP KLUS-14) 19:49	06:54 19:49	19:07 (WP KLUS-13) 19:18 (WP KLUS-13) 18:41	07:43 16:42 16:16
13	05:23 21:39	06:06 20:54 11	19:53 (WP KLUS-14) 20:04 (WP KLUS-14) 19:47	06:56 19:47	19:09 (WP KLUS-13) 19:16 (WP KLUS-13) 18:39	07:45 16:40 16:16
14	05:24 21:39	06:08 20:52 2	19:57 (WP KLUS-14) 19:59 (WP KLUS-14)	06:57 19:45	07:46 18:37	07:41 16:39 16:16
15	05:25 21:38	06:10 20:50	06:59 19:42	07:48 18:34	07:42 16:37	08:24 16:16
16	05:26 21:37	06:11 20:48	07:01 19:40	07:50 18:32	07:44 16:36	08:25 16:17
17	05:27 21:36	06:13 20:46	07:02 19:38	07:52 18:30	07:46 16:35	08:26 16:17
18	05:28 21:34	06:14 20:44	07:04 19:35	07:53 18:28	07:47 16:33	08:27 16:17
19	05:30 21:33	06:16 20:42	07:05 19:33	07:55 18:26	07:49 16:32	08:27 16:17
20	05:31 21:32	06:17 20:40	07:07 19:31	07:57 18:24	07:51 16:31	08:28 16:18
21	05:32 21:31	06:19 20:38	07:09 19:28	07:58 18:22	07:52 16:30	08:29 16:18
22	05:34 21:30	06:21 20:36	07:10 19:26	08:00 18:20	07:54 16:29	08:29 16:19
23	05:35 21:28	06:22 20:34	07:12 19:24	08:02 18:18	07:56 16:28	08:30 16:19
24	05:36 21:27	06:24 20:32	07:13 19:22	08:04 18:16	07:57 16:27	08:30 16:20
25	05:38 21:26	19:57 (WP KLUS-14) 20:03 (WP KLUS-14) 20:29	06:25 20:29	07:15 19:19	07:05 17:14	07:59 16:26 16:20
26	05:39 21:24	6 20:05 (WP KLUS-14) 20:27	19:54 (WP KLUS-14) 20:27	07:17 19:17	07:07 17:12	08:00 16:25 16:21
27	05:40 21:23	11 19:52 (WP KLUS-14) 20:29	20:06 (WP KLUS-14) 20:25	07:18 19:15	07:09 17:10	08:02 16:24 16:22
28	05:42 21:21	14 19:52 (WP KLUS-14) 20:23	20:08 (WP KLUS-14) 20:23	07:20 19:12	07:11 17:08	08:04 16:23 16:23
29	05:43 21:20	16 19:51 (WP KLUS-14) 20:21	20:28 (WP KLUS-10) 20:21	07:22 19:10	07:12 17:06	08:05 16:22 16:23
30	05:45 21:18	20 19:50 (WP KLUS-14) 20:19	20:30 (WP KLUS-10) 20:19	07:23 19:08	07:14 17:04	08:06 16:21 16:24
31	05:46 21:17	26 19:50 (WP KLUS-14) 20:16	20:30 (WP KLUS-10) 20:16	07:23 19:08	07:16 17:02	08:32 16:25 16:25
Sonnenscheinstunden	500	453	381	332	268	246
astr.max.mögl.Beschattung	123	362	91			
Red.Sonnenscheinwahrsch.	0,39	0,40	0,32			
Reduktion Betriebsdauer	0,84	0,84	0,84			
Reduktion Windrichtung	0,62	0,62	0,68			
Gesamte Reduktion	0,20	0,21	0,18			
Met.wahrsch.Beschattung	25	76	17			

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ O - Im Sintfeld 6, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Januar	Februar	März	April	Mai	Juni				
1	08:32	08:06	07:13	07:03	19:11 (WP KLUS-13)	05:59	19:29 (WP KLUS-14)	05:15		
	16:26	17:14	18:04	19:58	12	19:23 (WP KLUS-13)	20:48	31	20:15 (WP KLUS-10)	21:33
2	08:32	08:04	07:11	07:01	19:11 (WP KLUS-13)	05:57	19:30 (WP KLUS-14)	05:14		
	16:28	17:15	18:06	19:59	10	19:21 (WP KLUS-13)	20:49	31	20:16 (WP KLUS-10)	21:34
3	08:31	08:02	07:09	06:59	19:12 (WP KLUS-13)	05:55	19:30 (WP KLUS-14)	05:13		
	16:29	17:17	18:08	20:01	7	19:19 (WP KLUS-13)	20:51	30	20:16 (WP KLUS-10)	21:35
4	08:31	08:01	07:06	06:56	19:11 (WP KLUS-13)	05:54	19:31 (WP KLUS-14)	05:12		
	16:30	17:19	18:10	20:03		20:53	29	20:16 (WP KLUS-10)	21:36	
5	08:31	07:59	07:04	06:54	19:11 (WP KLUS-13)	05:52	19:32 (WP KLUS-14)	05:12		
	16:31	17:21	18:12	20:04		20:54	26	20:15 (WP KLUS-10)	21:37	
6	08:31	07:58	07:02	06:52	19:11 (WP KLUS-13)	05:50	19:34 (WP KLUS-14)	05:11		
	16:32	17:23	18:13	20:06		20:56	22	20:15 (WP KLUS-10)	21:38	
7	08:30	07:56	07:00	06:50	19:11 (WP KLUS-13)	05:48	19:36 (WP KLUS-14)	05:11		
	16:33	17:25	18:15	20:08		20:57	14	20:13 (WP KLUS-10)	21:39	
8	08:30	07:54	06:58	06:47	19:11 (WP KLUS-13)	05:47	20:06 (WP KLUS-10)	05:10		
	16:35	17:26	18:17	20:09		20:59	5	20:11 (WP KLUS-10)	21:40	
9	08:29	07:52	06:55	06:45	19:11 (WP KLUS-13)	05:45		05:10		
	16:36	17:28	18:18	20:11		21:01		21:40		
10	08:29	07:51	06:53	06:43	19:11 (WP KLUS-13)	05:43		05:09		
	16:37	17:30	18:20	20:13		21:02		21:41		
11	08:28	07:49	06:51	06:41	19:11 (WP KLUS-13)	05:41		05:09		
	16:39	17:32	18:22	20:14		21:04		21:42		
12	08:28	07:47	06:49	06:39	19:11 (WP KLUS-13)	05:40		05:08		
	16:40	17:34	18:24	20:16		21:05		21:43		
13	08:27	07:45	06:46	06:36	19:11 (WP KLUS-13)	05:38		05:08		
	16:42	17:36	18:25	20:18		21:07		21:43		
14	08:26	07:43	06:44	06:34	19:11 (WP KLUS-13)	05:37		05:08		
	16:43	17:37	18:27	20:19		21:08		21:44		
15	08:26	07:41	06:42	06:32	19:11 (WP KLUS-13)	05:35		05:08		
	16:45	17:39	18:29	20:21		21:10		21:44		
16	08:25	07:40	06:40	06:30	19:11 (WP KLUS-13)	05:34		05:08		
	16:46	17:41	18:31	20:23		21:11		21:45		
17	08:24	07:38	06:37	06:28	19:11 (WP KLUS-13)	05:32		05:08		
	16:48	17:43	18:32	20:24		21:13		21:45		
18	08:23	07:36	06:35	06:26	19:11 (WP KLUS-13)	05:31		05:08		
	16:49	17:45	18:34	20:26		21:14		21:46		
19	08:22	07:34	06:33	06:23	19:11 (WP KLUS-13)	05:29		05:08		
	16:51	17:47	18:36	20:28		21:16		21:46		
20	08:21	07:32	06:31	06:21	19:11 (WP KLUS-13)	05:28		05:08		
	16:53	17:48	18:37	20:29		21:17		21:46		
21	08:20	07:30	06:28	06:19	19:39 (WP KLUS-14)	05:27		05:08		
	16:54	17:50	18:39	20:31	3	19:42 (WP KLUS-14)	21:19	21:47		
22	08:19	07:28	06:26	06:17	19:35 (WP KLUS-14)	05:25		05:08		
	16:56	17:52	18:41	20:33	11	19:46 (WP KLUS-14)	21:20	21:47		
23	08:18	07:26	06:24	06:15	19:33 (WP KLUS-14)	05:24		05:08		
	16:58	17:54	18:42	20:34	14	19:47 (WP KLUS-14)	21:21	21:47		
24	08:16	07:23	06:21	06:13	19:32 (WP KLUS-14)	05:23		05:09		
	16:59	17:56	18:44	20:36	16	19:48 (WP KLUS-14)	21:23	21:47		
25	08:15	07:21	06:19	06:11	19:31 (WP KLUS-14)	05:22		05:09		
	17:01	17:57	18:46	20:38	19	19:50 (WP KLUS-14)	21:24	21:47		
26	08:14	07:19	06:17	06:09	19:31 (WP KLUS-14)	05:21		05:09		
	17:03	17:59	18:47	20:39	19	19:50 (WP KLUS-14)	21:25	21:47		
27	08:13	07:17	06:15	18:15 (WP KLUS-13)	06:07	19:30 (WP KLUS-14)	05:20	05:10		
	17:05	18:01	18:49	6	18:21 (WP KLUS-13)	20:41	21	19:51 (WP KLUS-14)	21:27	
28	08:11	07:15	06:12	18:13 (WP KLUS-13)	06:05	19:29 (WP KLUS-14)	05:18	05:10		
	17:06	18:03	18:51	10	18:23 (WP KLUS-13)	20:43	21	19:50 (WP KLUS-14)	21:28	
29	08:10		07:10	19:11 (WP KLUS-13)	06:03	19:29 (WP KLUS-14)	05:17	05:11		
	17:08		19:53	12	19:23 (WP KLUS-13)	20:44	28	20:14 (WP KLUS-10)	21:29	
30	08:08		07:08	19:10 (WP KLUS-13)	06:01	19:29 (WP KLUS-14)	05:17	05:11		
	17:10		19:54	13	19:23 (WP KLUS-13)	20:46	31	20:15 (WP KLUS-10)	21:30	
31	08:07		07:05	19:10 (WP KLUS-13)		05:16		05:10		
	17:12		19:56	13	19:23 (WP KLUS-13)	21:32		21:47		
Sonnenscheinstunden	261	278	367	415		483		497		
astr.max.mögl.Beschattung			54		212		188			
Red.Sonnenscheinwahrsch.			0,28		0,36		0,43			
Reduktion Betriebsdauer			0,84		0,84		0,84			
Reduktion Windrichtung			0,68		0,64		0,63			
Gesamte Reduktion			0,16		0,20		0,23			
Met.wahrsch.Beschattung			9		41		43			

