



Weil • Winterkamp • Knopp
Landschaftsarchitektin • Geographen
Partnerschaft für Umweltplanung

**Prognose des Schattenschlagwurfs
von vier Windenergieanlagen
Nordex N163/6.X TCS164
in Ahaus (Lüntener Mark)
Anhang 4: Schattenschlagkalender WEA 4**

Auftraggeber:
Hörsteloer Bürgerwind GmbH & Co. KG
Hengeler 11
48703 Stadtlohn

08.12.2023

Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 01-NO - IP 01-NO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:42	08:15	08:53 (WEA 4)	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:27	08:18
	16:31	17:19	09:16 (WEA 4)	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25
2	08:42	08:13	08:53 (WEA 4)	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34	07:28	08:19
	16:32	17:21	09:16 (WEA 4)	18:13	20:07	20:58	21:44	21:57	21:23	20:20	19:10	17:04	16:25
3	08:42	08:12	08:54 (WEA 4)	07:17	07:05	06:01	05:18	05:18	05:56	06:46	07:36	07:30	08:21
	16:33	17:23	09:17 (WEA 4)	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24
4	08:41	08:10	08:54 (WEA 4)	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22
	16:34	17:25	09:16 (WEA 4)	18:17	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:24
5	08:41	08:08	08:55 (WEA 4)	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23
	16:36	17:27	09:15 (WEA 4)	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23
6	08:41	08:07	08:56 (WEA 4)	07:10	06:59	05:55	05:16	05:20	06:01	06:51	07:41	07:36	08:25
	16:37	17:28	09:14 (WEA 4)	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:23
7	08:40	08:05	08:57 (WEA 4)	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:43	07:37	08:26
	16:38	17:30	09:13 (WEA 4)	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22
8	08:40	08:03	08:59 (WEA 4)	07:05	06:54	05:52	05:14	05:22	06:04	06:55	07:44	07:39	08:27
	16:39	17:32	09:12 (WEA 4)	18:24	20:17	21:08	21:50	21:54	21:13	20:06	18:54	16:54	16:22
9	08:39	08:01	09:02 (WEA 4)	07:03	06:52	05:50	05:14	05:23	06:06	06:56	07:46	07:41	08:28
	16:41	17:34	09:10 (WEA 4)	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:22
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	16:42	17:36		18:27	20:21	21:12	21:52	21:52	21:09	20:02	18:52	16:50	16:21
11	08:38	07:58		06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:45	08:31
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	16:48	17:43		18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21
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	16:51	17:47		18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:21
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	16:53	17:49		18:40	20:33	21:23	21:56	21:46	20:55	19:45	18:37	16:40	16:21
18	08:33	07:44		06:43	06:32	05:36	05:12	05:33	06:20	07:11	08:02	07:57	08:37
	16:54	17:51		18:41	20:35	21:24	21:56	21:45	20:53	19:43	18:34	16:39	16:22
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	16:56	17:53		18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	16:22
20	08:31	07:40	08:59 (WEA 4)	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	08:38
	16:58	17:55	09:04 (WEA 4)	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	16:22
21	08:30	07:38	08:58 (WEA 4)	06:36	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	08:39
	16:59	17:56	09:08 (WEA 4)	18:46	20:40	21:29	21:57	21:41	20:47	19:36	18:28	16:34	16:23
22	08:28	07:36	08:56 (WEA 4)	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:09	08:04	08:39
	17:01	17:58	09:09 (WEA 4)	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	16:23
23	08:27	07:34	08:55 (WEA 4)	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	08:40
	17:03	18:00	09:11 (WEA 4)	18:50	20:43	21:31	21:58	21:38	20:42	19:31	18:24	16:33	16:24
24	08:26	07:32	08:54 (WEA 4)	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	08:40
	17:05	18:02	09:12 (WEA 4)	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:32	16:24
25	08:25	07:30	08:53 (WEA 4)	06:26	06:17	05:26	05:13	05:43	06:32	07:22	08:13	08:08	08:41
	17:06	18:04	09:13 (WEA 4)	18:53	20:47	21:34	21:58	21:36	20:38	19:27	18:20	16:31	16:25
26	08:23	07:28	08:53 (WEA 4)	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:14	08:10	08:41
	17:08	18:06	09:14 (WEA 4)	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:17	16:30	16:25
27	08:22	07:25	08:52 (WEA 4)	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:17	08:12	08:41
	17:10	18:07	09:14 (WEA 4)	18:57	20:50	21:37	21:58	21:33	20:34	19:22	18:16	16:29	16:26
28	08:21	07:23	08:53 (WEA 4)	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	08:42
	17:12	18:09	09:16 (WEA 4)	18:59	20:52	21:38	21:58	21:31	20:31	19:20	18:14	16:28	16:27
29	08:19	07:24	08:52 (WEA 4)	06:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	08:15	08:42
	17:14	18:11	09:16 (WEA 4)	19:00	20:53	21:39	21:57	21:30	20:29	19:17	18:12	16:27	16:28
30	08:18	07:26	08:52 (WEA 4)	06:15	06:07	05:21	05:16	05:50	06:40	07:31	08:23	08:16	08:42
	17:15	18:12	09:16 (WEA 4)	19:02	20:55	21:41	21:57	21:28	20:27	19:15	18:10	16:26	16:29
31	08:16	07:28	08:53 (WEA 4)	06:12	06:04	05:20	05:15	05:51	06:41	07:32	08:24	08:16	08:42
	17:17	18:14	09:17 (WEA 4)	19:04	20:56	21:42	21:58	21:26	20:25	19:14	18:08	16:25	16:30
Sonnenscheinstunden	258	277		367	416	486	500	503	454	381	331	266	243
astr.max.mögl.Beschattung	220	166									389		

Tabellen-Layout: Die Daten für jeden Tag 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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 01-SO - IP 01-SO
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	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42 16:31	08:15 17:19	08:51 (WEA 4) 09:15 (WEA 4)	07:21 18:11	07:10 20:05	06:05 20:57	05:19 21:43	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:13	07:27 17:06	08:29 (WEA 4) 08:37 (WEA 4)	08:18 16:25
2	08:42 16:32	08:13 17:21	08:51 (WEA 4) 09:15 (WEA 4)	07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44	05:17 21:57	05:54 21:23	06:45 20:20	07:34 19:10	07:28 17:04	08:26 (WEA 4) 08:40 (WEA 4)	08:19 16:25
3	08:42 16:33	08:12 17:23	08:52 (WEA 4) 09:16 (WEA 4)	07:17 18:15	07:05 20:09	06:01 21:00	05:18 21:45	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02	08:25 (WEA 4) 08:41 (WEA 4)	08:21 16:24
4	08:41 16:34	08:10 17:25	08:52 (WEA 4) 09:15 (WEA 4)	07:14 18:17	07:03 20:11	05:59 21:02	05:17 21:46	05:18 21:56	05:58 21:20	06:48 20:16	07:37 19:06	07:32 17:01	08:24 (WEA 4) 08:43 (WEA 4)	08:22 16:24
5	08:41 16:36	08:08 17:27	08:53 (WEA 4) 09:14 (WEA 4)	07:12 18:18	07:01 20:12	05:57 21:03	05:16 21:47	05:19 21:55	05:50 21:18	06:50 20:13	07:39 19:03	07:34 16:59	08:23 (WEA 4) 08:44 (WEA 4)	08:23 16:23
6	08:41 16:37	08:07 17:28	08:53 (WEA 4) 09:13 (WEA 4)	07:10 18:20	06:59 20:14	05:55 21:05	05:16 21:48	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	07:36 16:57	08:22 (WEA 4) 08:44 (WEA 4)	08:25 16:23
7	08:40 16:38	08:05 17:30	08:54 (WEA 4) 09:13 (WEA 4)	07:08 18:22	06:56 20:16	05:54 21:07	05:15 21:49	05:21 21:54	06:02 21:14	06:53 20:09	07:43 18:59	07:37 16:55	08:22 (WEA 4) 08:45 (WEA 4)	08:26 16:22
8	08:40 16:39	08:03 17:32	08:56 (WEA 4) 09:12 (WEA 4)	07:05 18:24	06:54 20:17	05:52 21:08	05:14 21:50	05:22 21:54	06:04 21:13	06:55 20:06	07:44 18:57	07:39 16:54	08:22 (WEA 4) 08:45 (WEA 4)	08:27 16:22
9	08:39 16:41	08:01 17:34	08:58 (WEA 4) 09:11 (WEA 4)	07:03 18:25	06:52 20:19	05:50 21:10	05:14 21:51	05:23 21:53	06:06 21:11	06:56 20:04	07:46 18:54	07:41 16:52	08:22 (WEA 4) 08:46 (WEA 4)	08:28 16:22
10	08:39 16:42	08:00 17:36	09:01 (WEA 4) 09:07 (WEA 4)	07:01 18:27	06:49 20:21	05:48 21:12	05:13 21:52	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	08:22 (WEA 4) 08:46 (WEA 4)	08:30 16:21
11	08:38 16:44	07:58 17:38	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:29	06:52 20:23	05:50 21:13	05:14 21:52	05:23 21:51	06:06 21:07	06:59 19:59	07:49 18:50	07:45 16:49	08:22 (WEA 4) 08:46 (WEA 4)	08:31 16:21
12	08:38 16:45	07:56 17:40	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:31	06:52 20:24	05:50 21:15	05:14 21:53	05:23 21:51	06:06 21:05	06:59 19:57	07:49 18:48	07:45 16:47	08:22 (WEA 4) 08:46 (WEA 4)	08:32 16:21
13	08:37 16:47	07:54 17:42	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:33	06:52 20:26	05:50 21:16	05:14 21:54	05:23 21:50	06:06 21:03	06:59 19:55	07:49 18:45	07:45 16:46	08:22 (WEA 4) 08:46 (WEA 4)	08:33 16:21
14	08:36 16:48	07:52 17:43	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:34	06:52 20:28	05:50 21:18	05:14 21:54	05:23 21:49	06:06 21:01	06:59 19:52	07:49 18:43	07:45 16:44	08:22 (WEA 4) 08:46 (WEA 4)	08:34 16:21
15	08:35 16:50	07:50 17:45	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:36	06:52 20:29	05:50 21:20	05:14 21:55	05:23 21:48	06:06 20:59	06:59 19:50	07:49 18:41	07:45 16:43	08:22 (WEA 4) 08:46 (WEA 4)	08:35 16:21
16	08:35 16:51	07:48 17:47	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:38	06:52 20:31	05:50 21:21	05:14 21:55	05:23 21:47	06:06 20:57	06:59 19:48	07:49 18:39	07:45 16:41	08:22 (WEA 4) 08:46 (WEA 4)	08:35 16:21
17	08:34 16:53	07:46 17:49	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:40	06:52 20:33	05:50 21:23	05:14 21:56	05:23 21:46	06:06 20:55	06:59 19:45	07:49 18:37	07:45 16:40	08:22 (WEA 4) 08:46 (WEA 4)	08:36 16:21
18	08:33 16:54	07:44 17:51	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:41	06:52 20:35	05:50 21:24	05:14 21:56	05:23 21:45	06:06 20:53	06:59 19:43	07:49 18:34	07:45 16:39	08:22 (WEA 4) 08:46 (WEA 4)	08:37 16:22
19	08:32 16:56	07:42 17:53	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:43	06:52 20:36	05:50 21:26	05:14 21:57	05:23 21:43	06:06 20:51	06:59 19:41	07:49 18:32	07:45 16:37	08:22 (WEA 4) 08:46 (WEA 4)	08:38 16:22
20	08:31 16:58	07:40 17:55	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:43	06:52 20:36	05:50 21:26	05:14 21:57	05:23 21:43	06:06 20:51	06:59 19:41	07:49 18:32	07:45 16:37	08:22 (WEA 4) 08:46 (WEA 4)	08:38 16:22
21	08:30 16:59	07:38 17:56	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:44	06:52 20:37	05:50 21:27	05:14 21:57	05:23 21:42	06:06 20:49	06:59 19:38	07:49 18:30	07:45 16:36	08:22 (WEA 4) 08:46 (WEA 4)	08:39 16:22
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29	08:19 17:14	07:21 18:07	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:45	06:52 20:38	05:50 21:27	05:14 21:57	05:23 21:28	06:06 20:30	06:59 19:17	07:49 18:14	07:45 16:27	08:22 (WEA 4) 08:46 (WEA 4)	08:45 16:28
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31	08:16 17:17	07:17 18:05	08:59 (WEA 4) 09:07 (WEA 4)	07:03 18:45	06:52 20:38	05:50 21:27	05:14 21:57	05:23 21:24	06:06 20:25	06:59 19:13	07:49 18:10	07:45 16:25	08:22 (WEA 4) 08:46 (WEA 4)	08:47 16:30
	Sonnenscheinstunden astr.max.mögl.Beschattung	258 196	277 191	367	416	486	500	503	454	381	331	266	391	243

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 02-SO - IP 02-SO
Annahmen für Schattenwurfberechnung