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ O - Im Sintfeld 6, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	Juli	August	September	Oktober	November	Dezember
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1	05:12 21:46	05:48 21:15		06:37 20:14		07:25 19:05	07:18 17:00	08:08 16:21
2	05:13 21:46	05:49 21:14		06:38 20:12		07:26 19:03	07:19 16:58	08:09 16:20
3	05:13 21:46	05:51 21:12		06:40 20:10		07:28 19:01	07:21 16:57	08:11 16:19
4	05:14 21:45	05:52 21:10		06:41 20:07		07:30 18:59	07:23 16:55	08:12 16:19
5	05:15 21:45	05:54 21:09	6	20:16 (WP KLUS-10) 20:22 (WP KLUS-10)	06:43 20:05	07:31 18:56	07:25 16:53	08:13 16:18
6	05:16 21:44	05:55 21:07	17	19:44 (WP KLUS-14) 20:23 (WP KLUS-10)	06:45 20:03	07:33 18:54	07:27 16:51	08:15 16:18
7	05:17 21:44	05:57 21:05	23	19:43 (WP KLUS-14) 20:25 (WP KLUS-10)	06:46 20:01	07:35 18:52	07:28 16:50	08:16 16:18
8	05:17 21:43	05:59 21:03	26	19:41 (WP KLUS-14) 20:24 (WP KLUS-10)	06:48 19:58	07:36 18:50	07:30 16:48	08:17 16:17
9	05:18 21:43	06:00 21:01	29	19:40 (WP KLUS-14) 20:25 (WP KLUS-10)	06:49 19:56	7 19:06 (WP KLUS-13) 19:13 (WP KLUS-13)	07:32 16:46	08:18 16:17
10	05:19 21:42	06:02 21:00	31	19:39 (WP KLUS-14) 20:25 (WP KLUS-10)	06:51 19:54	10 19:04 (WP KLUS-13) 19:14 (WP KLUS-13)	07:40 18:45	08:19 16:17
11	05:20 21:41	06:03 20:58	32	19:38 (WP KLUS-14) 20:25 (WP KLUS-10)	06:53 19:52	12 19:03 (WP KLUS-13) 19:15 (WP KLUS-13)	07:41 18:43	08:20 16:17
12	05:21 21:40	06:05 20:56	32	19:37 (WP KLUS-14) 20:24 (WP KLUS-10)	06:54 19:49	12 19:02 (WP KLUS-13) 19:14 (WP KLUS-13)	07:43 18:41	08:21 16:16
13	05:23 21:39	06:06 20:54	30	19:37 (WP KLUS-14) 20:23 (WP KLUS-10)	06:56 19:47	12 19:02 (WP KLUS-13) 19:14 (WP KLUS-13)	07:45 18:39	08:22 16:16
14	05:24 21:39	06:08 20:52	27	19:37 (WP KLUS-14) 20:21 (WP KLUS-10)	06:57 19:45	12 19:01 (WP KLUS-13) 19:13 (WP KLUS-13)	07:46 18:36	08:23 16:16
15	05:25 21:38	06:10 20:50	21	19:37 (WP KLUS-14) 19:58 (WP KLUS-14)	06:59 19:42	10 19:02 (WP KLUS-13) 19:12 (WP KLUS-13)	07:48 18:34	08:24 16:16
16	05:26 21:37	06:11 20:48	20	19:37 (WP KLUS-14) 19:57 (WP KLUS-14)	07:01 19:40	7 19:04 (WP KLUS-13) 19:11 (WP KLUS-13)	07:50 18:32	08:25 16:17
17	05:27 21:36	06:13 20:46	20	19:37 (WP KLUS-14) 19:57 (WP KLUS-14)	07:02 19:38	7 19:11 (WP KLUS-13)	07:52 18:30	08:26 16:17
18	05:28 21:34	06:14 20:44	19	19:37 (WP KLUS-14) 19:56 (WP KLUS-14)	07:04 19:35		07:53 18:28	08:27 16:17
19	05:30 21:33	06:16 20:42	17	19:38 (WP KLUS-14) 19:55 (WP KLUS-14)	07:05 19:33		07:55 18:26	08:27 16:17
20	05:31 21:32	06:17 20:40	14	19:39 (WP KLUS-14) 19:53 (WP KLUS-14)	07:07 19:31		07:57 18:24	08:28 16:18
21	05:32 21:31	06:19 20:38	10	19:41 (WP KLUS-14) 19:51 (WP KLUS-14)	07:09 19:28		07:58 18:22	08:29 16:18
22	05:34 21:30	06:21 20:36		07:10 19:26			08:00 18:20	08:29 16:19
23	05:35 21:28	06:22 20:34		07:12 19:24			08:02 18:18	08:30 16:19
24	05:36 21:27	06:24 20:32		07:13 19:22			08:04 18:16	08:30 16:20
25	05:38 21:26	06:25 20:29		07:15 19:19			07:05 17:14	08:31 16:20
26	05:39 21:24	06:27 20:27		07:17 19:17			07:07 17:12	08:31 16:21
27	05:40 21:23	06:29 20:25		07:18 19:15			07:09 17:10	08:31 16:22
28	05:42 21:21	06:30 20:23		07:20 19:12			07:11 17:08	08:31 16:23
29	05:43 21:20	06:32 20:21		07:22 19:10			07:12 17:06	08:32 16:23
30	05:45 21:18	06:33 20:19		07:23 19:08			07:14 17:04	08:32 16:24
31	05:46 21:17	06:35 20:16					07:16 17:02	08:32 16:25
	Sonnenscheinstunden	500	453	381	82	332	268	246
	astr.max.mögl.Beschattung		374	82				
	Red.Sonnenscheinwahrsch.		0,40	0,32				
	Reduktion Betriebsdauer		0,84	0,84				
	Reduktion Windrichtung		0,63	0,68				
	Gesamte Reduktion		0,21	0,18				
	Met.wahrsch.Beschattung		79	15				

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ P - Im Sintfeld 7, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni
1	08:32	08:05	07:13	07:03	05:59	05:15
	16:26	17:14	18:04	19:58	20:48	21:33
2	08:32	08:04	07:11	07:01	05:57	05:14
	16:27	17:15	18:06	19:59	20:49	21:34
3	08:31	08:02	07:09	06:59	05:55	05:13
	16:29	17:17	18:08	20:01	20:51	21:35
4	08:31	08:01	07:06	06:56	05:54	05:12
	16:30	17:19	18:10	20:03	20:53	21:36
5	08:31	07:59	07:04	06:54	05:52	05:12
	16:31	17:21	18:11	20:04	20:54	21:37
6	08:31	07:58	07:02	06:52	05:50	05:11
	16:32	17:23	18:13	20:06	20:56	21:38
7	08:30	07:56	07:00	06:50	05:48	05:11
	16:33	17:25	18:15	20:08	20:57	21:39
8	08:30	07:54	06:58	06:47	05:46	05:10
	16:35	17:26	18:17	20:09	20:59	21:40
9	08:29	07:52	06:55	06:45	19:35 (WP KLUS-14)	05:45
	16:36	17:28	18:18	20:11	2	20:16 (WP KLUS-11)
					19:37 (WP KLUS-14)	21:01
10	08:29	07:51	06:53	06:43	19:31 (WP KLUS-14)	05:43
	16:37	17:30	18:20	20:13	8	20:26 (WP KLUS-11)
					19:39 (WP KLUS-14)	21:02
11	08:28	07:49	06:51	06:41	19:30 (WP KLUS-14)	05:41
	16:39	17:32	18:22	20:14	11	20:27 (WP KLUS-11)
					19:41 (WP KLUS-14)	21:04
12	08:28	07:47	06:49	06:39	19:29 (WP KLUS-14)	05:40
	16:40	17:34	18:24	20:16	12	20:27 (WP KLUS-11)
					19:41 (WP KLUS-14)	21:05
13	08:27	07:45	06:46	06:36	19:29 (WP KLUS-14)	05:38
	16:42	17:36	18:25	20:18	12	20:27 (WP KLUS-11)
					19:41 (WP KLUS-14)	21:07
14	08:26	07:43	06:44	06:34	19:28 (WP KLUS-14)	05:37
	16:43	17:37	18:27	20:19	13	20:27 (WP KLUS-11)
					19:41 (WP KLUS-14)	21:08
15	08:26	07:41	06:42	06:32	19:29 (WP KLUS-14)	05:35
	16:45	17:39	18:29	20:21	12	20:27 (WP KLUS-11)
					19:41 (WP KLUS-14)	21:10
16	08:25	07:39	06:40	06:30	19:29 (WP KLUS-14)	05:34
	16:46	17:41	18:31	20:23	10	20:27 (WP KLUS-11)
					19:39 (WP KLUS-14)	21:11
17	08:24	07:38	06:37	06:28	19:31 (WP KLUS-14)	05:32
	16:48	17:43	18:32	20:24	7	20:25 (WP KLUS-11)
					19:38 (WP KLUS-14)	21:13
18	08:23	07:36	06:35	06:26	05:31	20:17 (WP KLUS-11)
	16:49	17:45	18:34	20:26	8	20:25 (WP KLUS-11)
					19:41 (WP KLUS-14)	21:14
19	08:22	07:34	06:33	06:23	05:29	20:20 (WP KLUS-11)
	16:51	17:46	18:36	20:28	3	20:23 (WP KLUS-11)
					19:31 (WP KLUS-14)	21:16
20	08:21	07:32	06:31	06:21	05:28	05:08
	16:53	17:48	18:37	20:29	21:17	21:46
21	08:20	07:30	06:28	06:19	05:27	05:08
	16:54	17:50	18:39	20:31	21:19	21:47
22	08:19	07:28	06:26	06:17	05:25	05:08
	16:56	17:52	18:41	20:33	21:20	21:47
23	08:18	07:26	06:24	06:15	05:24	05:08
	16:58	17:54	18:42	20:34	21:21	21:47
24	08:16	07:23	06:21	06:13	05:23	05:09
	16:59	17:55	18:44	20:36	21:23	21:47
25	08:15	07:21	06:19	06:11	05:22	05:09
	17:01	17:57	18:46	20:38	21:24	21:47
26	08:14	07:19	06:17	06:09	05:21	05:09
	17:03	17:59	18:47	20:39	21:25	21:47
27	08:13	07:17	06:15	06:07	05:19	05:10
	17:05	18:01	18:49	20:41	21:27	21:47
28	08:11	07:15	06:12	06:05	05:18	05:10
	17:06	18:03	18:51	20:43	21:28	21:47
29	08:10		07:10	06:03	05:17	05:11
	17:08		19:52	20:44	21:29	21:47
30	08:08		07:08	06:01	05:16	05:11
	17:10		19:54	20:46	21:30	21:47
31	08:07		07:05		05:16	
	17:12		19:56		21:31	
Sonnenscheinstunden	261	278	367	415	483	497
astr.max.mögl.Beschattung				87	121	
Red.Sonnenscheinwahrsch.				0,36	0,43	
Reduktion Betriebsdauer				0,84	0,84	
Reduktion Windrichtung				0,65	0,62	
Gesamte Reduktion				0,20	0,22	
Met.wahrsch.Beschattung				17	27	

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

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

Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ P - Im Sintfeld 7, Bad Wünnenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

	July	August	September	Oktober	November	Dezember
1	05:12 21:46	05:48 21:15	20:25 (WP KLUS-11) 20:37 (WP KLUS-11)	06:37 20:14	19:29 (WP KLUS-14) 19:40 (WP KLUS-14)	07:25 17:00
2	05:13 21:46	05:49 21:14	20:26 (WP KLUS-11) 20:37 (WP KLUS-11)	06:38 20:12	19:30 (WP KLUS-14) 19:38 (WP KLUS-14)	07:26 16:58
3	05:13 21:46	05:51 21:12	20:26 (WP KLUS-11) 20:36 (WP KLUS-11)	06:40 20:10	19:33 (WP KLUS-14) 19:35 (WP KLUS-14)	07:21 16:57
4	05:14 21:45	05:52 21:10	20:26 (WP KLUS-11) 20:35 (WP KLUS-11)	06:41 20:07	19:30 (WP KLUS-14) 18:59	07:20 16:55
5	05:15 21:45	05:54 21:09	20:28 (WP KLUS-11) 20:34 (WP KLUS-11)	06:43 20:05	19:30 (WP KLUS-14) 18:56	07:25 16:53
6	05:16 21:44	05:55 21:07	20:34 (WP KLUS-11)	06:45 20:03	19:30 (WP KLUS-14) 18:54	07:27 16:51
7	05:17 21:44	05:57 21:05		06:46 20:01	19:30 (WP KLUS-14) 18:52	07:28 16:50
8	05:17 21:43	05:58 21:03		06:48 19:58	19:30 (WP KLUS-14) 18:50	07:30 16:48
9	05:18 21:43	06:00 21:01		06:49 19:56	19:30 (WP KLUS-14) 18:47	07:32 16:46
10	05:19 21:42	06:02 21:00		06:51 19:54	19:30 (WP KLUS-14) 18:45	07:34 16:45
11	05:20 21:41	06:03 20:58		06:53 19:51	19:30 (WP KLUS-14) 18:43	07:35 16:43
12	05:21 21:40	06:05 20:56		06:54 19:49	19:30 (WP KLUS-14) 18:41	07:37 16:42
13	05:22 21:39	06:06 20:54		06:56 19:47	19:30 (WP KLUS-14) 18:39	07:39 16:40
14	05:24 21:39	06:08 20:52		06:57 19:45	19:30 (WP KLUS-14) 18:36	07:41 16:39
15	05:25 21:38	06:09 20:50		06:59 19:42	19:30 (WP KLUS-14) 18:34	07:42 16:37
16	05:26 21:37	06:11 20:48		07:01 19:40	19:30 (WP KLUS-14) 18:32	07:44 16:36
17	05:27 21:36	06:13 20:46		07:02 19:38	19:30 (WP KLUS-14) 18:30	07:46 16:35
18	05:28 21:34	06:14 20:44		07:04 19:35	19:30 (WP KLUS-14) 18:28	07:47 16:33
19	05:30 21:33	06:16 20:42		07:05 19:33	19:30 (WP KLUS-14) 18:26	07:49 16:32
20	05:31 21:32	06:17 20:40		07:07 19:31	19:30 (WP KLUS-14) 18:24	07:51 16:31
21	05:32 21:31	06:19 20:38		07:09 19:28	19:30 (WP KLUS-14) 18:22	07:52 16:30
22	05:34 21:30	06:21 20:36		07:10 19:26	19:30 (WP KLUS-14) 18:20	07:54 16:29
23	05:35 21:28	06:22 20:34		07:12 19:24	19:30 (WP KLUS-14) 18:18	07:56 16:28
24	05:36 21:27	06:24 20:32		07:13 19:22	19:30 (WP KLUS-14) 18:16	07:57 16:27
25	05:38 21:26	20:29 (WP KLUS-11) 20:34 (WP KLUS-11)	06:25 20:29	07:15 19:19	19:30 (WP KLUS-14) 17:14	07:59 16:26
26	05:39 21:24	20:27 (WP KLUS-11) 20:35 (WP KLUS-11)	06:27 20:27	19:33 (WP KLUS-14) 19:40 (WP KLUS-14)	07:17 19:17	08:00 16:25
27	05:40 21:23	20:26 (WP KLUS-11) 20:36 (WP KLUS-11)	06:29 20:25	19:31 (WP KLUS-14) 19:41 (WP KLUS-14)	07:18 19:15	08:02 16:24
28	05:42 21:21	20:26 (WP KLUS-11) 20:37 (WP KLUS-11)	06:30 20:23	19:30 (WP KLUS-14) 19:41 (WP KLUS-14)	07:20 19:12	08:03 16:23
29	05:43 21:20	20:25 (WP KLUS-11) 20:37 (WP KLUS-11)	06:32 20:21	19:29 (WP KLUS-14) 19:42 (WP KLUS-14)	07:21 19:10	08:05 16:22
30	05:45 21:18	20:25 (WP KLUS-11) 20:37 (WP KLUS-11)	06:33 20:19	19:28 (WP KLUS-14) 19:41 (WP KLUS-14)	07:23 19:08	08:06 16:21
31	05:46 21:17	20:25 (WP KLUS-11) 20:38 (WP KLUS-11)	06:35 20:16	19:29 (WP KLUS-14) 19:41 (WP KLUS-14)	07:16 17:02	08:32 16:25
Sonnenscheinstunden	500	453	381	332	268	246
astr.max.mögl.Beschattung	71	114	21			
Red.Sonnenscheinwahrsch.	0,39	0,40	0,32			
Reduktion Betriebsdauer	0,84	0,84	0,84			
Reduktion Windrichtung	0,62	0,64	0,65			
Gesamte Reduktion	0,20	0,22	0,18			
Met.wahrsch.Beschattung	14	25	4			