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

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

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 03-SO - IP 03-SO
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	09:13 (WEA 4)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:27	08:18	08:54 (WEA 4)
2	16:31	09:25 (WEA 4)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	09:16 (WEA 4)
3	16:32	09:13 (WEA 4)	08:12	07:17	07:05	06:01	05:18	05:18	05:56	06:46	07:36	07:30	16:25	09:17 (WEA 4)
4	16:33	09:27 (WEA 4)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	09:16 (WEA 4)
5	08:41	09:13 (WEA 4)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	16:24	08:57 (WEA 4)
6	16:34	09:29 (WEA 4)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:24	09:17 (WEA 4)
7	08:41	09:12 (WEA 4)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	16:23	08:57 (WEA 4)
8	16:36	09:29 (WEA 4)	17:27	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	09:16 (WEA 4)
9	08:41	09:13 (WEA 4)	08:07	07:10	06:59	05:55	05:16	05:20	06:01	06:51	07:41	07:36	16:25	08:59 (WEA 4)
10	16:37	09:30 (WEA 4)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:23	09:17 (WEA 4)
11	08:40	09:12 (WEA 4)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:43	07:37	16:26	08:59 (WEA 4)
12	16:38	09:31 (WEA 4)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	09:16 (WEA 4)
13	08:40	09:12 (WEA 4)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	16:27	09:00 (WEA 4)
14	16:39	09:31 (WEA 4)	17:32	18:24	20:17	21:08	21:50	21:54	21:13	20:06	18:57	16:54	16:22	09:16 (WEA 4)
15	08:39	09:12 (WEA 4)	08:01	07:03	06:52	05:50	05:14	05:23	06:06	06:56	07:46	07:41	16:28	09:01 (WEA 4)
16	16:41	09:33 (WEA 4)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:22	09:16 (WEA 4)
17	08:39	09:12 (WEA 4)	08:00	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	16:28	09:03 (WEA 4)
18	16:42	09:33 (WEA 4)	17:36	18:27	20:21	21:12	21:52	21:52	21:09	20:02	18:52	16:50	16:21	09:16 (WEA 4)
19	08:38	09:12 (WEA 4)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:45	16:28	09:04 (WEA 4)
20	16:44	09:34 (WEA 4)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	09:16 (WEA 4)
21	08:38	09:12 (WEA 4)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	16:28	09:05 (WEA 4)
22	16:45	09:34 (WEA 4)	17:40	18:31	20:24	21:15	21:53	21:51	21:05	19:57	18:48	16:47	16:21	09:15 (WEA 4)
23	08:37	09:13 (WEA 4)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	16:28	09:06 (WEA 4)
24	16:46	09:36 (WEA 4)	17:42	18:33	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	09:15 (WEA 4)
25	08:36	09:13 (WEA 4)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:55	07:50	16:28	09:07 (WEA 4)
26	16:48	09:37 (WEA 4)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	09:15 (WEA 4)
27	08:35	09:13 (WEA 4)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	16:28	09:08 (WEA 4)
28	16:50	09:37 (WEA 4)	17:45	18:36	20:29	21:20	21:55	21:48	20:59	19:50	18:41	16:43	16:21	09:16 (WEA 4)
29	08:35	09:13 (WEA 4)	07:48	06:47	06:36	05:39	05:12	05:31	06:17	07:08	07:58	07:53	16:28	09:08 (WEA 4)
30	16:51	09:38 (WEA 4)	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:21	09:14 (WEA 4)
31	08:34	09:12 (WEA 4)	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	16:28	09:10 (WEA 4)
32	16:53	09:37 (WEA 4)	17:49	18:40	20:33	21:23	21:56	21:46	20:55	19:45	18:37	16:40	16:21	09:14 (WEA 4)
33	08:33	09:13 (WEA 4)	07:44	06:43	06:32	05:36	05:12	05:33	06:20	07:11	08:02	07:57	16:28	09:03 (WEA 4)
34	16:54	09:38 (WEA 4)	17:51	18:41	20:35	21:24	21:56	21:45	20:53	19:43	18:34	16:39	16:22	09:13 (WEA 4)
35	08:32	09:13 (WEA 4)	07:42	06:40	06:30	05:34	05:12	05:34	06:22	07:12	08:03	07:59	16:28	09:08 (WEA 4)
36	16:56	09:38 (WEA 4)	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	16:22	09:13 (WEA 4)
37	08:31	09:14 (WEA 4)	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	16:28	09:10 (WEA 4)
38	16:58	09:39 (WEA 4)	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	16:22	09:13 (WEA 4)
39	08:30	09:15 (WEA 4)	07:38	06:36	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	16:28	09:08 (WEA 4)
40	16:59	09:39 (WEA 4)	17:56	18:46	20:40	21:29	21:57	21:41	20:47	19:36	18:28	16:35	16:23	09:14 (WEA 4)
41	08:28	09:15 (WEA 4)	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:09	08:04	16:28	09:08 (WEA 4)
42	17:01	09:38 (WEA 4)	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	16:23	09:15 (WEA 4)
43	08:27	09:16 (WEA 4)	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	16:28	09:10 (WEA 4)
44	17:03	09:39 (WEA 4)	18:00	18:50	20:43	21:31	21:58	21:38	20:42	19:31	18:24	16:33	16:24	09:15 (WEA 4)
45	08:26	09:17 (WEA 4)	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	16:28	09:08 (WEA 4)
46	17:05	09:37 (WEA 4)	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:32	16:24	09:16 (WEA 4)
47	08:25	09:19 (WEA 4)	07:30	06:26	06:17	05:26	05:13	05:43	06:32	07:22	08:14	08:09	16:28	09:08 (WEA 4)
48	17:06	09:38 (WEA 4)	18:04	18:53	20:47	21:34	21:58	21:36	20:38	19:27	18:20	16:31	16:25	09:15 (WEA 4)
49	08:23	09:18 (WEA 4)	07:28	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	16:28	09:08 (WEA 4)
50	17:08	09:38 (WEA 4)	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:16	16:30	16:25	09:16 (WEA 4)
51	08:22	09:19 (WEA 4)	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:18	08:12	16:28	09:14 (WEA 4)
52	17:10	09:37 (WEA 4)	18:07	18:57	20:50	21:37	21:58	21:33	20:34	19:22	18:16	16:29	16:26	09:19 (WEA 4)
53	08:21	09:21 (WEA 4)	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	16:28	09:14 (WEA 4)
54	17:12	09:36 (WEA 4)	18:09	18:59	20:52	21:38	21:58	21:31	20:31	19:20	18:14	16:28	16:27	09:20 (WEA 4)
55	08:19	09:23 (WEA 4)	07:25	06:21	06:09	05:22	05:15	05:48	06:38	07:29	08:21	08:15	16:28	09:14 (WEA 4)
56	17:14	09:34 (WEA 4)	18:04	18:54	20:47	21:34	21:57	21:30	20:29	19:17	18:12	16:27	16:28	09:22 (WEA 4)
57	08:18	09:25 (WEA 4)	07:27	06:23	06:11	05:24	05:16	05:50	06:40	07:31	08:23	08:16	16:28	09:14 (WEA 4)
58	17:15	09:31 (WEA 4)	18:01	18:51	20:44	21:31	21:57	21:28	20:27	19:15	18:10	16:26	16:29	09:23 (WEA 4)
59	08:16	09:12 (WEA 4)	07:24	06:20	06:08	05:21	05:13	05:46	06:36	07:27	08:19	08:13	16:28	09:14 (WEA 4)
60	17:17	09:32 (WEA 4)	18:02	18:52	20:45	21:32	21:57	21:29	20:28	19:16	18:11	16:25	16:30	09:24 (WEA 4)
61	08:16	09:12 (WEA 4)	07:24	06:20	06:08	05:21	05:13	05:46	06:36	07:27	08:19	08:13	16:28	09:14 (WEA 4)
62	17:17	09:32 (WEA 4)	18:02	18:52	20:45	21:32	21:57	21:29	20:28	19:16	18:11	16:25	16:30	09:24 (WEA 4)
63	08:16	09:12 (WEA 4)	07:24	06:20	06:08	05:21	05:13	05:46	06:36	07:27	08:19	08:13	16:28	09:14 (WEA 4)
64	17:17	09:32 (WEA 4)	18:02	18:52	20:45	21:32	21:57	21:29	20:28	19:16	18:11	16:25	16:30	09:24 (WEA 4)
65	08:16	09:12 (WEA 4)	07:24	06:20	06:08	05:21	05:13	05:46	06:36	07:27	08:19	08:13	16:28	09:14 (WEA 4)
66	17:17	09:32 (WEA 4)	18:02	18:52	20:45	21:32	21:57	21:29	20:28	19:16	18:11	16:25	16:30	09:24 (WEA 4)

Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 05-SO - IP 05-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember			
1	08:42	13:00 (WEA 4)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:26	08:18	12:50 (WEA 4)	
2	16:31	50 13:50 (WEA 4)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	44 13:34 (WEA 4)	
3	08:42	13:01 (WEA 4)	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34	07:28	08:19	12:50 (WEA 4)	
4	16:32	50 13:51 (WEA 4)	17:21	18:13	20:07	20:58	21:44	21:57	21:23	20:20	19:10	17:04	16:25	45 13:35 (WEA 4)	
5	08:42	13:02 (WEA 4)	08:11	07:17	07:05	06:01	05:18	05:17	05:56	06:46	07:36	07:30	08:21	12:50 (WEA 4)	
6	16:33	49 13:51 (WEA 4)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	45 13:35 (WEA 4)	
7	08:41	13:02 (WEA 4)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	12:50 (WEA 4)	
8	16:34	49 13:51 (WEA 4)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:23	47 13:37 (WEA 4)	
9	08:41	13:03 (WEA 4)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	12:50 (WEA 4)	
10	16:35	49 13:52 (WEA 4)	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	47 13:37 (WEA 4)	
11	08:41	13:04 (WEA 4)	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41	07:35	08:25	12:50 (WEA 4)	
12	16:37	47 13:51 (WEA 4)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:22	47 13:37 (WEA 4)	
13	08:40	13:05 (WEA 4)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42	07:37	08:26	12:51 (WEA 4)	
14	16:38	47 13:52 (WEA 4)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	48 13:39 (WEA 4)	
15	08:40	13:05 (WEA 4)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27	12:50 (WEA 4)	
16	16:39	47 13:52 (WEA 4)	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	18:56	16:54	16:22	49 13:40 (WEA 4)	
17	08:39	13:07 (WEA 4)	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46	07:41	08:28	12:50 (WEA 4)	
18	16:41	45 13:52 (WEA 4)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:21	49 13:39 (WEA 4)	
19	08:39	13:07 (WEA 4)	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:29	12:50 (WEA 4)	
20	16:42	45 13:52 (WEA 4)	17:36	18:27	20:21	21:12	21:51	21:52	21:09	20:02	18:52	16:50	16:21	50 13:40 (WEA 4)	
21	08:38	13:08 (WEA 4)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:44	08:31	12:52 (WEA 4)	
22	16:43	44 13:52 (WEA 4)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	49 13:41 (WEA 4)	
23	08:38	13:09 (WEA 4)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	12:52 (WEA 4)	
24	16:45	42 13:51 (WEA 4)	17:40	18:31	20:24	21:15	21:53	21:50	21:05	19:57	18:47	16:47	16:21	50 13:42 (WEA 4)	
25	08:37	13:10 (WEA 4)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	12:52 (WEA 4)	
26	16:46	41 13:51 (WEA 4)	17:41	18:32	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	50 13:42 (WEA 4)	
27	08:36	13:11 (WEA 4)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:54	07:50	08:34	12:52 (WEA 4)	
28	16:48	40 13:51 (WEA 4)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	51 13:43 (WEA 4)	
29	08:35	13:12 (WEA 4)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	08:34	12:53 (WEA 4)	
30	16:50	38 13:50 (WEA 4)	17:45	18:36	20:29	21:19	21:55	21:48	20:59	19:50	18:41	16:43	16:21	51 13:44 (WEA 4)	
31	08:34	13:13 (WEA 4)	07:48	06:47	06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53	08:35	12:52 (WEA 4)	
32	16:51	37 13:50 (WEA 4)	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:21	51 13:43 (WEA 4)	
33	08:34	13:15 (WEA 4)	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	08:36	12:53 (WEA 4)	
34	16:53	34 13:49 (WEA 4)	17:49	18:39	20:33	21:23	21:56	21:46	20:55	19:45	18:36	16:40	16:21	51 13:44 (WEA 4)	
35	08:33	13:16 (WEA 4)	07:44	06:42	06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57	08:37	12:54 (WEA 4)	
36	16:54	33 13:49 (WEA 4)	17:51	18:41	20:35	21:24	21:56	21:44	20:53	19:43	18:34	16:39	16:21	51 13:45 (WEA 4)	
37	08:32	13:18 (WEA 4)	07:42	06:40	06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:59	9 13:04 (WEA 4)	08:38	12:54 (WEA 4)
38	16:56	30 13:48 (WEA 4)	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	9 13:13 (WEA 4)	16:22	52 13:46 (WEA 4)
39	08:31	13:20 (WEA 4)	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	10 13:00 (WEA 4)	08:38	12:54 (WEA 4)
40	16:58	27 13:47 (WEA 4)	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	18 13:18 (WEA 4)	16:22	51 13:45 (WEA 4)
41	08:29	13:23 (WEA 4)	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	12 12:58 (WEA 4)	08:39	12:55 (WEA 4)
42	16:59	23 13:46 (WEA 4)	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36	18:28	16:35	23 13:21 (WEA 4)	16:22	51 13:46 (WEA 4)
43	08:28	13:25 (WEA 4)	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:08	08:04	12 12:56 (WEA 4)	08:39	12:55 (WEA 4)
44	17:01	18 13:43 (WEA 4)	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	27 13:23 (WEA 4)	16:23	51 13:46 (WEA 4)
45	08:27	13:30 (WEA 4)	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	12 12:55 (WEA 4)	08:40	12:56 (WEA 4)
46	17:03	9 13:39 (WEA 4)	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	18:24	16:33	30 13:25 (WEA 4)	16:23	51 13:47 (WEA 4)
47	08:26	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	08:02	12 12:53 (WEA 4)	08:40	12:56 (WEA 4)
48	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:31	33 13:26 (WEA 4)	16:24	51 13:47 (WEA 4)	
49	08:25	07:30	06:26	06:17	05:26	05:13	05:42	06:31	07:22	08:14	08:09	08:00	12 12:53 (WEA 4)	08:41	12:57 (WEA 4)
50	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:27	18:20	16:30	34 13:27 (WEA 4)	16:25	51 13:48 (WEA 4)	
51	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	12 12:52 (WEA 4)	08:41	12:57 (WEA 4)	
52	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:17	16:29	37 13:29 (WEA 4)	16:25	51 13:48 (WEA 4)	
53	08:22	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:17	08:12	12 12:52 (WEA 4)	08:41	12:58 (WEA 4)	
54	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:16	16:29	38 13:30 (WEA 4)	16:26	51 13:49 (WEA 4)	
55	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	12 12:51 (WEA 4)	08:41	12:59 (WEA 4)	
56	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:14	16:28	40 13:31 (WEA 4)	16:27	50 13:49 (WEA 4)	
57	08:19	07:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	09:13	10:05	12 12:51 (WEA 4)	08:42	12:59 (WEA 4)	
58	17:14	18:11	19:00	20:53	21:39	21:57	21:30	20:29	19:17	18:12	16:27	41 13:32 (WEA 4)	16:28	51 13:50 (WEA 4)	
59	08:18	07:15	06:07	05:21	05:15	05:50	06:40	07:31	08:23	09:16	10:08	12 12:51 (WEA 4)	08:42	13:00 (WEA 4)	
60	17:15	18:12	19:01	20:55	21:40	21:57	21:28	20:27	19:15	18:10	17:02	42 13:33 (WEA 4)	16:29	50 13:50 (WEA 4)	
61	08:16	07:12	06:04	05:20	05:14	05:49	06:39	07:30	08:22	09:15	10:07	12 12:51 (WEA 4)	08:42	13:01 (WEA 4)	
62	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:13	18:08	17:00	43 13:34 (WEA 4)	16:30	50 13:51 (WEA 4)	
63	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	372	243	1536
64	astr.max.mögl.Beschattung	894													

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

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

Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 05-SW - IP 05-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:42	12:57 (WEA 4)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:26	08:18	12:47 (WEA 4)		
2	16:31	49 13:46 (WEA 4)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	42 13:29 (WEA 4)		
3	08:42	12:59 (WEA 4)	08:11	07:17	07:05	06:01	05:18	05:17	05:56	06:46	07:36	07:30	08:21	12:46 (WEA 4)		
4	16:33	48 13:47 (WEA 4)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	45 13:31 (WEA 4)		
5	08:41	12:59 (WEA 4)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	12:47 (WEA 4)		
6	16:34	48 13:47 (WEA 4)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:23	45 13:32 (WEA 4)		
7	08:41	13:00 (WEA 4)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	12:46 (WEA 4)		
8	16:35	47 13:47 (WEA 4)	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	47 13:33 (WEA 4)		
9	08:40	13:00 (WEA 4)	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41	07:36	08:25	12:46 (WEA 4)		
10	16:37	47 13:47 (WEA 4)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:22	47 13:33 (WEA 4)		
11	08:40	13:01 (WEA 4)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42	07:37	08:26	12:47 (WEA 4)		
12	16:38	47 13:48 (WEA 4)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	47 13:34 (WEA 4)		
13	08:40	13:02 (WEA 4)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27	12:47 (WEA 4)		
14	16:39	45 13:47 (WEA 4)	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	18:56	16:54	16:22	48 13:35 (WEA 4)		
15	08:39	13:03 (WEA 4)	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46	07:41	08:28	12:47 (WEA 4)		
16	16:41	45 13:48 (WEA 4)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:21	48 13:35 (WEA 4)		
17	08:39	13:04 (WEA 4)	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:29	12:47 (WEA 4)		
18	16:42	44 13:48 (WEA 4)	17:36	18:27	20:21	21:12	21:51	21:52	21:09	20:02	18:52	16:50	16:21	49 13:36 (WEA 4)		
19	08:38	13:05 (WEA 4)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:44	08:31	12:48 (WEA 4)		
20	16:43	42 13:47 (WEA 4)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	49 13:37 (WEA 4)		
21	08:38	13:05 (WEA 4)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	12:48 (WEA 4)		
22	16:45	42 13:47 (WEA 4)	17:40	18:31	20:24	21:15	21:53	21:50	21:05	19:57	18:47	16:47	16:21	50 13:38 (WEA 4)		
23	08:37	13:06 (WEA 4)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	12:48 (WEA 4)		
24	16:46	41 13:47 (WEA 4)	17:41	18:32	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	50 13:38 (WEA 4)		
25	08:36	13:07 (WEA 4)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:54	07:50	08:34	12:49 (WEA 4)		
26	16:48	39 13:46 (WEA 4)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	50 13:39 (WEA 4)		
27	08:35	13:09 (WEA 4)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	08:34	12:49 (WEA 4)		
28	16:50	37 13:46 (WEA 4)	17:45	18:36	20:29	21:19	21:55	21:48	20:59	19:50	18:41	16:43	16:21	50 13:39 (WEA 4)		
29	08:34	13:10 (WEA 4)	07:48	06:47	06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53	08:35	12:49 (WEA 4)		
30	16:51	35 13:45 (WEA 4)	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:21	50 13:39 (WEA 4)		
31	08:34	13:11 (WEA 4)	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	08:36	12:49 (WEA 4)		
32	16:53	34 13:45 (WEA 4)	17:49	18:39	20:33	21:23	21:56	21:46	20:55	19:45	18:36	16:40	16:21	51 13:40 (WEA 4)		
33	08:33	13:13 (WEA 4)	07:44	06:42	06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57	08:37	12:50 (WEA 4)		
34	16:54	31 13:44 (WEA 4)	17:51	18:41	20:35	21:24	21:56	21:44	20:53	19:43	18:34	16:39	16:21	51 13:41 (WEA 4)		
35	08:32	13:15 (WEA 4)	07:42	06:40	06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:59	08:38	12:51 (WEA 4)		
36	16:56	28 13:43 (WEA 4)	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	16:22	50 13:41 (WEA 4)		
37	08:31	13:17 (WEA 4)	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	08:38	12:51 (WEA 4)		
38	16:58	25 13:42 (WEA 4)	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	14	13:12 (WEA 4)	16:22	50 13:41 (WEA 4)
39	08:29	13:20 (WEA 4)	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	08:39	12:51 (WEA 4)		
40	16:59	20 13:40 (WEA 4)	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36	18:28	16:35	20	13:15 (WEA 4)	16:22	51 13:42 (WEA 4)
41	08:28	13:23 (WEA 4)	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:08	08:04	08:39	12:51 (WEA 4)		
42	17:01	14 13:37 (WEA 4)	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	25	13:18 (WEA 4)	16:23	51 13:42 (WEA 4)
43	08:27	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	08:00	08:40	12:52 (WEA 4)		
44	17:03	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	18:24	16:33	28	13:20 (WEA 4)	16:23	50 13:43 (WEA 4)	
45	08:26	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	08:00	08:40	12:53 (WEA 4)		
46	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:31	31	13:21 (WEA 4)	16:24	50 13:43 (WEA 4)	
47	08:25	07:30	06:26	06:17	05:26	05:13	05:42	06:31	07:22	08:14	08:09	08:00	08:41	12:53 (WEA 4)		
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49	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	08:00	08:41	12:53 (WEA 4)		
50	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:17	16:29	35	13:24 (WEA 4)	16:25	51 13:44 (WEA 4)	
51	08:22	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:17	08:12	08:00	08:41	12:55 (WEA 4)		
52	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:16	16:29	37	13:26 (WEA 4)	16:26	50 13:45 (WEA 4)	
53	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	08:00	08:41	12:55 (WEA 4)		
54	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:14	16:28	39	13:26 (WEA 4)	16:27	50 13:45 (WEA 4)	
55	08:19	07:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	09:15	10:08	10:00	08:42	12:56 (WEA 4)		
56	17:14	18:11	19:00	20:53	21:39	21:57	21:30	20:29	19:17	18:12	16:27	41	13:28 (WEA 4)	16:28	50 13:46 (WEA 4)	
57	08:18	07:15	06:07	05:21	05:15	05:50	06:40	07:31	08:23	09:16	10:09	10:00	08:42	12:56 (WEA 4)		
58	17:15	18:12	19:01	20:55	21:40	21:57	21:28	20:27	19:15	18:10	16:26	42	13:29 (WEA 4)	16:29	50 13:46 (WEA 4)	
59	08:16	07:12	06:04	05:20	05:14	05:49	06:39	07:30	08:22	09:15	10:08	10:00	08:42	12:57 (WEA 4)		
60	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:13	18:08	17:00	16:00	16:30	49 13:46 (WEA 4)		
61	08:16	07:12	06:04	05:20	05:14	05:49	06:39	07:30	08:22	09:15	10:08	10:00	08:42	12:57 (WEA 4)		
62	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:13	18:08	17:00	16:00	16:30	49 13:46 (WEA 4)		
63	08:16	07:12	06:04	05:20	05:14	05:49	06:39	07:30	08:22	09:15	10:08	10:00	08:42	12:57 (WEA 4)		
64	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:13	18:08	17:00	16:00	16:30	49 13:46 (WEA 4)		
65	08:16	07:12	06:04	05:20	05:14	05:49	06:39	07:30	08:22	09:15	10:08	10:00	08:42	12:57 (WEA 4)		
66	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:13	18:08	17:00	16:00	16:30	49 13:46 (WEA 4)		
67	08:16	07:12	06:04	05:20	05:14	05:49	06:39	07:30	08:22	09:15	10:08	10:00	08:42	12:57 (WEA 4)		
68	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:13	18:08	17:00	16:00	16:30	49 13:46 (WEA 4)		
69	08:16	07:12	06:04	05:20	05:14	05:49	06:39	07:30	08:22	09:15	10:08	10:00	08:42	12:57 (WEA 4)		
70	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:13	18:08	17:00	16:00	16:30	49 13:46		

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 06a-SO - IP 06a-SO
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	13:16 (WEA 4)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:26	08:18	13:05 (WEA 4)
2	16:31	14:05 (WEA 4)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	13:49 (WEA 4)
3	08:42	13:17 (WEA 4)	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34	07:28	08:19	13:06 (WEA 4)
4	16:32	14:06 (WEA 4)	17:21	18:13	20:07	20:58	21:44	21:57	21:23	20:20	19:10	17:04	16:25	13:50 (WEA 4)
5	08:42	13:18 (WEA 4)	08:11	07:17	07:05	06:01	05:18	05:17	05:56	06:46	07:36	07:30	08:21	13:05 (WEA 4)
6	16:33	14:06 (WEA 4)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	13:51 (WEA 4)
7	08:41	13:18 (WEA 4)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	13:06 (WEA 4)
8	16:34	14:06 (WEA 4)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:23	13:52 (WEA 4)
9	08:41	13:19 (WEA 4)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	13:05 (WEA 4)
10	16:35	14:07 (WEA 4)	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	13:52 (WEA 4)
11	08:41	13:19 (WEA 4)	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41	07:35	08:25	13:05 (WEA 4)
12	16:37	14:06 (WEA 4)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:22	13:53 (WEA 4)
13	08:40	13:20 (WEA 4)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42	07:37	08:26	13:06 (WEA 4)
14	16:38	14:07 (WEA 4)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	13:54 (WEA 4)
15	08:40	13:20 (WEA 4)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27	13:06 (WEA 4)
16	16:39	14:07 (WEA 4)	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	18:56	16:54	16:22	13:54 (WEA 4)
17	08:39	13:22 (WEA 4)	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46	07:41	08:28	13:06 (WEA 4)
18	16:41	14:08 (WEA 4)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:21	13:55 (WEA 4)
19	08:39	13:22 (WEA 4)	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:29	13:06 (WEA 4)
20	16:42	14:07 (WEA 4)	17:36	18:27	20:21	21:12	21:51	21:52	21:09	20:02	18:52	16:50	16:21	13:55 (WEA 4)
21	08:38	13:23 (WEA 4)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:44	08:31	13:07 (WEA 4)
22	16:43	14:07 (WEA 4)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	13:56 (WEA 4)
23	08:38	13:24 (WEA 4)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	13:07 (WEA 4)
24	16:45	14:07 (WEA 4)	17:40	18:31	20:24	21:15	21:53	21:50	21:05	19:57	18:47	16:47	16:21	13:57 (WEA 4)
25	08:37	13:25 (WEA 4)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	13:07 (WEA 4)
26	16:46	14:07 (WEA 4)	17:41	18:32	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	13:57 (WEA 4)
27	08:36	13:26 (WEA 4)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:54	07:50	08:34	13:08 (WEA 4)
28	16:48	14:06 (WEA 4)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	13:58 (WEA 4)
29	08:35	13:27 (WEA 4)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	08:34	13:08 (WEA 4)
30	16:50	14:06 (WEA 4)	17:45	18:36	20:29	21:19	21:55	21:48	20:59	19:50	18:41	16:43	16:21	13:59 (WEA 4)
31	08:34	13:28 (WEA 4)	07:48	06:47	06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53	08:35	13:08 (WEA 4)
32	16:51	14:06 (WEA 4)	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:21	13:58 (WEA 4)
33	08:34	13:29 (WEA 4)	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	08:36	13:08 (WEA 4)
34	16:53	14:05 (WEA 4)	17:49	18:39	20:33	21:23	21:56	21:46	20:55	19:45	18:36	16:40	16:21	13:59 (WEA 4)
35	08:33	13:31 (WEA 4)	07:44	06:42	06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57	08:37	13:09 (WEA 4)
36	16:54	14:05 (WEA 4)	17:51	18:41	20:35	21:24	21:56	21:44	20:53	19:43	18:34	16:39	16:21	14:00 (WEA 4)
37	08:32	13:32 (WEA 4)	07:42	06:40	06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:59	5	13:26 (WEA 4)
38	16:56	14:04 (WEA 4)	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	16	13:32 (WEA 4)
39	08:31	13:34 (WEA 4)	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	17	13:13 (WEA 4)
40	16:58	14:03 (WEA 4)	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	22	13:35 (WEA 4)
41	08:29	13:37 (WEA 4)	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	23	13:12 (WEA 4)
42	16:59	14:02 (WEA 4)	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36	18:28	16:35	25	13:37 (WEA 4)
43	08:28	13:38 (WEA 4)	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:08	08:04	26	13:10 (WEA 4)
44	17:01	14:00 (WEA 4)	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	29	13:39 (WEA 4)
45	08:27	13:42 (WEA 4)	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	30	13:09 (WEA 4)
46	17:03	13:58 (WEA 4)	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	18:24	16:33	32	13:41 (WEA 4)
47	08:26	13:47 (WEA 4)	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	33	13:08 (WEA 4)
48	17:05	13:52 (WEA 4)	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:31	34	13:42 (WEA 4)
49	08:25	13:50 (WEA 4)	07:30	06:26	06:17	05:26	05:13	05:42	06:31	07:22	08:14	08:09	35	13:07 (WEA 4)
50	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26	18:14	17:06	16:30	36	13:43 (WEA 4)
51	08:23	14:02 (WEA 4)	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	37	13:07 (WEA 4)
52	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:12	17:04	16:29	38	13:45 (WEA 4)
53	08:22	14:03 (WEA 4)	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:17	08:12	39	13:07 (WEA 4)
54	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:10	17:02	16:29	40	13:46 (WEA 4)
55	08:21	14:04 (WEA 4)	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	41	13:06 (WEA 4)
56	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:07	17:00	16:28	42	13:46 (WEA 4)
57	08:19	14:05 (WEA 4)	07:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	09:13	09:08	43	13:06 (WEA 4)
58	17:14	18:11	19:00	20:53	21:39	21:57	21:30	20:29	19:17	18:05	17:00	16:27	44	13:48 (WEA 4)
59	08:18	14:06 (WEA 4)	07:15	06:07	05:21	05:15	05:50	06:40	07:31	08:23	09:15	09:10	45	13:06 (WEA 4)
60	17:15	18:12	19:01	20:52	21:40	21:57	21:28	20:27	19:15	18:03	17:00	16:26	46	13:49 (WEA 4)
61	08:16	14:07 (WEA 4)	07:12	06:04	05:20	05:14	05:51	06:41	07:32	08:24	09:16	09:11	47	13:06 (WEA 4)
62	17:17	18:14	19:03	20:54	21:42	21:59	21:26	20:25	19:13	18:01	17:00	16:27	48	13:49 (WEA 4)
63	08:16	14:08 (WEA 4)	07:11	06:03	05:19	05:13	05:52	06:42	07:33	08:25	09:17	09:12	49	13:06 (WEA 4)
64	17:18	18:15	19:04	20:55	21:43	21:60	21:27	20:26	19:14	18:02	17:01	16:28	50	13:50 (WEA 4)
65	08:16	14:09 (WEA 4)	07:10	06:02	05:18	05:12	05:53	06:43	07:34	08:26	09:18	09:13	51	13:06 (WEA 4)
66	17:19	18:16	19:05	20:56	21:44	21:61	21:28	20:27	19:15	18:03	17:02	16:29	52	13:51 (WEA 4)
67	08:16	14:10 (WEA 4)	07:09	06:01	05:17	05:11	05:54	06:44	07:35	08:27	09:19	09:14	53	13:06 (WEA 4)
68	17:20	18:17	19:06	20:57	21:45	21:62	21:29	20:28	19:16	18:04	17:03	16:30	54	13:52 (WEA 4)
69	08:16	14:11 (WEA 4)	07:08	06:00	05:16	05:10	05:55	06:45	07:36	08:28	09:20	09:15	55	13:06 (WEA 4)
70	17:21	18:18	19:07	20:58	21:46	21:63	21:30	20:29	19:17	18:05	17:04	16:31	56	13:53 (WEA 4)
71	08:16	14:12 (WEA 4)	07:07	06:00	05:16	05:10	05:56	06:46	07:37	08:29	09:21	09:16	57	13:06 (WEA 4)
72	17:22	18:19	19:08	20:59	21:47	21:64	21:31	20:30	19:18	18:06	17:05	16:32	58	13:54 (WEA 4)
73	08:16	14:13 (WEA 4)	07:06	06:00	05:16	05:10	05:57	06:47	07:38	08:30	09:22	09:17	59	13:06 (WEA 4)
74	17:23	18:20	19:09	21:00	21:48	21:65	21:32	20:31	19:19	18:07	17:06	16:33	60	13:55 (WEA 4)
75	08:16</													

Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 06a-SW - IP 06a-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember					
1	08:42	13:12 (WEA 4)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:26	08:18	13:02 (WEA 4)			
2	16:31	48 14:00 (WEA 4)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	42 13:44 (WEA 4)			
3	08:42	13:14 (WEA 4)	08:11	07:17	07:05	06:01	05:18	05:17	05:56	06:46	07:36	07:30	08:21	13:01 (WEA 4)			
4	16:33	47 14:01 (WEA 4)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	44 13:45 (WEA 4)			
5	08:41	13:14 (WEA 4)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	13:02 (WEA 4)			
6	16:34	47 14:01 (WEA 4)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:23	45 13:47 (WEA 4)			
7	08:41	13:15 (WEA 4)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	13:01 (WEA 4)			
8	16:35	47 14:02 (WEA 4)	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	46 13:47 (WEA 4)			
9	08:41	13:15 (WEA 4)	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41	07:35	08:25	13:01 (WEA 4)			
10	16:37	46 14:01 (WEA 4)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:22	46 13:47 (WEA 4)			
11	08:40	13:16 (WEA 4)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42	07:37	08:26	13:02 (WEA 4)			
12	16:38	46 14:02 (WEA 4)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	47 13:49 (WEA 4)			
13	08:40	13:17 (WEA 4)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27	13:02 (WEA 4)			
14	16:39	45 14:02 (WEA 4)	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	18:56	16:54	16:22	47 13:49 (WEA 4)			
15	08:39	13:18 (WEA 4)	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46	07:41	08:28	13:02 (WEA 4)			
16	16:41	44 14:02 (WEA 4)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:21	47 13:49 (WEA 4)			
17	08:39	13:19 (WEA 4)	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:29	13:02 (WEA 4)			
18	16:42	43 14:02 (WEA 4)	17:36	18:27	20:21	21:12	21:51	21:52	21:09	20:02	18:52	16:50	16:21	48 13:50 (WEA 4)			
19	08:38	13:19 (WEA 4)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:44	08:31	13:03 (WEA 4)			
20	16:43	43 14:02 (WEA 4)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	48 13:51 (WEA 4)			
21	08:38	13:20 (WEA 4)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	13:03 (WEA 4)			
22	16:45	41 14:01 (WEA 4)	17:40	18:31	20:24	21:15	21:53	21:50	21:05	19:57	18:47	16:47	16:21	49 13:52 (WEA 4)			
23	08:37	13:21 (WEA 4)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	13:03 (WEA 4)			
24	16:46	40 14:01 (WEA 4)	17:41	18:32	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	49 13:52 (WEA 4)			
25	08:36	13:22 (WEA 4)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:54	07:50	08:34	13:04 (WEA 4)			
26	16:48	39 14:01 (WEA 4)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	49 13:53 (WEA 4)			
27	08:35	13:23 (WEA 4)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	08:34	13:04 (WEA 4)			
28	16:50	37 14:00 (WEA 4)	17:45	18:36	20:29	21:19	21:55	21:48	20:59	19:50	18:41	16:43	16:21	49 13:53 (WEA 4)			
29	08:34	13:25 (WEA 4)	07:48	06:47	06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53	08:35	13:04 (WEA 4)			
30	16:51	35 14:00 (WEA 4)	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:21	49 13:53 (WEA 4)			
31	08:34	13:26 (WEA 4)	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	08:36	13:04 (WEA 4)			
32	16:53	33 13:59 (WEA 4)	17:49	18:39	20:33	21:23	21:56	21:46	20:55	19:45	18:36	16:40	16:21	50 13:54 (WEA 4)			
33	08:33	13:28 (WEA 4)	07:44	06:42	06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57	08:37	13:05 (WEA 4)			
34	16:54	31 13:59 (WEA 4)	17:51	18:41	20:35	21:24	21:56	21:44	20:53	19:43	18:34	16:39	16:21	50 13:55 (WEA 4)			
35	08:32	13:30 (WEA 4)	07:42	06:40	06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:59	13:19 (WEA 4)	08:38	13:06 (WEA 4)		
36	16:56	28 13:58 (WEA 4)	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	1	13:20 (WEA 4)	16:22	50 13:56 (WEA 4)	
37	08:31	13:32 (WEA 4)	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	13:12 (WEA 4)	08:38	13:06 (WEA 4)		
38	16:58	25 13:57 (WEA 4)	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	15	13:27 (WEA 4)	16:22	49 13:55 (WEA 4)	
39	08:29	13:35 (WEA 4)	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	13:10 (WEA 4)	08:39	13:07 (WEA 4)		
40	16:59	20 13:55 (WEA 4)	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36	18:28	16:35	20	13:30 (WEA 4)	16:22	49 13:56 (WEA 4)	
41	08:28	13:37 (WEA 4)	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:08	08:04	13:08 (WEA 4)	08:39	13:07 (WEA 4)		
42	17:01	15 13:52 (WEA 4)	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	25	13:33 (WEA 4)	16:23	49 13:56 (WEA 4)	
43	08:27	13:45 (WEA 4)	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	13:07 (WEA 4)	08:40	13:08 (WEA 4)		
44	17:03	1	13:46 (WEA 4)	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	18:24	16:33	28	13:35 (WEA 4)	16:23	49 13:57 (WEA 4)
45	08:26	17:05	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	13:05 (WEA 4)	08:40	13:08 (WEA 4)		
46	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:31	31	13:36 (WEA 4)	16:24	49 13:57 (WEA 4)		
47	08:25	07:30	06:26	06:17	05:26	05:13	05:42	06:31	07:22	07:14	08:09	13:04 (WEA 4)	08:41	13:08 (WEA 4)	16:25	50 13:58 (WEA 4)	
48	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26	18:20	16:30	33	13:37 (WEA 4)	16:25	50 13:58 (WEA 4)		
49	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	07:16	08:10	13:04 (WEA 4)	08:41	13:08 (WEA 4)	16:25	50 13:58 (WEA 4)	
50	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:18	16:29	35	13:39 (WEA 4)	16:25	50 13:58 (WEA 4)		
51	08:22	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	07:17	08:12	13:03 (WEA 4)	08:41	13:10 (WEA 4)	16:26	49 13:59 (WEA 4)	
52	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:16	16:29	37	13:40 (WEA 4)	16:26	49 13:59 (WEA 4)		
53	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	07:19	08:13	13:02 (WEA 4)	08:41	13:10 (WEA 4)	16:27	49 13:59 (WEA 4)	
54	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:14	16:28	39	13:41 (WEA 4)	16:27	49 13:59 (WEA 4)		
55	08:19	07:17	06:09	05:22	05:15	05:48	06:38	07:29	07:21	08:15	13:02 (WEA 4)	08:42	13:11 (WEA 4)	16:28	49 14:00 (WEA 4)		
56	17:14	18:11	19:00	20:53	21:39	21:57	21:30	20:29	19:17	18:12	16:27	40	13:42 (WEA 4)	16:28	49 14:00 (WEA 4)		
57	08:18	07:15	06:07	05:21	05:15	05:50	06:40	07:31	07:23	08:16	13:02 (WEA 4)	08:42	13:11 (WEA 4)	16:29	49 14:00 (WEA 4)		
58	17:15	18:12	19:01	20:52	21:40	21:57	21:28	20:27	19:15	18:10	16:26	41	13:43 (WEA 4)	16:29	49 14:00 (WEA 4)		
59	08:16	07:12	06:04	05:20	05:14	05:49	06:39	07:30	07:22	08:15	13:02 (WEA 4)	08:42	13:12 (WEA 4)	16:30	49 14:01 (WEA 4)		
60	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:13	18:08	16:30	49	14:01 (WEA 4)	16:30	49 14:01 (WEA 4)		
61	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	345	243	1488		
62	astr.max.mögl.Beschattung	849															

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

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

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 06b-SO - IP 06b-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember			
1	08:42	13:20 (WEA 4)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:26	08:18	13:10 (WEA 4)	
2	16:31	14:09 (WEA 4)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	13:53 (WEA 4)	
3	08:42	13:22 (WEA 4)	08:11	07:17	07:05	06:01	05:18	05:17	05:56	06:46	07:36	07:30	08:21	13:10 (WEA 4)	
4	16:33	14:10 (WEA 4)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	13:54 (WEA 4)	
5	08:41	13:22 (WEA 4)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	13:10 (WEA 4)	
6	16:34	14:10 (WEA 4)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:23	13:55 (WEA 4)	
7	08:41	13:23 (WEA 4)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	13:10 (WEA 4)	
8	16:35	14:10 (WEA 4)	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	13:56 (WEA 4)	
9	08:41	13:23 (WEA 4)	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41	07:35	08:25	13:10 (WEA 4)	
10	16:37	14:10 (WEA 4)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:22	13:56 (WEA 4)	
11	08:40	13:25 (WEA 4)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42	07:37	08:26	13:10 (WEA 4)	
12	16:38	14:11 (WEA 4)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	13:57 (WEA 4)	
13	08:40	13:25 (WEA 4)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27	13:10 (WEA 4)	
14	16:39	14:10 (WEA 4)	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	18:56	16:54	16:22	13:58 (WEA 4)	
15	08:39	13:26 (WEA 4)	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46	07:41	08:28	13:10 (WEA 4)	
16	16:41	14:11 (WEA 4)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:21	13:58 (WEA 4)	
17	08:39	13:27 (WEA 4)	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:29	13:10 (WEA 4)	
18	16:42	14:11 (WEA 4)	17:36	18:27	20:21	21:12	21:51	21:52	21:09	20:02	18:52	16:50	16:21	13:59 (WEA 4)	
19	08:38	13:28 (WEA 4)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:44	08:28	13:10 (WEA 4)	
20	16:43	14:11 (WEA 4)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	14:00 (WEA 4)	
21	08:38	13:28 (WEA 4)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	13:12 (WEA 4)	
22	16:45	14:10 (WEA 4)	17:40	18:31	20:24	21:15	21:53	21:50	21:05	19:57	18:47	16:47	16:21	14:00 (WEA 4)	
23	08:37	13:29 (WEA 4)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	13:12 (WEA 4)	
24	16:46	14:10 (WEA 4)	17:41	18:32	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	14:01 (WEA 4)	
25	08:36	13:30 (WEA 4)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:54	07:50	08:34	13:12 (WEA 4)	
26	16:48	14:10 (WEA 4)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	14:02 (WEA 4)	
27	08:35	13:31 (WEA 4)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	08:34	13:13 (WEA 4)	
28	16:50	14:09 (WEA 4)	17:45	18:36	20:29	21:19	21:55	21:48	20:59	19:50	18:41	16:43	16:21	14:02 (WEA 4)	
29	08:34	13:32 (WEA 4)	07:48	06:47	06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53	08:35	13:12 (WEA 4)	
30	16:51	14:09 (WEA 4)	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:21	14:02 (WEA 4)	
31	08:34	13:34 (WEA 4)	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	08:36	13:13 (WEA 4)	
32	16:53	14:09 (WEA 4)	17:49	18:39	20:33	21:23	21:56	21:46	20:55	19:45	18:36	16:40	16:21	14:03 (WEA 4)	
33	08:33	13:35 (WEA 4)	07:44	06:42	06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57	08:37	13:14 (WEA 4)	
34	16:54	14:08 (WEA 4)	17:51	18:41	20:35	21:24	21:56	21:44	20:53	19:43	18:34	16:39	16:21	14:03 (WEA 4)	
35	08:32	13:37 (WEA 4)	07:42	06:40	06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:59	13:22 (WEA 4)	08:38	
36	16:56	14:07 (WEA 4)	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	12	13:34 (WEA 4)	16:22
37	08:31	13:39 (WEA 4)	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	13:14 (WEA 4)	08:38	
38	16:58	14:06 (WEA 4)	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	19	13:38 (WEA 4)	16:22
39	08:29	13:42 (WEA 4)	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	13:17 (WEA 4)	08:39	
40	16:59	14:05 (WEA 4)	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36	18:28	16:35	23	13:40 (WEA 4)	16:22
41	08:28	13:44 (WEA 4)	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:08	08:04	13:15 (WEA 4)	08:39	
42	17:01	14:03 (WEA 4)	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	27	13:42 (WEA 4)	16:23
43	08:27	13:48 (WEA 4)	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	13:14 (WEA 4)	08:40	
44	17:03	14:00 (WEA 4)	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	18:24	16:33	30	13:44 (WEA 4)	16:23
45	08:26	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	08:02	13:13 (WEA 4)	08:40	
46	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:31	32	13:45 (WEA 4)	16:24	
47	08:25	07:30	06:26	06:17	05:26	05:13	05:42	06:31	07:22	08:14	08:09	08:04	13:12 (WEA 4)	08:41	
48	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26	18:16	17:06	16:30	35	13:47 (WEA 4)	16:25
49	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	08:05	13:12 (WEA 4)	08:41	
50	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:14	17:04	16:29	36	13:48 (WEA 4)	16:25
51	08:22	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:17	08:12	08:07	13:11 (WEA 4)	08:41	
52	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:12	17:02	16:29	39	13:50 (WEA 4)	16:26
53	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	08:08	13:10 (WEA 4)	08:41	
54	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:08	17:04	16:28	40	13:50 (WEA 4)	16:27
55	08:19	07:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	09:13	10:05	10:00	13:10 (WEA 4)	08:42	
56	17:14	18:11	19:00	20:00	20:53	21:39	21:57	21:30	20:29	19:17	18:06	16:27	41	13:51 (WEA 4)	16:28
57	08:18	07:15	06:07	05:21	05:15	05:50	06:40	07:31	08:23	09:15	10:07	10:02	13:10 (WEA 4)	08:42	
58	17:15	18:12	19:01	20:02	20:55	21:40	21:57	21:28	20:27	19:15	18:04	16:26	42	13:52 (WEA 4)	16:29
59	08:16	07:12	06:04	05:18	05:12	05:47	06:37	07:28	08:20	09:12	10:04	10:00	13:10 (WEA 4)	08:42	
60	17:17	18:14	19:03	20:04	21:00	21:42	21:26	20:25	19:13	18:02	16:28	16:28	16:30	14:09 (WEA 4)	
Sonnenscheinstunden	258		277	367	416	486	500	503	454	381	331	266	243		
astr.max.mögl.Beschattung	887										376		1498		

Tabellen-Layout: Die Daten für jeden Tag 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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 07-SO - IP 07-SO
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März	April	Mai	Juni		
1	08:42 16:31	13:11 (WEA 4) 14:10 (WEA 4)	08:15 17:19	13:43 (WEA 4) 14:00 (WEA 4)	07:21 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	13:11 (WEA 4) 14:10 (WEA 4)	08:13 17:21		07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44
3	08:42 16:33	13:12 (WEA 4) 14:11 (WEA 4)	08:11 17:23		07:17 18:15	07:05 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	13:12 (WEA 4) 14:11 (WEA 4)	08:10 17:25		07:14 18:16	07:03 20:11	05:59 21:02	05:17 21:46
5	08:41 16:35	13:13 (WEA 4) 14:11 (WEA 4)	08:08 17:26		07:12 18:18	07:01 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	13:13 (WEA 4) 14:11 (WEA 4)	08:06 17:28		07:10 18:20	06:58 20:14	05:55 21:05	05:15 21:48
7	08:40 16:38	13:14 (WEA 4) 14:12 (WEA 4)	08:05 17:30		07:08 18:22	06:56 20:16	05:54 21:07	05:15 21:49
8	08:40 16:39	13:14 (WEA 4) 14:12 (WEA 4)	08:03 17:32		07:05 18:24	06:54 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	13:15 (WEA 4) 14:13 (WEA 4)	08:01 17:34		07:03 18:25	06:52 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	13:16 (WEA 4) 14:13 (WEA 4)	07:59 17:36		07:01 18:27	06:49 20:21	05:48 21:12	05:13 21:51
11	08:38 16:43	13:16 (WEA 4) 14:13 (WEA 4)	07:58 17:38		06:59 18:29	06:47 20:23	05:47 21:13	05:13 21:52
12	08:38 16:45	13:16 (WEA 4) 14:13 (WEA 4)	07:56 17:40		06:56 18:31	06:45 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	13:17 (WEA 4) 14:13 (WEA 4)	07:54 17:41		06:54 18:32	06:43 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	13:17 (WEA 4) 14:13 (WEA 4)	07:52 17:43		06:52 18:34	06:40 20:28	05:42 21:18	05:12 21:54
15	08:35 16:50	13:18 (WEA 4) 14:13 (WEA 4)	07:50 17:45		06:49 18:36	06:38 20:29	05:40 21:19	05:12 21:55
16	08:34 16:51	13:19 (WEA 4) 14:14 (WEA 4)	07:48 17:47		06:47 18:38	06:36 20:31	05:39 21:21	05:12 21:55
17	08:34 16:53	13:20 (WEA 4) 14:14 (WEA 4)	07:46 17:49		06:45 18:39	06:34 20:33	05:37 21:23	05:12 21:56
18	08:33 16:54	13:20 (WEA 4) 14:14 (WEA 4)	07:44 17:51		06:42 18:41	06:32 20:35	05:36 21:24	05:12 21:56
19	08:32 16:56	13:21 (WEA 4) 14:14 (WEA 4)	07:42 17:53		06:40 18:43	06:29 20:36	05:34 21:26	05:12 21:57
20	08:31 16:58	13:22 (WEA 4) 14:14 (WEA 4)	07:40 17:55		06:38 18:45	06:27 20:38	05:33 21:27	05:12 21:57
21	08:29 16:59	13:24 (WEA 4) 14:14 (WEA 4)	07:38 17:56		06:35 18:46	06:25 20:40	05:31 21:28	05:12 21:57
22	08:28 17:01	13:24 (WEA 4) 14:13 (WEA 4)	07:36 17:58		06:33 18:48	06:23 20:41	05:30 21:30	05:12 21:57
23	08:27 17:03	13:25 (WEA 4) 14:13 (WEA 4)	07:34 18:00		06:31 18:50	06:21 20:43	05:29 21:31	05:12 21:57
24	08:26 17:05	13:26 (WEA 4) 14:12 (WEA 4)	07:32 18:02		06:29 18:52	06:19 20:45	05:28 21:33	05:13 21:58
25	08:25 17:06	13:28 (WEA 4) 14:11 (WEA 4)	07:30 18:04		06:26 18:53	06:17 20:46	05:26 21:34	05:13 21:58
26	08:23 17:08	13:29 (WEA 4) 14:11 (WEA 4)	07:27 18:06		06:24 18:55	06:15 20:48	05:25 21:35	05:13 21:58
27	08:22 17:10	13:30 (WEA 4) 14:10 (WEA 4)	07:25 18:07		06:22 18:57	06:13 20:50	05:24 21:37	05:14 21:58
28	08:21 17:12	13:33 (WEA 4) 14:09 (WEA 4)	07:23 18:09		06:19 18:58	06:11 20:52	05:23 21:38	05:14 21:57
29	08:19 17:14	13:34 (WEA 4) 14:07 (WEA 4)			07:17 20:00	06:09 20:53	05:22 21:39	05:15 21:57
30	08:18 17:15	13:36 (WEA 4) 14:05 (WEA 4)			07:15 20:02	06:07 20:55	05:21 21:40	05:15 21:57
31	08:16 17:17	13:40 (WEA 4) 14:03 (WEA 4)			07:12 20:04		05:20 21:42	
Sonnenscheinstunden	258		277		367	416	486	500
astr.max.mögl.Beschattung	1571		17					