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ Q - Kampstr. 33, Leihberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:32	08:06	07:13	07:03	05:59	05:15	05:12	05:48	06:37	07:25	07:18	08:08
	16:27	17:14	18:05	19:58	20:48	21:33	21:47	21:15	20:14	19:06	17:00	16:21
2	08:32	08:04	07:11	07:01	05:58	05:14	05:13	05:50	06:38	07:27	07:20	08:09
	16:28	17:16	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:59	16:20
3	08:32	08:03	07:09	06:59	05:56	05:13	05:14	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:20
4	08:31	08:01	07:07	06:57	05:54	05:13	05:14	05:53	06:42	07:30	07:23	08:12
	16:30	17:19	18:10	20:03	20:53	21:36	21:46	21:10	20:08	18:59	16:55	16:19
5	08:31	07:59	07:04	06:54	05:52	05:12	05:15	05:54	06:43	07:32	07:25	08:14
	16:31	17:21	18:12	20:04	20:54	21:37	21:45	21:09	20:05	18:57	16:53	16:19
6	08:31	07:58	07:02	06:52	05:50	05:11	05:16	05:56	06:45	07:33	07:27	08:15
	16:32	17:23	18:13	20:06	20:56	21:38	21:45	21:07	20:03	18:54	16:52	16:18
7	08:30	07:56	07:00	06:50	05:48	05:11	05:17	05:57	06:46	07:35	07:28	08:16
	16:34	17:25	18:15	20:08	20:58	21:39	21:44	21:05	20:01	18:52	16:50	16:18
8	08:30	07:54	06:58	06:48	05:47	05:10	05:18	05:59	06:48	07:37	07:30	08:17
	16:35	17:27	18:17	20:09	20:59	21:40	21:43	21:03	19:59	18:50	16:48	16:17
9	08:30	07:53	06:56	06:45	05:45	05:10	05:19	06:00	06:50	07:38	07:32	08:18
	16:36	17:28	18:19	20:11	21:01	21:40	21:43	21:02	19:56	18:48	16:47	16:17
10	08:29	07:51	06:53	06:43	05:43	05:09	05:20	06:02	06:51	07:40	07:34	08:19
	16:38	17:30	18:20	20:13	21:02	21:41	21:42	21:00	19:54	18:45	16:45	16:17
11	08:29	07:49	06:51	06:41	05:42	05:09	05:21	06:03	06:53	07:42	07:35	08:21
	16:39	17:32	18:22	20:14	21:04	21:42	21:41	20:58	19:52	18:43	16:44	16:17
12	08:28	07:47	06:49	06:39	05:40	05:09	05:22	06:05	06:54	07:43	07:37	08:22
	16:40	17:34	18:24	20:16	21:05	21:43	21:40	20:56	19:49	18:41	16:42	16:17
13	08:27	07:45	06:47	06:37	05:38	05:08	05:23	06:07	06:56	07:45	07:39	08:23
	16:42	17:36	18:26	20:18	21:07	21:43	21:40	20:54	19:47	18:39	16:41	16:17
14	08:26	07:43	06:44	06:34	05:37	05:08	05:24	06:08	06:58	07:47	07:41	08:24
	16:43	17:38	18:27	20:20	21:09	21:44	21:39	20:52	19:45	18:37	16:39	16:17
15	08:26	07:42	06:42	06:32	05:35	05:08	05:25	06:10	06:59	07:48	07:42	08:24
	16:45	17:39	18:29	20:21	21:10	21:44	21:38	20:50	19:43	18:35	16:38	16:17
16	08:25	07:40	06:40	06:30	05:34	05:08	05:26	06:11	07:01	07:50	07:44	08:25
	16:46	17:41	18:31	20:23	21:12	21:45	21:37	20:48	19:40	18:32	16:36	16:17
17	08:24	07:38	06:38	06:28	05:32	05:05	05:27	06:13	07:02	07:52	07:46	08:26
	16:48	17:43	18:32	20:25	21:13	21:45	21:36	20:46	19:38	18:30	16:35	16:17
18	08:23	07:36	06:35	06:26	05:31	05:08	05:29	06:15	07:04	07:53	07:48	08:27
	16:50	17:45	18:34	20:26	21:15	21:46	21:35	20:44	19:36	18:28	16:34	16:17
19	08:22	07:34	06:33	06:24	05:30	05:08	05:30	06:16	07:06	07:55	07:49	08:28
	16:51	17:47	18:36	20:28	21:16	21:46	21:33	20:42	19:33	18:26	16:32	16:18
20	08:21	07:32	06:31	06:22	05:28	05:08	05:31	06:18	07:07	07:57	07:51	08:28
	16:53	17:49	18:38	20:30	21:17	21:47	21:32	20:40	19:31	18:24	16:31	16:18
21	08:20	07:30	06:28	06:19	05:27	05:08	05:32	06:19	07:09	07:59	07:53	08:29
	16:55	17:50	18:39	20:31	21:19	21:47	21:31	20:38	19:29	18:22	16:30	16:18
22	08:19	07:28	06:26	06:17	05:26	05:08	05:34	06:21	07:10	08:00	07:54	08:29
	16:56	17:52	18:41	20:33	21:20	21:47	21:30	20:36	19:26	18:20	16:29	16:19
23	08:18	07:26	06:24	06:15	05:24	05:09	05:35	06:22	07:12	08:02	07:56	08:30
	16:58	17:54	18:43	20:35	21:22	21:47	21:29	20:34	19:24	18:18	16:28	16:19
24	08:17	07:24	06:22	06:13	05:23	05:09	05:37	06:24	07:14	08:04	07:57	08:30
	17:00	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	16:20
25	08:15	07:22	06:19	06:11	05:22	05:09	05:38	06:26	07:15	07:06	07:59	08:31
	17:01	17:58	18:46	20:38	21:24	21:47	21:26	20:30	19:19	17:14	16:26	16:21
26	08:14	07:19	06:17	06:09	05:21	05:10	05:39	06:27	07:17	07:07	08:01	08:31
	17:03	17:59	18:48	20:40	21:26	21:47	21:25	20:27	19:17	17:12	16:25	16:21
27	08:13	07:17	06:15	06:07	05:20	05:10	05:41	06:29	07:18	07:09	08:02	08:31
	17:05	18:01	18:49	20:41	21:27	21:47	21:23	20:25	19:15	17:10	16:24	16:22
28	08:11	07:15	06:12	06:05	05:19	05:10	05:42	06:30	07:20	07:11	08:04	08:31
	17:07	18:03	18:51	20:43	21:28	21:47	21:22	20:23	19:13	17:08	16:23	16:23
29	08:10		07:10	06:03	05:18	05:11	05:44	06:32	07:22	07:13	08:05	08:32
	17:08		19:53	20:44	21:29	21:47	21:20	20:21	19:10	17:06	16:22	16:24
30	08:09		07:08	06:01	05:17	05:12	05:45	06:34	07:23	07:14	08:07	08:32
	17:10		19:54	20:46	21:30	21:47	21:19	20:19	19:08	17:04	16:22	16:24
31	08:07		07:06	06:05	05:16	05:16	05:47	06:35	07:24	07:16	08:08	08:32
	17:12		19:56		21:32		21:17	20:17		17:02		16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ R - Kampstr. 22, Leihberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

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	16:27	17:14	18:05	19:58	20:48	21:33	21:47	21:15	20:14	19:06	17:00	16:21
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	16:28	17:16	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:59	16:20
3	08:32	08:03	07:09	06:59	05:56	05:13	05:14	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:20
4	08:31	08:01	07:07	06:57	05:54	05:13	05:14	05:53	06:42	07:30	07:23	08:12
	16:30	17:19	18:10	20:03	20:53	21:36	21:46	21:10	20:08	18:59	16:55	16:19
5	08:31	07:59	07:04	06:54	05:52	05:12	05:15	05:54	06:43	07:32	07:25	08:13
	16:31	17:21	18:12	20:04	20:54	21:37	21:45	21:09	20:05	18:57	16:53	16:19
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	16:35	17:27	18:17	20:09	20:59	21:40	21:43	21:03	19:59	18:50	16:48	16:17
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	16:45	17:39	18:29	20:21	21:10	21:44	21:38	20:50	19:43	18:35	16:38	16:17
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	16:50	17:45	18:34	20:26	21:14	21:46	21:35	20:44	19:36	18:28	16:34	16:17
19	08:22	07:34	06:33	06:24	05:30	05:08	05:30	06:16	07:06	07:55	07:49	08:28
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21	08:20	07:30	06:28	06:19	05:27	05:08	05:32	06:19	07:09	07:59	07:53	08:29
	16:55	17:50	18:39	20:31	21:19	21:47	21:31	20:38	19:29	18:22	16:30	16:18
22	08:19	07:28	06:26	06:17	05:26	05:08	05:34	06:21	07:10	08:00	07:54	08:29
	16:56	17:52	18:41	20:33	21:20	21:47	21:30	20:36	19:26	18:20	16:29	16:19
23	08:18	07:26	06:24	06:15	05:24	05:09	05:35	06:22	07:12	08:02	07:56	08:30
	16:58	17:54	18:43	20:35	21:22	21:47	21:29	20:34	19:24	18:18	16:28	16:19
24	08:17	07:24	06:22	06:13	05:23	05:09	05:37	06:24	07:14	08:04	07:57	08:30
	17:00	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	16:20
25	08:15	07:22	06:19	06:11	05:22	05:09	05:38	06:26	07:15	07:06	07:59	08:31
	17:01	17:58	18:46	20:38	21:24	21:47	21:26	20:30	19:19	17:14	16:26	16:21
26	08:14	07:19	06:17	06:09	05:21	05:10	05:39	06:27	07:17	07:07	08:01	08:31
	17:03	17:59	18:48	20:40	21:26	21:47	21:25	20:27	19:17	17:12	16:25	16:21
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	17:05	18:01	18:49	20:41	21:27	21:47	21:23	20:25	19:15	17:10	16:24	16:22
28	08:11	07:15	06:12	06:05	05:19	05:10	05:42	06:30	07:20	07:11	08:04	08:31
	17:07	18:03	18:51	20:43	21:28	21:47	21:22	20:23	19:13	17:08	16:23	16:23
29	08:10		07:10	06:03	05:18	05:11	05:44	06:32	07:22	07:13	08:05	08:32
	17:08		19:53	20:44	21:29	21:47	21:20	20:21	19:10	17:06	16:22	16:24
30	08:09		07:08	06:01	05:17	05:12	05:45	06:34	07:23	07:14	08:07	08:32
	17:10		19:54	20:46	21:30	21:47	21:19	20:19	19:08	17:04	16:22	16:24
31	08:07		07:06	06:05	05:16	05:16	05:47	06:35	07:24	07:16	08:08	08:32
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Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ S - Kampstr. 14, Leihberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:32	08:06	07:13	07:03	05:59	05:15	05:12	05:48	06:37	07:25	07:18	08:08
	16:27	17:14	18:05	19:58	20:48	21:33	21:47	21:15	20:14	19:06	17:00	16:21
2	08:32	08:04	07:11	07:01	05:58	05:14	05:13	05:50	06:38	07:27	07:20	08:09
	16:28	17:16	18:06	19:59	20:49	21:34	21:46	21:14	20:12	19:03	16:59	16:20
3	08:32	08:03	07:09	06:59	05:56	05:13	05:14	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:20
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	16:30	17:19	18:10	20:03	20:53	21:36	21:46	21:10	20:08	18:59	16:55	16:19
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Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
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Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ T - Am Bleichplatz 5a, Leihberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
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Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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):

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			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

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Betriebsdauer je Sektor

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Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:

Wbg Energie 1 GmbH & Co. KG
An der Grotte 17

D-33181 Bad Wünnenberg

Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ V - Am Mühlenbusch 3a, Leihberg (MI)