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 07-SO - IP 07-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November		Dezember
1	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:13	07:26 17:06		08:18 16:25 57 12:58 (WEA 4)
2	05:17 21:57	05:54 21:23	06:45 20:20	07:34 19:10	07:28 17:04		08:19 16:25 57 12:59 (WEA 4)
3	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02		08:21 16:24 58 12:58 (WEA 4)
4	05:18 21:56	05:58 21:20	06:48 20:16	07:37 19:06	07:32 17:01		08:22 16:23 58 12:59 (WEA 4)
5	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03	07:34 16:59		08:23 16:23 58 12:59 (WEA 4)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	07:35 16:57		08:25 16:22 58 12:59 (WEA 4)
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59	07:37 16:55		08:26 16:22 59 13:00 (WEA 4)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	07:39 16:54		08:27 16:22 59 13:00 (WEA 4)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52	2 13:21 (WEA 4)	08:28 16:21 59 13:00 (WEA 4)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	18 13:23 (WEA 4)	08:29 16:21 59 13:00 (WEA 4)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	25 13:10 (WEA 4)	08:31 16:21 59 13:02 (WEA 4)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	29 13:35 (WEA 4)	08:32 16:21 59 14:01 (WEA 4)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	33 13:08 (WEA 4)	08:33 16:21 59 13:02 (WEA 4)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	36 13:39 (WEA 4)	08:34 16:21 59 13:03 (WEA 4)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	40 13:05 (WEA 4)	08:34 16:21 59 14:02 (WEA 4)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	42 13:41 (WEA 4)	08:35 16:21 59 13:03 (WEA 4)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	44 13:02 (WEA 4)	08:36 16:21 59 13:04 (WEA 4)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	46 13:45 (WEA 4)	08:37 16:21 59 14:03 (WEA 4)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	48 13:00 (WEA 4)	08:38 16:22 59 13:05 (WEA 4)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	49 13:47 (WEA 4)	08:38 16:22 59 14:04 (WEA 4)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	50 12:59 (WEA 4)	08:39 16:23 59 13:06 (WEA 4)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	51 13:48 (WEA 4)	08:39 16:23 59 13:06 (WEA 4)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	53 13:50 (WEA 4)	08:40 16:23 59 13:07 (WEA 4)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	55 13:51 (WEA 4)	08:40 16:24 59 13:07 (WEA 4)
25	05:42 21:35	06:31 20:38	07:22 19:27	08:13 18:20	08:09 16:30	54 12:57 (WEA 4)	08:41 16:25 59 13:07 (WEA 4)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 18:18	08:10 16:29	54 13:52 (WEA 4)	08:41 16:25 59 13:08 (WEA 4)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 18:16	08:12 16:29	55 13:53 (WEA 4)	08:41 16:26 59 14:07 (WEA 4)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 18:14	08:13 16:28	55 12:58 (WEA 4)	08:41 16:26 59 13:09 (WEA 4)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 18:12	08:15 16:27	56 13:51 (WEA 4)	08:42 16:27 59 14:08 (WEA 4)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 18:10	08:16 16:26	56 12:58 (WEA 4)	08:42 16:28 59 13:10 (WEA 4)
31	05:51 21:26	06:41 20:25	07:32 19:14	08:25 18:08	08:17 16:25	57 13:54 (WEA 4)	08:42 16:29 59 14:09 (WEA 4)
Sonnenscheinstunden	503	454	381	331	266		243 1821
astr.max.mögl.Beschattung					952		

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 07-SW - IP 07-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni		
1	08:42 16:31	13:07 (WEA 4) 14:06 (WEA 4)	08:15 17:19	13:42 (WEA 4) 13:53 (WEA 4)	07:21 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	13:08 (WEA 4) 14:06 (WEA 4)	08:13 17:21	07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44	05:18 21:44
3	08:42 16:33	13:08 (WEA 4) 14:07 (WEA 4)	08:11 17:23	07:17 18:15	07:05 20:09	06:01 21:00	05:18 21:45	05:18 21:45
4	08:41 16:34	13:08 (WEA 4) 14:07 (WEA 4)	08:10 17:25	07:14 18:16	07:03 20:11	05:59 21:02	05:17 21:46	05:17 21:46
5	08:41 16:35	13:09 (WEA 4) 14:08 (WEA 4)	08:08 17:26	07:12 18:18	07:01 20:12	05:57 21:03	05:16 21:47	05:16 21:47
6	08:41 16:37	13:09 (WEA 4) 14:07 (WEA 4)	08:06 17:28	07:10 18:20	06:58 20:14	05:55 21:05	05:15 21:48	05:15 21:48
7	08:40 16:38	13:10 (WEA 4) 14:08 (WEA 4)	08:05 17:30	07:08 18:22	06:56 20:16	05:54 21:07	05:15 21:49	05:15 21:49
8	08:40 16:39	13:10 (WEA 4) 14:08 (WEA 4)	08:03 17:32	07:05 18:24	06:54 20:17	05:52 21:08	05:14 21:50	05:14 21:50
9	08:39 16:41	13:12 (WEA 4) 14:09 (WEA 4)	08:01 17:34	07:03 18:25	06:52 20:19	05:50 21:10	05:14 21:51	05:14 21:51
10	08:39 16:42	13:12 (WEA 4) 14:09 (WEA 4)	07:59 17:36	07:01 18:27	06:49 20:21	05:48 21:12	05:13 21:51	05:13 21:51
11	08:38 16:43	13:12 (WEA 4) 14:09 (WEA 4)	07:58 17:38	06:59 18:29	06:47 20:23	05:47 21:13	05:13 21:52	05:13 21:52
12	08:38 16:45	13:13 (WEA 4) 14:09 (WEA 4)	07:56 17:40	06:56 18:31	06:45 20:24	05:45 21:15	05:13 21:53	05:13 21:53
13	08:37 16:46	13:13 (WEA 4) 14:09 (WEA 4)	07:54 17:41	06:54 18:32	06:43 20:26	05:43 21:16	05:12 21:54	05:12 21:54
14	08:36 16:48	13:14 (WEA 4) 14:09 (WEA 4)	07:52 17:43	06:52 18:34	06:40 20:28	05:42 21:18	05:12 21:54	05:12 21:54
15	08:35 16:50	13:15 (WEA 4) 14:09 (WEA 4)	07:50 17:45	06:49 18:36	06:38 20:29	05:40 21:19	05:12 21:55	05:12 21:55
16	08:34 16:51	13:15 (WEA 4) 14:09 (WEA 4)	07:48 17:47	06:47 18:38	06:36 20:31	05:39 21:21	05:12 21:55	05:12 21:55
17	08:34 16:53	13:16 (WEA 4) 14:10 (WEA 4)	07:46 17:49	06:45 18:39	06:34 20:33	05:37 21:23	05:12 21:56	05:12 21:56
18	08:33 16:54	13:17 (WEA 4) 14:10 (WEA 4)	07:44 17:51	06:42 18:41	06:32 20:35	05:36 21:24	05:12 21:56	05:12 21:56
19	08:32 16:56	13:18 (WEA 4) 14:10 (WEA 4)	07:42 17:53	06:40 18:43	06:29 20:36	05:34 21:26	05:12 21:57	05:12 21:57
20	08:31 16:58	13:19 (WEA 4) 14:10 (WEA 4)	07:40 17:55	06:38 18:45	06:27 20:38	05:33 21:27	05:12 21:57	05:12 21:57
21	08:29 16:59	13:20 (WEA 4) 14:10 (WEA 4)	07:38 17:56	06:35 18:46	06:25 20:40	05:31 21:28	05:12 21:57	05:12 21:57
22	08:28 17:01	13:21 (WEA 4) 14:09 (WEA 4)	07:36 17:58	06:33 18:48	06:23 20:41	05:30 21:30	05:12 21:57	05:12 21:57
23	08:27 17:03	13:22 (WEA 4) 14:08 (WEA 4)	07:34 18:00	06:31 18:50	06:21 20:43	05:29 21:31	05:12 21:57	05:12 21:57
24	08:26 17:05	13:23 (WEA 4) 14:07 (WEA 4)	07:32 18:02	06:29 18:52	06:19 20:45	05:28 21:33	05:13 21:58	05:13 21:58
25	08:25 17:06	13:25 (WEA 4) 14:07 (WEA 4)	07:30 18:04	06:26 18:53	06:17 20:46	05:26 21:34	05:13 21:58	05:13 21:58
26	08:23 17:08	13:27 (WEA 4) 14:07 (WEA 4)	07:27 18:06	06:24 18:55	06:15 20:48	05:25 21:35	05:13 21:58	05:13 21:58
27	08:22 17:10	13:28 (WEA 4) 14:05 (WEA 4)	07:25 18:07	06:22 18:57	06:13 20:50	05:24 21:37	05:14 21:58	05:14 21:58
28	08:21 17:12	13:30 (WEA 4) 14:04 (WEA 4)	07:23 18:09	06:19 18:58	06:11 20:52	05:23 21:38	05:14 21:57	05:14 21:57
29	08:19 17:14	13:32 (WEA 4) 14:02 (WEA 4)	07:21 18:09	06:17 20:00	06:09 20:53	05:22 21:39	05:15 21:57	05:15 21:57
30	08:18 17:15	13:34 (WEA 4) 14:00 (WEA 4)	07:19 18:09	06:15 20:02	06:07 20:55	05:21 21:40	05:15 21:57	05:15 21:57
31	08:16 17:17	13:38 (WEA 4) 13:58 (WEA 4)	07:17 18:09	06:13 20:04	06:05 20:57	05:19 21:42	05:14 21:56	05:14 21:56
Sonnenscheinstunden	258	277	367	416	486	500		
astr.max.mögl.Beschattung	1541	11						

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 07-SW - IP 07-SW
Annahmen für Schattenwurfberechnung

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

	July	August	September	Oktober	November		Dezember
1	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:13	07:26 17:06		08:18 16:25 57 12:54 (WEA 4)
2	05:17 21:57	05:54 21:23	06:45 20:20	07:34 19:10	07:28 17:04		08:19 16:25 57 12:55 (WEA 4)
3	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02		08:21 16:24 57 12:55 (WEA 4)
4	05:18 21:56	05:58 21:20	06:48 20:16	07:37 19:06	07:32 17:01		08:22 16:23 57 12:56 (WEA 4)
5	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03	07:34 16:59		08:23 16:23 58 12:55 (WEA 4)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	07:35 16:57		08:25 16:22 59 12:55 (WEA 4)
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59	07:37 16:55		08:26 16:22 59 12:56 (WEA 4)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	07:39 16:54		08:27 16:22 59 12:56 (WEA 4)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52		08:28 16:21 58 12:57 (WEA 4)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	12 13:13 (WEA 4)	08:29 16:21 58 12:57 (WEA 4)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	21 13:25 (WEA 4)	08:31 16:21 59 12:58 (WEA 4)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	26 13:08 (WEA 4)	08:32 16:21 59 12:58 (WEA 4)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	31 13:29 (WEA 4)	08:33 16:21 59 12:59 (WEA 4)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	34 13:06 (WEA 4)	08:34 16:21 59 12:59 (WEA 4)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	37 13:36 (WEA 4)	08:34 16:21 59 13:00 (WEA 4)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	41 13:38 (WEA 4)	08:35 16:21 59 13:00 (WEA 4)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	42 12:59 (WEA 4)	08:36 16:21 59 13:01 (WEA 4)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	44 13:41 (WEA 4)	08:37 16:21 59 13:01 (WEA 4)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	46 13:41 (WEA 4)	08:38 16:22 58 14:00 (WEA 4)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	48 13:42 (WEA 4)	08:38 16:22 59 14:00 (WEA 4)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	50 13:44 (WEA 4)	08:39 16:23 59 14:01 (WEA 4)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	51 12:55 (WEA 4)	08:39 16:23 59 14:02 (WEA 4)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	52 12:55 (WEA 4)	08:40 16:23 59 14:03 (WEA 4)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	53 13:47 (WEA 4)	08:40 16:24 59 14:04 (WEA 4)
25	05:42 21:35	06:31 20:38	07:22 19:27	08:14 18:20	08:09 16:30	54 13:47 (WEA 4)	08:41 16:25 59 14:05 (WEA 4)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 18:18	08:10 16:29	55 12:55 (WEA 4)	08:41 16:25 59 14:06 (WEA 4)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 18:16	08:12 16:29	54 13:49 (WEA 4)	08:41 16:26 59 14:07 (WEA 4)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 18:14	08:13 16:28	54 13:49 (WEA 4)	08:41 16:26 59 14:08 (WEA 4)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 18:12	08:15 16:27	55 13:49 (WEA 4)	08:42 16:27 58 14:09 (WEA 4)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 18:10	08:16 16:26	56 12:54 (WEA 4)	08:42 16:28 59 14:10 (WEA 4)
31	05:51 21:26	06:41 20:25	07:32 19:14	08:25 18:08	08:18 16:25	56 13:50 (WEA 4)	08:42 16:29 58 14:11 (WEA 4)
Sonnenscheinstunden	503	454	381	331	266		243
astr.max.mögl.Beschattung					918		1815