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3	08:32	08:03	07:09	06:59	05:56	05:13	05:14	05:51	06:40	07:28	07:21	08:11
	16:29	17:17	18:08	20:01	20:51	21:35	21:46	21:12	20:10	19:01	16:57	16:20
4	08:31	08:01	07:07	06:57	05:54	05:13	05:14	05:53	06:42	07:30	07:23	08:12
	16:30	17:19	18:10	20:03	20:53	21:36	21:45	21:10	20:08	18:59	16:55	16:19
5	08:31	07:59	07:04	06:54	05:52	05:12	05:15	05:54	06:43	07:32	07:25	08:13
	16:31	17:21	18:12	20:04	20:54	21:37	21:45	21:09	20:05	18:57	16:53	16:19
6	08:31	07:58	07:02	06:52	05:50	05:11	05:16	05:56	06:45	07:33	07:27	08:15
	16:32	17:23	18:13	20:06	20:56	21:38	21:45	21:07	20:03	18:54	16:52	16:18
7	08:30	07:56	07:00	06:50	05:48	05:11	05:17	05:57	06:46	07:35	07:28	08:16
	16:34	17:25	18:15	20:08	20:58	21:39	21:44	21:05	20:01	18:52	16:50	16:18
8	08:30	07:54	06:58	06:48	05:47	05:10	05:18	05:59	06:48	07:37	07:30	08:17
	16:35	17:27	18:17	20:09	20:59	21:40	21:43	21:03	19:59	18:50	16:48	16:17
9	08:30	07:53	06:56	06:45	05:45	05:10	05:19	06:00	06:50	07:38	07:32	08:18
	16:36	17:28	18:19	20:11	21:01	21:40	21:43	21:02	19:56	18:48	16:47	16:17
10	08:29	07:51	06:53	06:43	05:43	05:09	05:20	06:02	06:51	07:40	07:34	08:19
	16:38	17:30	18:20	20:13	21:02	21:41	21:42	21:00	19:54	18:45	16:45	16:17
11	08:29	07:49	06:51	06:41	05:42	05:09	05:21	06:03	06:53	07:42	07:35	08:21
	16:39	17:32	18:22	20:14	21:04	21:42	21:41	20:58	19:52	18:43	16:44	16:17
12	08:28	07:47	06:49	06:39	05:40	05:09	05:22	06:05	06:54	07:43	07:37	08:22
	16:40	17:34	18:24	20:16	21:05	21:43	21:40	20:56	19:49	18:41	16:42	16:17
13	08:27	07:45	06:47	06:37	05:38	05:08	05:23	06:07	06:56	07:45	07:39	08:23
	16:42	17:36	18:26	20:18	21:07	21:43	21:40	20:54	19:47	18:39	16:41	16:17
14	08:26	07:43	06:44	06:34	05:37	05:08	05:24	06:08	06:58	07:47	07:41	08:24
	16:43	17:38	18:27	20:19	21:09	21:44	21:39	20:52	19:45	18:37	16:39	16:17
15	08:26	07:42	06:42	06:32	05:35	05:08	05:25	06:10	06:59	07:48	07:42	08:24
	16:45	17:39	18:29	20:21	21:10	21:44	21:38	20:50	19:43	18:35	16:38	16:17
16	08:25	07:40	06:40	06:30	05:34	05:08	05:26	06:11	07:01	07:50	07:44	08:25
	16:46	17:41	18:31	20:23	21:12	21:45	21:37	20:48	19:40	18:32	16:36	16:17
17	08:24	07:38	06:38	06:28	05:32	05:08	05:27	06:13	07:02	07:52	07:46	08:26
	16:48	17:43	18:32	20:25	21:13	21:45	21:36	20:46	19:38	18:30	16:35	16:17
18	08:23	07:36	06:35	06:26	05:31	05:08	05:29	06:14	07:04	07:53	07:48	08:27
	16:50	17:45	18:34	20:26	21:14	21:46	21:35	20:44	19:36	18:28	16:34	16:17
19	08:22	07:34	06:33	06:24	05:30	05:08	05:30	06:16	07:06	07:55	07:49	08:28
	16:51	17:47	18:36	20:28	21:16	21:46	21:33	20:42	19:33	18:26	16:32	16:18
20	08:21	07:32	06:31	06:22	05:28	05:08	05:31	06:18	07:07	07:57	07:51	08:28
	16:53	17:49	18:38	20:30	21:17	21:47	21:32	20:40	19:31	18:24	16:31	16:18
21	08:20	07:30	06:28	06:19	05:27	05:08	05:32	06:19	07:09	07:59	07:53	08:29
	16:55	17:50	18:39	20:31	21:19	21:47	21:31	20:38	19:29	18:22	16:30	16:18
22	08:19	07:28	06:26	06:17	05:26	05:08	05:34	06:21	07:10	08:00	07:54	08:29
	16:56	17:52	18:41	20:33	21:20	21:47	21:30	20:36	19:26	18:20	16:29	16:19
23	08:18	07:26	06:24	06:15	05:24	05:09	05:35	06:22	07:12	08:02	07:56	08:30
	16:58	17:54	18:43	20:35	21:22	21:47	21:29	20:34	19:24	18:18	16:28	16:19
24	08:17	07:24	06:22	06:13	05:23	05:09	05:36	06:24	07:14	08:04	07:57	08:30
	17:00	17:56	18:44	20:36	21:23	21:47	21:27	20:32	19:22	18:16	16:27	16:20
25	08:15	07:22	06:19	06:11	05:22	05:09	05:38	06:26	07:15	07:06	07:59	08:31
	17:01	17:58	18:46	20:38	21:24	21:47	21:26	20:30	19:19	17:14	16:26	16:21
26	08:14	07:19	06:17	06:09	05:21	05:10	05:39	06:27	07:17	07:07	08:01	08:31
	17:03	17:59	18:48	20:39	21:26	21:47	21:25	20:27	19:17	17:12	16:25	16:21
27	08:13	07:17	06:15	06:07	05:20	05:10	05:41	06:29	07:18	07:09	08:02	08:31
	17:05	18:01	18:49	20:41	21:27	21:47	21:23	20:25	19:15	17:10	16:24	16:22
28	08:11	07:15	06:12	06:05	05:19	05:10	05:42	06:30	07:20	07:11	08:04	08:31
	17:07	18:03	18:51	20:43	21:28	21:47	21:22	20:23	19:13	17:08	16:23	16:23
29	08:10		07:10	06:03	05:18	05:11	05:44	06:32	07:22	07:13	08:05	08:32
	17:08		19:53	20:44	21:29	21:47	21:20	20:21	19:10	17:06	16:22	16:24
30	08:09		07:08	06:01	05:17	05:12	05:45	06:34	07:23	07:14	08:07	08:32
	17:10		19:54	20:46	21:30	21:47	21:19	20:19	19:08	17:04	16:22	16:24
31	08:07		07:06	06:05	05:16	05:16	05:47	06:35	07:24	07:16	08:08	08:32
	17:12		19:56		21:32		21:17	20:16		17:02		16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ W - Siedlung Eilern 15, Eilern (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni		
1	08:31	08:05	07:13	07:03	05:59	05:14		20:29 (WP EilB-29)
	16:26	17:13	18:04	18:04	19:57	20:47	8	21:32 (WP EilB-29)
2	08:31	08:04	07:11	07:01	05:57	05:14		20:27 (WP EilB-29)
	16:27	17:15	18:06	19:59	20:49	21:34	11	20:38 (WP EilB-29)
3	08:31	08:02	07:08	06:58	05:55	05:13		20:26 (WP EilB-29)
	16:28	17:17	18:08	20:01	20:51	21:35	13	20:39 (WP EilB-29)
4	08:31	08:01	07:06	06:56	05:53	05:12		20:26 (WP EilB-29)
	16:29	17:19	18:09	20:02	20:52	21:36	15	20:41 (WP EilB-29)
5	08:31	07:59	07:04	06:54	05:52	05:11		20:25 (WP EilB-29)
	16:31	17:21	18:11	20:04	20:54	21:37	16	20:41 (WP EilB-29)
6	08:31	07:57	07:02	06:52	05:50	05:11		20:25 (WP EilB-29)
	16:32	17:22	18:13	20:06	20:56	21:38	18	20:43 (WP EilB-29)
7	08:30	07:56	07:00	06:49	05:48	05:10		20:24 (WP EilB-29)
	16:33	17:24	18:15	20:07	20:57	21:38	19	20:43 (WP EilB-29)
8	08:30	07:54	06:57	06:47	05:46	05:10		20:24 (WP EilB-29)
	16:34	17:26	18:16	20:09	20:59	21:39	20	20:44 (WP EilB-29)
9	08:29	07:52	06:55	06:45	05:45	05:09		20:23 (WP EilB-29)
	16:36	17:28	18:18	20:11	21:00	21:40	8	20:44 (WP EilB-29)
10	08:29	07:50	06:53	06:43	05:43	05:09		20:24 (WP EilB-29)
	16:37	17:30	18:20	20:12	21:02	21:41	13	20:45 (WP EilB-29)
11	08:28	07:49	06:51	06:40	05:41	05:08		20:24 (WP EilB-29)
	16:38	17:32	18:22	20:14	21:04	21:42	14	20:45 (WP EilB-29)
12	08:28	07:47	06:48	06:38	05:40	05:08		20:24 (WP EilB-29)
	16:40	17:33	18:23	20:16	21:05	21:42	17	20:46 (WP EilB-29)
13	08:27	07:45	06:46	06:36	05:38	05:08		20:23 (WP EilB-29)
	16:41	17:35	18:25	20:17	21:07	21:43	18	20:46 (WP EilB-29)
14	08:26	07:43	06:44	06:34	05:36	05:08		20:23 (WP EilB-29)
	16:43	17:37	18:27	20:19	21:08	21:44	19	20:46 (WP EilB-29)
15	08:25	07:41	06:42	06:32	05:35	05:07		20:24 (WP EilB-29)
	16:44	17:39	18:29	20:21	21:10	21:44	19	20:47 (WP EilB-29)
16	08:25	07:39	06:39	06:30	05:33	05:07		20:24 (WP EilB-29)
	16:46	17:41	18:30	20:22	21:11	21:45	20	20:47 (WP EilB-29)
17	08:24	07:37	06:37	06:27	05:32	05:07		20:24 (WP EilB-29)
	16:48	17:43	18:32	20:24	21:13	21:45	21	20:47 (WP EilB-29)
18	08:23	07:35	06:35	06:25	05:30	05:07		20:24 (WP EilB-29)
	16:49	17:44	18:34	20:26	21:14	21:46	20	20:47 (WP EilB-29)
19	08:22	07:33	06:33	06:23	05:29	05:07		20:24 (WP EilB-29)
	16:51	17:46	18:35	20:27	21:16	21:46	20	20:48 (WP EilB-29)
20	08:21	07:31	06:30	06:21	05:28	05:07		20:24 (WP EilB-29)
	16:52	17:48	18:37	20:29	21:17	21:46	20	20:48 (WP EilB-29)
21	08:20	07:29	06:28	06:19	05:26	05:08		20:25 (WP EilB-29)
	16:54	17:50	18:39	20:31	21:18	21:46	19	20:49 (WP EilB-29)
22	08:19	07:27	06:26	06:17	05:25	05:08		20:25 (WP EilB-29)
	16:56	17:52	18:40	20:32	21:20	21:47	19	20:49 (WP EilB-29)
23	08:17	07:25	06:23	06:15	05:24	05:08		20:25 (WP EilB-29)
	16:57	17:53	18:42	20:34	21:21	21:47	18	20:49 (WP EilB-29)
24	08:16	07:23	06:21	06:13	05:23	05:08		20:25 (WP EilB-29)
	16:59	17:55	18:44	20:36	21:23	21:47	18	20:49 (WP EilB-29)
25	08:15	07:21	06:19	06:11	05:21	05:09		20:26 (WP EilB-29)
	17:01	17:57	18:46	20:37	21:24	21:47	16	20:49 (WP EilB-29)
26	08:14	07:19	06:17	06:09	05:20	05:09		20:26 (WP EilB-29)
	17:03	17:59	18:47	20:39	21:25	21:47	15	20:49 (WP EilB-29)
27	08:12	07:17	06:14	06:07	05:19	05:09		20:27 (WP EilB-29)
	17:04	18:01	18:49	20:41	21:26	21:47	14	20:50 (WP EilB-29)
28	08:11	07:15	06:12	06:05	05:18	05:10		20:27 (WP EilB-29)
	17:06	18:02	18:51	20:42	21:28	21:47	12	20:49 (WP EilB-29)
29	08:10		07:10	06:03	05:17	05:10		20:27 (WP EilB-29)
	17:08		19:52	20:44	21:29	21:47	10	20:50 (WP EilB-29)
30	08:08		07:07	06:01	05:16	05:11		20:27 (WP EilB-29)
	17:10		19:54	20:46	21:30	21:47	6	20:49 (WP EilB-29)
31	08:07		07:05	06:00	05:15			
	17:12		19:56	20:48	21:31			
Sonnenscheinstunden	261	278	367	415	484	497		
astr.max.mögl.Beschattung					356	623		
Red.Sonnenscheinwahrsch.					0,43	0,34		
Reduktion Betriebsdauer					0,84	0,84		
Reduktion Windrichtung					0,71	0,61		
Gesamte Reduktion					0,25	0,17		
Met.wahrsch.Beschattung					91	106		

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de Berechnet: 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ W - Siedlung Eilern 15, Eilern (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

| Juli | August | September | Oktober | November | Dezember

1	05:12	20:28 (WP EIIIB-29)	05:47	16	06:37 (WP EIIIB-39)	06:36	07:25	07:17	08:08
	21:46	20:50 (WP EIIIB-29)	21:15		06:53 (WP EIIIB-39)	20:14	19:05	17:00	16:20
2	05:12	20:29 (WP EIIIB-29)	05:49	14	06:37 (WP EIIIB-39)	06:38	07:26	07:19	08:09
	21:46	20:50 (WP EIIIB-29)	21:13		06:51 (WP EIIIB-39)	20:12	19:03	16:58	16:20
3	05:13	20:29 (WP EIIIB-29)	05:51	12	06:39 (WP EIIIB-39)	06:40	07:28	07:21	08:11
	21:46	20:49 (WP EIIIB-29)	21:12		06:51 (WP EIIIB-39)	20:09	19:01	16:56	16:19
4	05:14	20:29 (WP EIIIB-29)	05:52	7	06:41 (WP EIIIB-39)	06:41	07:29	07:23	08:12
	21:45	20:49 (WP EIIIB-29)	21:10		06:48 (WP EIIIB-39)	20:07	18:58	16:55	16:19
5	05:15	20:30 (WP EIIIB-29)	05:54			06:43	07:31	07:25	08:13
	21:45	20:49 (WP EIIIB-29)	21:08			20:05	18:56	16:53	16:18
6	05:15	20:31 (WP EIIIB-29)	05:55			06:44	07:33	07:26	08:14
	21:44	20:49 (WP EIIIB-29)	21:07			20:03	18:54	16:51	16:18
7	05:16	20:31 (WP EIIIB-29)	05:57			06:46	07:34	07:28	08:16
	21:44	20:48 (WP EIIIB-29)	21:05			20:00	18:52	16:49	16:17
8	05:17	20:32 (WP EIIIB-29)	05:58			06:48	07:36	07:30	08:17
	21:43	20:48 (WP EIIIB-29)	21:03			19:58	18:49	16:48	16:17
9	05:18	20:33 (WP EIIIB-29)	06:00			06:49	07:38	07:32	08:18
	21:42	20:47 (WP EIIIB-29)	21:01			19:56	18:47	16:46	16:17
10	05:19	20:34 (WP EIIIB-29)	06:01			06:51	07:39	07:33	08:19
	21:42	20:46 (WP EIIIB-29)	20:59			19:54	18:45	16:45	16:16
11	05:20	20:36 (WP EIIIB-29)	06:03			06:52	07:41	07:35	08:20
	21:41	20:45 (WP EIIIB-29)	20:58			19:51	18:43	16:43	16:16
12	05:21	20:38 (WP EIIIB-29)	06:04			06:54	07:43	07:37	08:21
	21:40	20:43 (WP EIIIB-29)	20:56			19:49	18:41	16:42	16:16
13	05:22	06:41 (WP EIIIB-39)	06:06			06:56	07:44	07:39	08:22
	21:39	06:46 (WP EIIIB-39)	20:54			19:47	18:38	16:40	16:16
14	05:23	06:40 (WP EIIIB-39)	06:08			06:57	07:46	07:40	08:23
	21:38	06:48 (WP EIIIB-39)	20:52			19:44	18:36	16:39	16:16
15	05:24	06:38 (WP EIIIB-39)	06:09			06:59	07:48	07:42	08:24
	21:37	06:49 (WP EIIIB-39)	20:50			19:42	18:34	16:37	16:16
16	05:26	06:37 (WP EIIIB-39)	06:11			07:00	07:50	07:44	08:25
	21:36	06:50 (WP EIIIB-39)	20:48			19:40	18:32	16:36	16:16
17	05:27	06:38 (WP EIIIB-39)	06:12			07:02	07:51	07:46	08:26
	21:35	06:52 (WP EIIIB-39)	20:46			19:37	18:30	16:34	16:16
18	05:28	06:37 (WP EIIIB-39)	06:14			07:04	07:53	07:47	08:27
	21:34	06:52 (WP EIIIB-39)	20:44			19:35	18:28	16:33	16:17
19	05:29	06:36 (WP EIIIB-39)	06:16			07:05	07:55	07:49	08:27
	21:33	06:53 (WP EIIIB-39)	20:42			19:33	18:26	16:32	16:17
20	05:31	06:36 (WP EIIIB-39)	06:17			07:07	07:56	07:51	08:28
	21:32	06:53 (WP EIIIB-39)	20:40			19:31	18:23	16:31	16:17
21	05:32	06:35 (WP EIIIB-39)	06:19			07:08	07:58	07:52	08:28
	21:31	06:54 (WP EIIIB-39)	20:38			19:28	18:21	16:30	16:18
22	05:33	06:36 (WP EIIIB-39)	06:20			07:10	08:00	07:54	08:29
	21:30	06:55 (WP EIIIB-39)	20:36			19:26	18:19	16:28	16:18
23	05:35	06:35 (WP EIIIB-39)	06:22			07:12	08:02	07:55	08:30
	21:28	06:55 (WP EIIIB-39)	20:33			19:24	18:17	16:27	16:19
24	05:36	06:35 (WP EIIIB-39)	06:24			07:13	08:03	07:57	08:30
	21:27	06:55 (WP EIIIB-39)	20:31			19:21	18:15	16:26	16:19
25	05:37	06:34 (WP EIIIB-39)	06:25			07:15	07:05	07:59	08:30
	21:26	06:55 (WP EIIIB-39)	20:29			19:19	17:13	16:25	16:20
26	05:39	06:35 (WP EIIIB-39)	06:27			07:16	07:07	08:00	08:31
	21:24	06:55 (WP EIIIB-39)	20:27			19:17	17:11	16:24	16:21
27	05:40	06:35 (WP EIIIB-39)	06:28			07:18	07:09	08:02	08:31
	21:23	06:55 (WP EIIIB-39)	20:25			19:14	17:09	16:23	16:21
28	05:42	06:35 (WP EIIIB-39)	06:30			07:20	07:10	08:03	08:31
	21:21	06:54 (WP EIIIB-39)	20:23			19:12	17:07	16:23	16:22
29	05:43	06:35 (WP EIIIB-39)	06:32			07:21	07:12	08:05	08:31
	21:20	06:55 (WP EIIIB-39)	20:21			19:10	17:06	16:22	16:23
30	05:45	06:35 (WP EIIIB-39)	06:33			07:23	07:14	08:06	08:31
	21:18	06:54 (WP EIIIB-39)	20:18			19:08	17:04	16:21	16:24
31	05:46	06:37 (WP EIIIB-39)	06:35				07:16	07:16	08:31
	21:17	06:54 (WP EIIIB-39)	20:16				17:02	16:25	16:25
Sonnenscheinstunden	500		453			381	332	268	246
astr.max.mögl.Beschattung	507		49						
Red.Sonnenscheinwahrsch.	0,39		0,40						
Reduktion Betriebsdauer	0,84		0,84						
Reduktion Windrichtung	0,67		0,71						
Gesamte Reduktion	0,22		0,24						
Met.wahrsch.Beschattung	110		12						