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 08-SO - IP 08-SO
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März	April	Mai	Juni		
1	08:42 16:31	14:31 (WEA 4) 15:17 (WEA 4)	08:15 17:19	14:45 (WEA 4) 15:25 (WEA 4)	07:21 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	14:32 (WEA 4) 15:17 (WEA 4)	08:13 17:21	14:46 (WEA 4) 15:24 (WEA 4)	07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44
3	08:41 16:33	14:32 (WEA 4) 15:18 (WEA 4)	08:11 17:23	14:48 (WEA 4) 15:24 (WEA 4)	07:17 18:15	07:05 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	14:32 (WEA 4) 15:18 (WEA 4)	08:10 17:25	14:49 (WEA 4) 15:22 (WEA 4)	07:14 18:16	07:03 20:10	05:59 21:02	05:17 21:46
5	08:41 16:35	14:32 (WEA 4) 15:19 (WEA 4)	08:08 17:26	14:50 (WEA 4) 15:21 (WEA 4)	07:12 18:18	07:01 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	14:32 (WEA 4) 15:19 (WEA 4)	08:06 17:28	14:52 (WEA 4) 15:19 (WEA 4)	07:10 18:20	06:58 20:14	05:55 21:05	05:15 21:48
7	08:40 16:38	14:33 (WEA 4) 15:21 (WEA 4)	08:05 17:30	14:55 (WEA 4) 15:17 (WEA 4)	07:08 18:22	06:56 20:16	05:54 21:07	05:15 21:49
8	08:40 16:39	14:33 (WEA 4) 15:21 (WEA 4)	08:03 17:32	14:58 (WEA 4) 15:13 (WEA 4)	07:05 18:24	06:54 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	14:34 (WEA 4) 15:22 (WEA 4)	08:01 17:34	14:59 (WEA 4) 15:11 (WEA 4)	07:03 18:25	06:52 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	14:34 (WEA 4) 15:22 (WEA 4)	07:59 17:36	14:59 (WEA 4) 15:10 (WEA 4)	07:01 18:27	06:49 20:21	05:48 21:12	05:13 21:51
11	08:38 16:43	14:34 (WEA 4) 15:23 (WEA 4)	07:58 17:38	14:59 (WEA 4) 15:09 (WEA 4)	06:59 18:29	06:47 20:23	05:47 21:13	05:13 21:52
12	08:38 16:45	14:34 (WEA 4) 15:23 (WEA 4)	07:56 17:40	14:59 (WEA 4) 15:08 (WEA 4)	06:56 18:31	06:45 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	14:34 (WEA 4) 15:23 (WEA 4)	07:54 17:41	14:59 (WEA 4) 15:07 (WEA 4)	06:54 18:32	06:43 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	14:34 (WEA 4) 15:24 (WEA 4)	07:52 17:43	14:59 (WEA 4) 15:06 (WEA 4)	06:52 18:34	06:40 20:28	05:42 21:18	05:12 21:54
15	08:35 16:50	14:34 (WEA 4) 15:24 (WEA 4)	07:50 17:45	14:59 (WEA 4) 15:05 (WEA 4)	06:49 18:36	06:38 20:29	05:40 21:19	05:12 21:55
16	08:34 16:51	14:35 (WEA 4) 15:25 (WEA 4)	07:48 17:47	14:59 (WEA 4) 15:04 (WEA 4)	06:47 18:38	06:36 20:31	05:39 21:21	05:12 21:55
17	08:34 16:53	14:35 (WEA 4) 15:25 (WEA 4)	07:46 17:49	14:59 (WEA 4) 15:03 (WEA 4)	06:45 18:39	06:34 20:33	05:37 21:23	05:12 21:56
18	08:33 16:54	14:36 (WEA 4) 15:26 (WEA 4)	07:44 17:51	14:59 (WEA 4) 15:02 (WEA 4)	06:42 18:41	06:32 20:35	05:36 21:24	05:12 21:56
19	08:32 16:56	14:36 (WEA 4) 15:26 (WEA 4)	07:42 17:53	14:59 (WEA 4) 15:01 (WEA 4)	06:40 18:43	06:29 20:36	05:34 21:26	05:12 21:57
20	08:31 16:58	14:37 (WEA 4) 15:27 (WEA 4)	07:40 17:54	14:59 (WEA 4) 15:00 (WEA 4)	06:38 18:45	06:27 20:38	05:33 21:27	05:12 21:57
21	08:29 16:59	14:37 (WEA 4) 15:27 (WEA 4)	07:38 17:56	14:59 (WEA 4) 14:59 (WEA 4)	06:35 18:46	06:25 20:40	05:31 21:28	05:12 21:57
22	08:28 17:01	14:37 (WEA 4) 15:27 (WEA 4)	07:36 17:58	14:59 (WEA 4) 14:59 (WEA 4)	06:33 18:48	06:23 20:41	05:30 21:30	05:12 21:57
23	08:27 17:03	14:38 (WEA 4) 15:27 (WEA 4)	07:34 18:00	14:59 (WEA 4) 14:59 (WEA 4)	06:31 18:50	06:21 20:43	05:29 21:31	05:12 21:57
24	08:26 17:05	14:38 (WEA 4) 15:27 (WEA 4)	07:32 18:02	14:59 (WEA 4) 14:59 (WEA 4)	06:29 18:52	06:19 20:45	05:28 21:33	05:13 21:58
25	08:25 17:06	14:39 (WEA 4) 15:27 (WEA 4)	07:30 18:04	14:59 (WEA 4) 14:59 (WEA 4)	06:26 18:53	06:17 20:46	05:26 21:34	05:13 21:58
26	08:23 17:08	14:40 (WEA 4) 15:28 (WEA 4)	07:27 18:06	14:59 (WEA 4) 14:59 (WEA 4)	06:24 18:55	06:15 20:48	05:25 21:35	05:13 21:58
27	08:22 17:10	14:40 (WEA 4) 15:27 (WEA 4)	07:25 18:07	14:59 (WEA 4) 14:59 (WEA 4)	06:22 18:57	06:13 20:50	05:24 21:37	05:14 21:58
28	08:21 17:12	14:40 (WEA 4) 15:26 (WEA 4)	07:23 18:09	14:59 (WEA 4) 14:59 (WEA 4)	06:19 18:58	06:11 20:52	05:23 21:38	05:14 21:57
29	08:19 17:14	14:42 (WEA 4) 15:26 (WEA 4)	18:09	14:59 (WEA 4) 14:59 (WEA 4)	07:17 20:00	06:09 20:53	05:22 21:39	05:15 21:57
30	08:18 17:15	14:42 (WEA 4) 15:26 (WEA 4)		14:59 (WEA 4) 14:59 (WEA 4)	07:15 20:02	06:07 20:55	05:21 21:40	05:15 21:57
31	08:16 17:17	14:44 (WEA 4) 15:26 (WEA 4)		14:59 (WEA 4) 14:59 (WEA 4)	07:12 20:04		05:20 21:42	
Sonnenscheinstunden	258		277	367	416	486	500	
astr.max.mögl.Beschattung	1483		242					

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 08-SO - IP 08-SO
Annahmen für Schattenwurfberechnung

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

	July	August	September	Oktober	November		Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:12	07:26 17:06		08:18 16:25	49 14:16 (WEA 4)
2	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10	07:28 17:04		08:19 16:25	48 14:17 (WEA 4)
3	05:17 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02	16	14:27 (WEA 4) 14:43 (WEA 4)	48 14:17 (WEA 4) 15:05 (WEA 4)
4	05:18 21:56	05:58 21:20	06:48 20:15	07:37 19:06	07:32 17:01	23	14:24 (WEA 4) 14:47 (WEA 4)	48 14:18 (WEA 4) 15:06 (WEA 4)
5	05:19 21:55	05:59 21:18	06:49 20:13	07:39 19:03	07:34 16:59	27	14:22 (WEA 4) 14:49 (WEA 4)	48 14:18 (WEA 4) 15:06 (WEA 4)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	07:35 16:57	31	14:20 (WEA 4) 14:51 (WEA 4)	48 14:18 (WEA 4) 15:06 (WEA 4)
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59	07:37 16:55	34	14:18 (WEA 4) 14:52 (WEA 4)	46 14:20 (WEA 4) 15:06 (WEA 4)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	07:39 16:54	37	14:17 (WEA 4) 14:54 (WEA 4)	46 14:20 (WEA 4) 15:06 (WEA 4)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52	39	14:16 (WEA 4) 14:55 (WEA 4)	46 14:20 (WEA 4) 15:06 (WEA 4)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	41	14:15 (WEA 4) 14:56 (WEA 4)	45 14:21 (WEA 4) 15:06 (WEA 4)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	42	14:15 (WEA 4) 14:57 (WEA 4)	46 14:22 (WEA 4) 15:08 (WEA 4)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	44	14:14 (WEA 4) 14:58 (WEA 4)	45 14:23 (WEA 4) 15:08 (WEA 4)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	44	14:14 (WEA 4) 14:58 (WEA 4)	45 14:23 (WEA 4) 15:08 (WEA 4)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	46	14:13 (WEA 4) 14:59 (WEA 4)	44 14:24 (WEA 4) 15:08 (WEA 4)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	47	14:13 (WEA 4) 15:00 (WEA 4)	44 14:24 (WEA 4) 15:08 (WEA 4)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	47	14:13 (WEA 4) 15:00 (WEA 4)	44 14:24 (WEA 4) 15:08 (WEA 4)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	48	14:13 (WEA 4) 15:01 (WEA 4)	44 14:25 (WEA 4) 15:09 (WEA 4)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	49	14:12 (WEA 4) 15:01 (WEA 4)	44 14:26 (WEA 4) 15:10 (WEA 4)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	49	14:12 (WEA 4) 15:01 (WEA 4)	43 14:27 (WEA 4) 15:10 (WEA 4)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	50	14:12 (WEA 4) 15:02 (WEA 4)	43 14:27 (WEA 4) 15:10 (WEA 4)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	50	14:12 (WEA 4) 15:02 (WEA 4)	43 14:28 (WEA 4) 15:11 (WEA 4)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	50	14:13 (WEA 4) 15:03 (WEA 4)	43 14:28 (WEA 4) 15:11 (WEA 4)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	50	14:13 (WEA 4) 15:03 (WEA 4)	43 14:29 (WEA 4) 15:12 (WEA 4)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	50	14:13 (WEA 4) 15:03 (WEA 4)	43 14:29 (WEA 4) 15:12 (WEA 4)
25	05:42 21:35	06:31 20:38	07:22 19:26	07:14 17:20	08:09 16:30	50	14:13 (WEA 4) 15:03 (WEA 4)	43 14:29 (WEA 4) 15:12 (WEA 4)
26	05:44 21:34	06:33 20:36	07:24 19:24	07:16 17:18	08:10 16:29	50	14:14 (WEA 4) 15:04 (WEA 4)	44 14:29 (WEA 4) 15:13 (WEA 4)
27	05:45 21:33	06:35 20:33	07:26 19:22	07:17 17:16	08:12 16:29	50	14:14 (WEA 4) 15:04 (WEA 4)	44 14:30 (WEA 4) 15:14 (WEA 4)
28	05:47 21:31	06:36 20:31	07:27 19:19	07:19 17:14	08:13 16:28	50	14:14 (WEA 4) 15:04 (WEA 4)	45 14:30 (WEA 4) 15:15 (WEA 4)
29	05:48 21:30	06:38 20:29	07:29 19:17	07:21 17:12	08:15 16:27	50	14:15 (WEA 4) 15:05 (WEA 4)	45 14:31 (WEA 4) 15:15 (WEA 4)
30	05:50 21:28	06:40 20:27	07:31 19:15	07:23 17:10	08:16 16:26	49	14:16 (WEA 4) 15:05 (WEA 4)	45 14:31 (WEA 4) 15:16 (WEA 4)
31	05:51 21:26	06:41 20:25		07:25 17:08			08:42 16:30	46 14:31 (WEA 4) 15:17 (WEA 4)
Sonnenscheinstunden	503	454	381	331	266		243	
astr.max.mögl.Beschattung					1213		1397	

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 08-SW - IP 08-SW
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März	April	Mai	Juni	
1	08:42 16:31	14:26 (WEA 4) 15:13 (WEA 4)	08:15 17:19	14:42 (WEA 4) 15:19 (WEA 4)	07:21 18:11	07:10 20:05	06:05 21:43
2	08:42 16:32	14:26 (WEA 4) 15:13 (WEA 4)	08:13 17:21	14:43 (WEA 4) 15:18 (WEA 4)	07:19 18:13	07:08 20:07	06:03 21:44
3	08:41 16:33	14:27 (WEA 4) 15:14 (WEA 4)	08:11 17:23	14:45 (WEA 4) 15:17 (WEA 4)	07:17 18:15	07:05 20:09	06:01 21:45
4	08:41 16:34	14:27 (WEA 4) 15:14 (WEA 4)	08:10 17:25	14:47 (WEA 4) 15:16 (WEA 4)	07:14 18:16	07:03 20:10	05:59 21:46
5	08:41 16:35	14:27 (WEA 4) 15:15 (WEA 4)	08:08 17:26	14:49 (WEA 4) 15:14 (WEA 4)	07:12 18:18	07:01 20:12	05:57 21:47
6	08:41 16:37	14:27 (WEA 4) 15:15 (WEA 4)	08:06 17:28	14:51 (WEA 4) 15:11 (WEA 4)	07:10 18:20	06:58 20:14	05:55 21:48
7	08:40 16:38	14:28 (WEA 4) 15:17 (WEA 4)	08:05 17:30	14:55 (WEA 4) 15:08 (WEA 4)	07:08 18:22	06:56 20:16	05:54 21:49
8	08:40 16:39	14:28 (WEA 4) 15:17 (WEA 4)	08:03 17:32	14:55 (WEA 4) 15:08 (WEA 4)	07:05 18:24	06:54 20:17	05:52 21:50
9	08:39 16:41	14:29 (WEA 4) 15:18 (WEA 4)	08:01 17:34	14:55 (WEA 4) 15:08 (WEA 4)	07:03 18:25	06:52 20:19	05:50 21:51
10	08:39 16:42	14:29 (WEA 4) 15:18 (WEA 4)	07:59 17:36	14:55 (WEA 4) 15:08 (WEA 4)	07:01 18:27	06:49 20:21	05:48 21:51
11	08:38 16:43	14:29 (WEA 4) 15:18 (WEA 4)	07:58 17:38	14:55 (WEA 4) 15:08 (WEA 4)	06:59 18:29	06:47 20:23	05:47 21:52
12	08:38 16:45	14:29 (WEA 4) 15:19 (WEA 4)	07:56 17:40	14:55 (WEA 4) 15:08 (WEA 4)	06:56 18:31	06:45 20:24	05:45 21:53
13	08:37 16:46	14:29 (WEA 4) 15:19 (WEA 4)	07:54 17:41	14:55 (WEA 4) 15:08 (WEA 4)	06:54 18:32	06:43 20:26	05:43 21:54
14	08:36 16:48	14:29 (WEA 4) 15:19 (WEA 4)	07:52 17:43	14:55 (WEA 4) 15:08 (WEA 4)	06:52 18:34	06:40 20:28	05:42 21:54
15	08:35 16:50	14:30 (WEA 4) 15:20 (WEA 4)	07:50 17:45	14:55 (WEA 4) 15:08 (WEA 4)	06:49 18:36	06:38 20:29	05:40 21:55
16	08:34 16:51	14:30 (WEA 4) 15:20 (WEA 4)	07:48 17:47	14:55 (WEA 4) 15:08 (WEA 4)	06:47 18:38	06:36 20:31	05:39 21:55
17	08:34 16:53	14:31 (WEA 4) 15:21 (WEA 4)	07:46 17:49	14:55 (WEA 4) 15:08 (WEA 4)	06:45 18:39	06:34 20:33	05:37 21:56
18	08:33 16:54	14:31 (WEA 4) 15:21 (WEA 4)	07:44 17:51	14:55 (WEA 4) 15:08 (WEA 4)	06:42 18:41	06:32 20:35	05:36 21:56
19	08:32 16:56	14:32 (WEA 4) 15:22 (WEA 4)	07:42 17:53	14:55 (WEA 4) 15:08 (WEA 4)	06:40 18:43	06:29 20:36	05:34 21:57
20	08:31 16:58	14:32 (WEA 4) 15:22 (WEA 4)	07:40 17:54	14:55 (WEA 4) 15:08 (WEA 4)	06:38 18:45	06:27 20:38	05:33 21:57
21	08:29 16:59	14:33 (WEA 4) 15:22 (WEA 4)	07:38 17:56	14:55 (WEA 4) 15:08 (WEA 4)	06:35 18:46	06:25 20:40	05:31 21:57
22	08:28 17:01	14:33 (WEA 4) 15:22 (WEA 4)	07:36 17:58	14:55 (WEA 4) 15:08 (WEA 4)	06:33 18:48	06:23 20:41	05:30 21:57
23	08:27 17:03	14:34 (WEA 4) 15:22 (WEA 4)	07:34 18:00	14:55 (WEA 4) 15:08 (WEA 4)	06:31 18:50	06:21 20:43	05:29 21:57
24	08:26 17:05	14:34 (WEA 4) 15:22 (WEA 4)	07:32 18:02	14:55 (WEA 4) 15:08 (WEA 4)	06:29 18:52	06:19 20:45	05:28 21:58
25	08:25 17:06	14:35 (WEA 4) 15:22 (WEA 4)	07:30 18:04	14:55 (WEA 4) 15:08 (WEA 4)	06:26 18:53	06:17 20:46	05:26 21:58
26	08:23 17:08	14:36 (WEA 4) 15:22 (WEA 4)	07:27 18:06	14:55 (WEA 4) 15:08 (WEA 4)	06:24 18:55	06:15 20:48	05:25 21:58
27	08:22 17:10	14:36 (WEA 4) 15:22 (WEA 4)	07:25 18:07	14:55 (WEA 4) 15:08 (WEA 4)	06:22 18:57	06:13 20:50	05:24 21:58
28	08:21 17:12	14:37 (WEA 4) 15:21 (WEA 4)	07:23 18:09	14:55 (WEA 4) 15:08 (WEA 4)	06:19 18:58	06:11 20:52	05:23 21:57
29	08:19 17:14	14:38 (WEA 4) 15:21 (WEA 4)	18:09	14:55 (WEA 4) 15:08 (WEA 4)	07:17 20:00	06:09 20:53	05:22 21:57
30	08:18 17:15	14:39 (WEA 4) 15:20 (WEA 4)		14:55 (WEA 4) 15:08 (WEA 4)	07:15 20:02	06:07 20:55	05:21 21:57
31	08:16 17:17	14:41 (WEA 4) 15:20 (WEA 4)		14:55 (WEA 4) 15:08 (WEA 4)	07:12 20:04	06:05 21:42	05:20
Sonnenscheinstunden	258			367	416	486	500
astr.max.mögl.Beschattung	1479	277	191				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 08-SW - IP 08-SW
Annahmen für Schattenwurfberechnung

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

	July	August	September	Oktober	November		Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:12	07:26 17:06		08:18 16:25	50 14:11 (WEA 4)
2	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10	07:28 17:04		08:19 16:25	49 14:12 (WEA 4)
3	05:17 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02		08:21 16:24	49 14:12 (WEA 4)
4	05:18 21:56	05:58 21:20	06:48 20:15	07:37 19:06	07:32 17:01	14	14:24 (WEA 4) 14:38 (WEA 4)	08:22 16:23
5	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03	07:34 16:59	21	14:20 (WEA 4) 14:41 (WEA 4)	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	07:35 16:57	26	14:18 (WEA 4) 14:44 (WEA 4)	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59	07:37 16:55	30	14:16 (WEA 4) 14:46 (WEA 4)	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	07:39 16:54	32	14:15 (WEA 4) 14:47 (WEA 4)	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52	36	14:13 (WEA 4) 14:49 (WEA 4)	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	38	14:12 (WEA 4) 14:50 (WEA 4)	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	40	14:11 (WEA 4) 14:51 (WEA 4)	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	41	14:11 (WEA 4) 14:52 (WEA 4)	08:32 16:21
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	43	14:10 (WEA 4) 14:53 (WEA 4)	08:33 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	44	14:10 (WEA 4) 14:54 (WEA 4)	08:34 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	46	14:09 (WEA 4) 14:55 (WEA 4)	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	46	14:09 (WEA 4) 14:55 (WEA 4)	08:35 16:21
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	47	14:09 (WEA 4) 14:56 (WEA 4)	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	48	14:08 (WEA 4) 14:56 (WEA 4)	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	48	14:08 (WEA 4) 14:56 (WEA 4)	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	49	14:08 (WEA 4) 14:57 (WEA 4)	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	49	14:08 (WEA 4) 14:57 (WEA 4)	08:39 16:22
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	50	14:08 (WEA 4) 14:58 (WEA 4)	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	50	14:09 (WEA 4) 14:59 (WEA 4)	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	50	14:08 (WEA 4) 14:58 (WEA 4)	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	08:14 17:20	08:09 16:30	50	14:09 (WEA 4) 14:59 (WEA 4)	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18	08:10 16:29	50	14:09 (WEA 4) 14:59 (WEA 4)	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16	08:12 16:29	50	14:10 (WEA 4) 15:00 (WEA 4)	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14	08:13 16:28	50	14:10 (WEA 4) 15:00 (WEA 4)	08:41 16:27
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12	08:15 16:27	50	14:10 (WEA 4) 15:00 (WEA 4)	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	08:16 16:26	50	14:11 (WEA 4) 15:01 (WEA 4)	08:42 16:29
31	05:51 21:26	06:41 20:25		07:25 17:08				08:42 16:30
Sonnenscheinstunden	503	454	381	331	266		243	
astr.max.mögl.Beschattung					1148			1446

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 09-SO - IP 09-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni		
1	08:42 16:31	14:32 (WEA 4) 08:15	08:15 17:19	14:20 (WEA 4) 07:21	15:31 (WEA 4) 18:11	14:40 (WEA 4) 07:10	06:05 20:57	05:19 21:43
2	08:42 16:32	14:32 (WEA 4) 08:13	08:13 17:21	14:20 (WEA 4) 07:19	15:31 (WEA 4) 18:13	14:44 (WEA 4) 07:08	06:03 20:58	05:18 21:44
3	08:41 16:33	14:32 (WEA 4) 08:11	08:11 17:23	14:20 (WEA 4) 07:17	15:32 (WEA 4) 18:15	14:50 (WEA 4) 07:05	06:01 20:59	05:18 21:45
4	08:41 16:34	15:01 (WEA 4) 17:23	08:10 17:25	15:32 (WEA 4) 18:16	14:20 (WEA 4) 07:14	15:06 (WEA 4) 20:09	06:01 21:00	05:17 21:46
5	08:41 16:35	14:31 (WEA 4) 08:08	08:08 17:26	14:20 (WEA 4) 07:12	15:32 (WEA 4) 18:18	07:03 20:11	05:59 21:02	05:17 21:47
6	08:41 16:35	15:04 (WEA 4) 17:26	08:06 17:26	14:20 (WEA 4) 07:10	15:32 (WEA 4) 18:18	07:01 20:12	05:57 21:03	05:16 21:47
7	08:41 16:37	14:30 (WEA 4) 08:06	08:06 17:28	14:20 (WEA 4) 07:10	15:32 (WEA 4) 18:20	06:58 20:14	05:55 21:05	05:15 21:48
8	08:40 16:38	15:04 (WEA 4) 17:28	08:05 17:30	14:20 (WEA 4) 07:08	15:32 (WEA 4) 18:22	06:56 20:16	05:54 21:07	05:15 21:49
9	08:40 16:39	15:06 (WEA 4) 17:30	08:03 17:32	14:20 (WEA 4) 07:05	15:32 (WEA 4) 18:24	06:54 20:17	05:52 21:08	05:14 21:50
10	08:39 16:40	14:29 (WEA 4) 08:01	08:01 17:34	14:20 (WEA 4) 07:03	15:32 (WEA 4) 18:25	06:52 20:19	05:50 21:10	05:14 21:51
11	08:39 16:41	14:28 (WEA 4) 07:59	07:59 17:36	14:21 (WEA 4) 07:01	15:32 (WEA 4) 18:27	06:49 20:21	05:48 21:12	05:13 21:51
12	08:38 16:42	14:27 (WEA 4) 07:58	07:58 17:38	14:21 (WEA 4) 06:59	15:33 (WEA 4) 18:29	06:47 20:23	05:47 21:13	05:13 21:52
13	08:38 16:43	15:11 (WEA 4) 17:38	07:56 17:40	14:21 (WEA 4) 06:56	15:33 (WEA 4) 18:31	06:45 20:24	05:45 21:15	05:13 21:53
14	08:37 16:44	15:12 (WEA 4) 17:40	07:54 17:42	14:22 (WEA 4) 06:54	15:33 (WEA 4) 18:32	06:43 20:26	05:43 21:16	05:12 21:54
15	08:37 16:46	14:26 (WEA 4) 07:52	07:52 17:41	14:22 (WEA 4) 06:52	15:33 (WEA 4) 18:34	06:40 20:28	05:42 21:18	05:12 21:54
16	08:36 16:48	15:15 (WEA 4) 17:43	07:50 17:43	14:22 (WEA 4) 06:49	15:33 (WEA 4) 18:34	06:38 20:28	05:40 21:18	05:12 21:54
17	08:35 16:50	14:25 (WEA 4) 07:50	07:50 17:45	14:22 (WEA 4) 06:49	15:32 (WEA 4) 18:36	06:38 20:29	05:40 21:19	05:12 21:55
18	08:34 16:51	14:25 (WEA 4) 07:48	07:48 17:47	14:23 (WEA 4) 06:47	15:32 (WEA 4) 18:38	06:36 20:31	05:39 21:21	05:12 21:55
19	08:34 16:51	15:17 (WEA 4) 17:47	07:46 17:47	14:23 (WEA 4) 06:45	15:32 (WEA 4) 18:38	06:34 20:31	05:37 21:21	05:12 21:55
20	08:34 16:53	14:24 (WEA 4) 07:46	07:46 17:49	14:23 (WEA 4) 06:45	15:30 (WEA 4) 18:39	06:34 20:33	05:37 21:23	05:12 21:56
21	08:33 16:53	15:18 (WEA 4) 17:49	07:44 17:49	14:23 (WEA 4) 06:42	15:30 (WEA 4) 18:41	06:32 20:35	05:36 21:24	05:12 21:56
22	08:33 16:54	15:19 (WEA 4) 17:51	07:44 17:51	14:23 (WEA 4) 06:42	15:30 (WEA 4) 18:41	06:32 20:35	05:36 21:24	05:12 21:56
23	08:32 16:54	14:24 (WEA 4) 07:42	07:42 17:51	14:24 (WEA 4) 06:40	15:30 (WEA 4) 18:41	06:29 20:35	05:34 21:24	05:12 21:56
24	08:32 16:56	15:21 (WEA 4) 17:53	07:42 17:53	14:24 (WEA 4) 06:40	15:29 (WEA 4) 18:43	06:29 20:36	05:34 21:26	05:12 21:57
25	08:31 16:56	14:24 (WEA 4) 07:40	07:40 17:53	14:25 (WEA 4) 06:38	15:29 (WEA 4) 18:43	06:27 20:36	05:33 21:26	05:12 21:57
26	08:31 16:58	15:22 (WEA 4) 17:55	07:40 17:55	14:25 (WEA 4) 06:38	15:29 (WEA 4) 18:45	06:27 20:38	05:33 21:27	05:12 21:57
27	08:29 16:58	14:23 (WEA 4) 07:38	07:38 17:55	14:26 (WEA 4) 06:35	15:29 (WEA 4) 18:45	06:25 20:38	05:31 21:27	05:12 21:57
28	08:29 16:59	15:23 (WEA 4) 17:56	07:38 17:56	14:26 (WEA 4) 06:35	15:28 (WEA 4) 18:46	06:25 20:40	05:31 21:28	05:12 21:57
29	08:28 17:01	14:22 (WEA 4) 07:36	07:36 17:58	14:28 (WEA 4) 06:33	15:28 (WEA 4) 18:48	06:23 20:41	05:30 21:30	05:12 21:57
30	08:28 17:01	15:23 (WEA 4) 17:58	07:36 17:58	14:28 (WEA 4) 06:33	15:27 (WEA 4) 18:48	06:23 20:41	05:30 21:30	05:12 21:57
31	08:27 17:03	14:22 (WEA 4) 07:34	07:34 18:00	14:29 (WEA 4) 06:31	15:26 (WEA 4) 18:50	06:21 20:43	05:29 21:31	05:12 21:57
32	08:26 17:03	15:25 (WEA 4) 18:00	07:32 18:00	14:31 (WEA 4) 06:29	15:26 (WEA 4) 18:50	06:19 20:43	05:28 21:31	05:13 21:57
33	08:26 17:05	14:22 (WEA 4) 07:32	07:32 18:02	14:31 (WEA 4) 06:29	15:25 (WEA 4) 18:52	06:19 20:45	05:28 21:33	05:13 21:58
34	08:25 17:05	15:25 (WEA 4) 18:02	07:30 18:02	14:31 (WEA 4) 06:26	15:25 (WEA 4) 18:52	06:17 20:45	05:26 21:33	05:13 21:58
35	08:25 17:06	14:22 (WEA 4) 07:30	07:30 18:04	14:31 (WEA 4) 06:26	15:25 (WEA 4) 18:52	06:17 20:46	05:26 21:34	05:13 21:58
36	08:25 17:06	15:26 (WEA 4) 18:04	07:28 18:04	15:23 (WEA 4) 18:53	15:23 (WEA 4) 18:53	06:15 20:46	05:25 21:34	05:13 21:58
37	08:23 17:08	14:22 (WEA 4) 07:27	07:27 18:06	14:33 (WEA 4) 06:24	15:23 (WEA 4) 18:53	06:15 20:48	05:25 21:35	05:13 21:58
38	08:22 17:08	15:27 (WEA 4) 18:06	07:25 18:06	15:21 (WEA 4) 18:55	15:21 (WEA 4) 18:55	06:13 20:48	05:24 21:35	05:14 21:58
39	08:22 17:10	14:21 (WEA 4) 07:25	07:25 18:07	14:36 (WEA 4) 06:22	15:20 (WEA 4) 18:57	06:13 20:50	05:24 21:37	05:14 21:58
40	08:21 17:10	15:28 (WEA 4) 18:07	07:23 18:07	15:20 (WEA 4) 18:57	15:20 (WEA 4) 18:57	06:11 20:50	05:23 21:37	05:14 21:58
41	08:21 17:12	14:20 (WEA 4) 07:23	07:23 18:09	14:38 (WEA 4) 06:19	15:18 (WEA 4) 18:58	06:11 20:52	05:23 21:38	05:14 21:57
42	08:21 17:12	15:28 (WEA 4) 18:09	07:21 18:09	15:18 (WEA 4) 18:58	15:18 (WEA 4) 18:58	06:09 20:52	05:22 21:38	05:15 21:57
43	08:19 17:14	14:21 (WEA 4) 07:21	07:21 18:11	15:17 (WEA 4) 18:59	15:17 (WEA 4) 18:59	06:09 20:53	05:22 21:39	05:15 21:57
44	08:19 17:14	15:29 (WEA 4) 18:11	07:19 18:11	15:16 (WEA 4) 19:00	15:16 (WEA 4) 19:00	06:07 20:53	05:21 21:39	05:15 21:57
45	08:18 17:15	14:20 (WEA 4) 07:20	07:19 18:12	15:15 (WEA 4) 18:59	15:15 (WEA 4) 18:59	06:07 20:55	05:21 21:40	05:15 21:57
46	08:18 17:15	15:29 (WEA 4) 18:12	07:17 18:12	15:14 (WEA 4) 19:00	15:14 (WEA 4) 19:00	06:07 20:55	05:21 21:40	05:15 21:57
47	08:16 17:17	14:21 (WEA 4) 07:20	07:17 18:14	15:13 (WEA 4) 19:01	15:13 (WEA 4) 19:01	06:07 20:55	05:21 21:40	05:15 21:57
48	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
49	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
50	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
51	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
52	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
53	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
54	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
55	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
56	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
57	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
58	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
59	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
60	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
61	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
62	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
63	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
64	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
65	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
66	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
67	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
68	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
69	08:16 17:17	15:31 (WEA 4) 18:14	07:15 18:14	15:12 (WEA 4) 19:02	15:12 (WEA 4) 19:02	06:07 20:55	05:21 21:40	05:15 21:57
70	08:16							