Tabellen-Layout: Die Daten für jeden Tag 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:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ X - Siedlung Eilern 16, Eilern (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni															
1	08:31	08:05	07:13	07:03	05:59	05:14															
	16:26	17:13	18:04	18:04	19:57	20:47															
2	08:31	08:04	07:11	07:01	05:57	05:14															
	16:27	17:15	18:06	19:59	20:49	21:34															
3	08:31	08:02	07:08	06:58	05:55	05:13															
	16:28	17:17	18:08	20:01	20:51	21:35															
4	08:31	08:01	07:06	06:56	05:53	05:12															
	16:29	17:19	18:09	20:02	20:52	21:36															
5	08:31	07:59	07:04	06:54	05:52	05:11															
	16:31	17:21	18:11	20:04	20:54	21:37															
6	08:31	07:57	07:02	06:52	05:50	05:11															
	16:32	17:22	18:13	20:06	20:56	21:38															
7	08:30	07:56	07:00	06:49	05:48	05:10															
	16:33	17:24	18:15	20:07	20:57	21:38															
8	08:30	07:54	06:57	06:47	05:46	05:10															
	16:34	17:26	18:16	20:09	20:59	21:39															
9	08:29	07:52	06:55	06:45	05:45	05:09															
	16:36	17:28	18:18	20:11	21:00	21:40															
10	08:29	07:50	06:53	06:43	05:43	05:09															
	16:37	17:30	18:20	20:12	21:02	21:41															
11	08:28	07:49	06:51	06:40	05:41	05:08															
	16:38	17:32	18:22	20:14	21:04	21:42															
12	08:28	07:47	06:48	06:38	05:40	05:08															
	16:40	17:33	18:23	20:16	21:05	21:42															
13	08:27	07:45	06:46	06:36	05:38	05:08															
	16:41	17:35	18:25	20:17	21:07	21:43															
14	08:26	07:43	06:44	06:34	05:36	05:08															
	16:43	17:37	18:27	20:19	21:08	21:44															
15	08:25	07:41	06:42	06:32	05:35	05:07															
	16:44	17:39	18:29	20:21	21:10	21:44															
16	08:25	07:39	06:39	06:30	05:33	05:07															
	16:46	17:41	18:30	20:22	21:11	21:45															
17	08:24	07:37	06:37	06:27	05:32	05:07															
	16:48	17:43	18:32	20:24	21:13	21:45															
18	08:23	07:35	06:35	06:25	05:30	05:07															
	16:49	17:44	18:34	20:26	21:14	21:46															
19	08:22	07:33	06:33	06:23	05:29	05:07															
	16:51	17:46	18:35	20:27	21:16	21:46															
20	08:21	07:31	06:30	06:21	05:28	05:07															
	16:52	17:48	18:37	20:29	21:17	21:46															
21	08:20	07:29	06:28	06:19	05:26	05:08															
	16:54	17:50	18:39	20:31	21:18	21:46															
22	08:19	07:27	06:26	06:17	05:25	05:08															
	16:56	17:52	18:40	20:32	21:20	21:47															
23	08:17	07:25	06:23	06:15	05:24	05:08															
	16:57	17:53	18:42	20:34	21:21	21:47															
24	08:16	07:23	06:21	06:13	05:23	05:08															
	16:59	17:55	18:44	20:36	21:23	21:47															
25	08:15	07:21	06:19	06:11	05:21	05:09															
	17:01	17:57	18:46	20:37	21:24	21:47															
26	08:14	07:19	06:17	06:09	05:20	05:09															
	17:03	17:59	18:47	20:39	21:25	21:47															
27	08:12	07:17	06:14	06:07	05:19	05:09															
	17:04	18:01	18:49	20:41	21:27	21:47															
28	08:11	07:15	06:12	06:05	05:18	05:10															
	17:06	18:02	18:51	20:42	21:28	21:47															
29	08:10		07:10	06:03	05:17	05:10															
	17:08		19:52	20:44	21:29	21:47															
30	08:08		07:07	06:01	05:16	05:11															
	17:10		19:54	20:46	21:30	21:47															
31	08:07		07:05	06:00	05:15	05:10															
	17:12		19:56	20:48	21:31	21:47															
Sonnenscheinstunden	261	278	367	415	484	497															
astr.max.mögl.Beschattung					467					1071											
Red.Sonnenscheinwahrsch.					0,43					0,34											
Reduktion Betriebsdauer					0,84					0,84											
Reduktion Windrichtung					0,68					0,61											
Gesamte Reduktion					0,24					0,17											
Met.wahrsch.Beschattung					113					185											

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
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Projekt: Schattenwurf Bad Wünnenb.-Hirschweg	Beschreibung: Auftraggeber: Wbg Energie 1 GmbH & Co. KG An der Grotte 17 D-33181 Bad Wünnenberg Bundesland des Projekts: Nordrhein-Westfalen	Lizenzierter Anwender: Power of Nature - Windenergie Aulendorf 40 DE-48727 Billerbeck 02543 9304674 Fürtges / joerg.fuertges@powernature.de <small>Berechnet:</small> 07.03.2023 12:26/3.6.361
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SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ X - Siedlung Eilern 16, Eilern (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N	NNO	ONO	O	OSO	SSO	S	SSW	WSW	W	WNW	NNW	Summe
261	393	465	559	645	475	572	869	1.140	1.059	606	326	7.370

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

Sonnenscheinstunden	500		453										
astr.max.mögl.Beschattung		659		133									
Red.Sonnenscheinwahrsch.		0,39		0,40									
Reduktion Betriebsdauer		0,84		0,84									
Reduktion Windrichtung		0,64		0,71									
Gesamte Reduktion		0,21		0,24									
Met.wahrsch.Beschattung		137		32									

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

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

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ Y - Tewesweg 1, Fürstenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:31	08:05	07:13	07:03	05:59	05:15	05:12	05:48	06:36	07:25	07:17	08:08
	16:26	17:13	18:04	19:57	20:47	21:32	21:46	21:15	20:14	19:05	17:00	16:20
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	17:12		19:56		21:31		21:17	20:16		17:02		16:25
Sonnenscheinstunden	261	278	367	415	483	497	500	453	381	332	268	246
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)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:
Schattenwurf Bad Wünnenb.-Hirschweg

Beschreibung:
Auftraggeber:
Wbg Energie 1 GmbH & Co. KG
An der Grotte 17
D-33181 Bad Wünnenberg
Bundesland des Projekts: Nordrhein-Westfalen

Lizenzierter Anwender:
Power of Nature - Windenergie
Aulendorf 40
DE-48727 Billerbeck
02543 9304674
Fürtges / joerg.fuertges@powernature.de
Berechnet:
07.03.2023 12:26/3.6.361

SHADOW - Kalender

Berechnung: Gesamtbelastung (Vorbelastung & 1 x Neuanlage) Schattenrezeptor: RZ Z - Tewesweg 3, Fürstenberg (MI)

Annahmen für Schattenwurfberechnung

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BAD LIPSPRINGE]

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

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
261 393 465 559 645 475 572 869 1.140 1.059 606 326 7.370

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