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 09-SO - IP 09-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober		November		Dezember		
1	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:13		07:26 17:06	73	13:49 (WEA 4) 16:25	45	14:09 (WEA 4) 14:54 (WEA 4)
2	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10		07:28 17:04	73	13:49 (WEA 4) 15:02 (WEA 4)	42	14:11 (WEA 4) 14:53 (WEA 4)
3	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08		07:30 17:02	73	13:49 (WEA 4) 15:02 (WEA 4)	40	14:12 (WEA 4) 14:52 (WEA 4)
4	05:18 21:56	05:58 21:20	06:48 20:15	07:37 19:06		07:32 17:01	73	13:49 (WEA 4) 15:02 (WEA 4)	38	14:14 (WEA 4) 14:52 (WEA 4)
5	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03		07:34 16:59	72	13:50 (WEA 4) 15:02 (WEA 4)	36	14:15 (WEA 4) 14:51 (WEA 4)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01		07:35 16:57	72	13:50 (WEA 4) 15:02 (WEA 4)	35	14:16 (WEA 4) 14:51 (WEA 4)
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59		07:37 16:55	72	13:50 (WEA 4) 15:02 (WEA 4)	33	14:18 (WEA 4) 14:51 (WEA 4)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56		07:39 16:54	72	13:50 (WEA 4) 15:02 (WEA 4)	31	14:19 (WEA 4) 14:50 (WEA 4)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54		07:41 16:52	71	13:51 (WEA 4) 15:02 (WEA 4)	29	14:20 (WEA 4) 14:49 (WEA 4)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52		07:43 16:50	71	13:51 (WEA 4) 15:02 (WEA 4)	27	14:21 (WEA 4) 14:48 (WEA 4)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	21	07:44 15:21 (WEA 4) 15:42 (WEA 4)	69	13:52 (WEA 4) 15:01 (WEA 4)	26	14:23 (WEA 4) 14:49 (WEA 4)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	30	07:46 15:17 (WEA 4) 15:47 (WEA 4)	69	13:52 (WEA 4) 15:01 (WEA 4)	23	14:25 (WEA 4) 14:48 (WEA 4)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	36	07:48 15:13 (WEA 4) 15:49 (WEA 4)	68	13:53 (WEA 4) 15:01 (WEA 4)	22	14:26 (WEA 4) 14:48 (WEA 4)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	42	07:50 15:09 (WEA 4) 15:51 (WEA 4)	68	13:53 (WEA 4) 15:01 (WEA 4)	20	14:27 (WEA 4) 14:47 (WEA 4)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	46	07:52 15:07 (WEA 4) 15:53 (WEA 4)	67	13:54 (WEA 4) 15:01 (WEA 4)	18	14:28 (WEA 4) 14:46 (WEA 4)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	49	07:53 15:05 (WEA 4) 15:54 (WEA 4)	65	13:55 (WEA 4) 15:00 (WEA 4)	16	14:29 (WEA 4) 14:45 (WEA 4)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	53	07:55 15:03 (WEA 4) 15:56 (WEA 4)	64	13:56 (WEA 4) 15:00 (WEA 4)	14	14:31 (WEA 4) 14:45 (WEA 4)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	56	07:57 15:01 (WEA 4) 15:57 (WEA 4)	63	13:56 (WEA 4) 14:59 (WEA 4)	13	14:32 (WEA 4) 14:45 (WEA 4)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	58	07:59 14:59 (WEA 4) 15:57 (WEA 4)	63	13:56 (WEA 4) 14:59 (WEA 4)	11	14:34 (WEA 4) 14:45 (WEA 4)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	60	08:00 14:58 (WEA 4) 15:58 (WEA 4)	61	13:57 (WEA 4) 14:58 (WEA 4)	11	14:34 (WEA 4) 14:45 (WEA 4)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	63	08:02 14:56 (WEA 4) 15:59 (WEA 4)	60	13:58 (WEA 4) 14:58 (WEA 4)	10	14:35 (WEA 4) 14:45 (WEA 4)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	64	08:04 14:55 (WEA 4) 15:59 (WEA 4)	58	14:00 (WEA 4) 14:58 (WEA 4)	10	14:35 (WEA 4) 14:45 (WEA 4)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	66	08:05 14:54 (WEA 4) 16:00 (WEA 4)	57	14:01 (WEA 4) 14:58 (WEA 4)	10	14:36 (WEA 4) 14:46 (WEA 4)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	67	08:07 14:54 (WEA 4) 16:01 (WEA 4)	56	14:01 (WEA 4) 14:57 (WEA 4)	11	14:36 (WEA 4) 14:47 (WEA 4)
25	05:42 21:35	06:31 20:38	07:22 19:26	08:14 17:20	68	08:09 13:53 (WEA 4) 15:01 (WEA 4)	54	14:02 (WEA 4) 14:56 (WEA 4)	12	14:36 (WEA 4) 14:48 (WEA 4)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18	69	08:10 13:52 (WEA 4) 15:01 (WEA 4)	52	14:04 (WEA 4) 14:56 (WEA 4)	14	14:35 (WEA 4) 14:49 (WEA 4)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16	70	08:12 13:52 (WEA 4) 15:02 (WEA 4)	51	14:05 (WEA 4) 14:56 (WEA 4)	15	14:36 (WEA 4) 14:51 (WEA 4)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14	71	08:13 13:51 (WEA 4) 15:02 (WEA 4)	49	14:06 (WEA 4) 14:55 (WEA 4)	17	14:35 (WEA 4) 14:52 (WEA 4)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12	71	08:15 13:51 (WEA 4) 15:02 (WEA 4)	48	14:07 (WEA 4) 14:55 (WEA 4)	19	14:35 (WEA 4) 14:54 (WEA 4)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	72	08:16 13:50 (WEA 4) 15:02 (WEA 4)	46	14:09 (WEA 4) 14:55 (WEA 4)	21	14:34 (WEA 4) 14:55 (WEA 4)
31	05:51 21:26	06:41 20:25	07:32 19:15	08:25 17:08	72	08:17 13:50 (WEA 4) 15:02 (WEA 4)		14:56 (WEA 4) 16:30	22	14:34 (WEA 4) 14:56 (WEA 4)
Sonnenscheinstunden	503	454	381	331		266	1910	243	691	
astr.max.mögl.Beschattung					1204					

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 09-SW - IP 09-SW
Annahmen für Schattenwurfberechnung

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

	Januar		Februar		März		April		Mai		Juni	
1	08:42		14:25 (WEA 4)	08:15	14:16 (WEA 4)	07:21	14:40 (WEA 4)	07:10	06:05		05:19	
	16:31	32	14:57 (WEA 4)	17:19	15:28 (WEA 4)	18:11	15:08 (WEA 4)	20:05	20:57		21:43	
2	08:42		14:25 (WEA 4)	08:13	14:16 (WEA 4)	07:19	14:45 (WEA 4)	07:08	06:03		05:18	
	16:32	34	14:59 (WEA 4)	17:21	15:28 (WEA 4)	18:13	15:04 (WEA 4)	20:07	20:58		21:44	
3	08:41		14:25 (WEA 4)	08:11	14:17 (WEA 4)	07:17		07:05	06:01		05:18	
	16:33	35	15:00 (WEA 4)	17:23	15:29 (WEA 4)	18:15		20:09	21:00		21:45	
4	08:41		14:24 (WEA 4)	08:10	14:16 (WEA 4)	07:14		07:03	05:59		05:17	
	16:34	37	15:01 (WEA 4)	17:25	15:29 (WEA 4)	18:16		20:11	21:02		21:46	
5	08:41		14:24 (WEA 4)	08:08	14:16 (WEA 4)	07:12		07:01	05:57		05:16	
	16:35	38	15:02 (WEA 4)	17:26	15:29 (WEA 4)	18:18		20:12	21:03		21:47	
6	08:41		14:23 (WEA 4)	08:06	14:16 (WEA 4)	07:10		06:58	05:55		05:15	
	16:37	40	15:03 (WEA 4)	17:28	15:29 (WEA 4)	18:20		20:14	21:05		21:48	
7	08:40		14:24 (WEA 4)	08:05	14:16 (WEA 4)	07:08		06:56	05:54		05:15	
	16:38	41	15:05 (WEA 4)	17:30	15:30 (WEA 4)	18:22		20:16	21:07		21:49	
8	08:40		14:23 (WEA 4)	08:03	14:16 (WEA 4)	07:05		06:54	05:52		05:14	
	16:39	43	15:06 (WEA 4)	17:32	15:29 (WEA 4)	18:24		20:17	21:08		21:50	
9	08:39		14:23 (WEA 4)	08:01	14:16 (WEA 4)	07:03		06:52	05:50		05:14	
	16:41	45	15:08 (WEA 4)	17:34	15:29 (WEA 4)	18:25		20:19	21:10		21:51	
10	08:39		14:22 (WEA 4)	07:59	14:17 (WEA 4)	07:01		06:49	05:48		05:13	
	16:42	46	15:08 (WEA 4)	17:36	15:30 (WEA 4)	18:27		20:21	21:12		21:51	
11	08:38		14:22 (WEA 4)	07:58	14:17 (WEA 4)	06:59		06:47	05:47		05:13	
	16:43	47	15:09 (WEA 4)	17:38	15:30 (WEA 4)	18:29		20:23	21:13		21:52	
12	08:38		14:21 (WEA 4)	07:56	14:18 (WEA 4)	06:56		06:45	05:45		05:13	
	16:45	49	15:10 (WEA 4)	17:40	15:29 (WEA 4)	18:31		20:24	21:15		21:53	
13	08:37		14:21 (WEA 4)	07:54	14:18 (WEA 4)	06:54		06:43	05:43		05:12	
	16:46	50	15:11 (WEA 4)	17:41	15:29 (WEA 4)	18:32		20:26	21:16		21:54	
14	08:36		14:20 (WEA 4)	07:52	14:19 (WEA 4)	06:52		06:40	05:42		05:12	
	16:48	53	15:13 (WEA 4)	17:43	15:29 (WEA 4)	18:34		20:28	21:18		21:54	
15	08:35		14:20 (WEA 4)	07:50	14:19 (WEA 4)	06:49		06:38	05:40		05:12	
	16:50	54	15:14 (WEA 4)	17:45	15:28 (WEA 4)	18:36		20:29	21:19		21:55	
16	08:34		14:20 (WEA 4)	07:48	14:20 (WEA 4)	06:47		06:36	05:39		05:12	
	16:51	55	15:15 (WEA 4)	17:47	15:28 (WEA 4)	18:38		20:31	21:21		21:55	
17	08:34		14:19 (WEA 4)	07:46	14:20 (WEA 4)	06:45		06:34	05:37		05:12	
	16:53	57	15:16 (WEA 4)	17:49	15:26 (WEA 4)	18:39		20:33	21:23		21:56	
18	08:33		14:19 (WEA 4)	07:44	14:20 (WEA 4)	06:42		06:32	05:36		05:12	
	16:54	58	15:17 (WEA 4)	17:51	15:26 (WEA 4)	18:41		20:35	21:24		21:56	
19	08:32		14:19 (WEA 4)	07:42	14:21 (WEA 4)	06:40		06:29	05:34		05:12	
	16:56	59	15:18 (WEA 4)	17:53	15:25 (WEA 4)	18:43		20:36	21:26		21:57	
20	08:31		14:19 (WEA 4)	07:40	14:23 (WEA 4)	06:38		06:27	05:33		05:12	
	16:58	60	15:19 (WEA 4)	17:55	15:25 (WEA 4)	18:45		20:38	21:27		21:57	
21	08:29		14:19 (WEA 4)	07:38	14:24 (WEA 4)	06:35		06:25	05:31		05:12	
	16:59	62	15:21 (WEA 4)	17:56	15:24 (WEA 4)	18:46		20:40	21:28		21:57	
22	08:28		14:18 (WEA 4)	07:36	14:25 (WEA 4)	06:33		06:23	05:30		05:12	
	17:01	63	15:21 (WEA 4)	17:58	15:23 (WEA 4)	18:48		20:41	21:30		21:57	
23	08:27		14:18 (WEA 4)	07:34	14:27 (WEA 4)	06:31		06:21	05:29		05:12	
	17:03	64	15:22 (WEA 4)	18:00	15:22 (WEA 4)	18:50		20:43	21:31		21:57	
24	08:26		14:17 (WEA 4)	07:32	14:28 (WEA 4)	06:29		06:19	05:28		05:13	
	17:05	65	15:22 (WEA 4)	18:02	15:21 (WEA 4)	18:52		20:45	21:33		21:58	
25	08:25		14:17 (WEA 4)	07:30	14:29 (WEA 4)	06:26		06:17	05:26		05:13	
	17:06	66	15:23 (WEA 4)	18:04	15:18 (WEA 4)	18:53		20:46	21:34		21:58	
26	08:23		14:17 (WEA 4)	07:27	14:32 (WEA 4)	06:24		06:15	05:25		05:13	
	17:08	68	15:25 (WEA 4)	18:06	15:17 (WEA 4)	18:55		20:48	21:35		21:58	
27	08:22		14:17 (WEA 4)	07:25	14:34 (WEA 4)	06:22		06:13	05:24		05:14	
	17:10	68	15:25 (WEA 4)	18:07	15:15 (WEA 4)	18:57		20:50	21:37		21:58	
28	08:21		14:16 (WEA 4)	07:23	14:37 (WEA 4)	06:19		06:11	05:23		05:14	
	17:12	69	15:25 (WEA 4)	18:09	15:12 (WEA 4)	18:58		20:52	21:38		21:57	
29	08:19		14:17 (WEA 4)			07:17		06:09	05:22		05:15	
	17:14	69	15:26 (WEA 4)			20:00		20:53	21:39		21:57	
30	08:18		14:16 (WEA 4)			07:15		06:07	05:21		05:15	
	17:15	70	15:26 (WEA 4)			20:02		20:55	21:40		21:57	
31	08:16		14:17 (WEA 4)			07:12			05:20			
	17:17	70	15:27 (WEA 4)			20:04			21:42			
Sonnenscheinstunden	258			277		367		416	486		500	
astr.max.mögl.Beschattung	1667			1803		47						

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 09-SW - IP 09-SW
Annahmen für Schattenwurfberechnung

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

	July	August	September	Oktober		November		Dezember	
1	05:16	05:53	06:43	07:32		07:26	13:46 (WEA 4)	08:18	14:04 (WEA 4)
	21:57	21:25	20:22	19:13		17:06	72 14:58 (WEA 4)	16:25	48 14:52 (WEA 4)
2	05:17	05:54	06:45	07:34		07:28	13:46 (WEA 4)	08:19	14:05 (WEA 4)
	21:56	21:23	20:20	19:10		17:04	72 14:58 (WEA 4)	16:25	47 14:52 (WEA 4)
3	05:18	05:56	06:46	07:36		07:30	13:46 (WEA 4)	08:21	14:06 (WEA 4)
	21:56	21:21	20:18	19:08		17:02	73 14:59 (WEA 4)	16:24	45 14:51 (WEA 4)
4	05:18	05:58	06:48	07:37		07:32	13:46 (WEA 4)	08:22	14:08 (WEA 4)
	21:56	21:20	20:15	19:06		17:01	73 14:59 (WEA 4)	16:23	43 14:51 (WEA 4)
5	05:19	05:59	06:50	07:39		07:34	13:46 (WEA 4)	08:23	14:09 (WEA 4)
	21:55	21:18	20:13	19:03		16:59	73 14:59 (WEA 4)	16:23	41 14:50 (WEA 4)
6	05:20	06:01	06:51	07:41		07:35	13:46 (WEA 4)	08:25	14:09 (WEA 4)
	21:55	21:16	20:11	19:01		16:57	73 14:59 (WEA 4)	16:22	40 14:49 (WEA 4)
7	05:21	06:02	06:53	07:42		07:37	13:46 (WEA 4)	08:26	14:11 (WEA 4)
	21:54	21:14	20:09	18:59		16:55	73 14:59 (WEA 4)	16:22	38 14:49 (WEA 4)
8	05:22	06:04	06:54	07:44		07:39	13:46 (WEA 4)	08:27	14:12 (WEA 4)
	21:53	21:12	20:06	18:56		16:54	73 14:59 (WEA 4)	16:22	37 14:49 (WEA 4)
9	05:23	06:05	06:56	07:46		07:41	13:47 (WEA 4)	08:28	14:13 (WEA 4)
	21:53	21:11	20:04	18:54		16:52	71 14:58 (WEA 4)	16:21	35 14:48 (WEA 4)
10	05:24	06:07	06:58	07:48		07:43	13:47 (WEA 4)	08:29	14:14 (WEA 4)
	21:52	21:09	20:02	18:52		16:50	71 14:58 (WEA 4)	16:21	34 14:48 (WEA 4)
11	05:25	06:09	06:59	07:49	15:24 (WEA 4)	07:44	13:47 (WEA 4)	08:30	14:16 (WEA 4)
	21:51	21:07	19:59	18:50	9 15:33 (WEA 4)	16:49	71 14:58 (WEA 4)	16:21	32 14:48 (WEA 4)
12	05:26	06:10	07:01	07:51	15:17 (WEA 4)	07:46	13:48 (WEA 4)	08:32	14:17 (WEA 4)
	21:50	21:05	19:57	18:47	23 15:40 (WEA 4)	16:47	70 14:58 (WEA 4)	16:21	31 14:48 (WEA 4)
13	05:27	06:12	07:03	07:53	15:12 (WEA 4)	07:48	13:49 (WEA 4)	08:33	14:18 (WEA 4)
	21:50	21:03	19:55	18:45	32 15:44 (WEA 4)	16:46	69 14:58 (WEA 4)	16:21	30 14:48 (WEA 4)
14	05:28	06:14	07:04	07:54	15:08 (WEA 4)	07:50	13:49 (WEA 4)	08:33	14:20 (WEA 4)
	21:49	21:01	19:52	18:43	37 15:45 (WEA 4)	16:44	69 14:58 (WEA 4)	16:21	28 14:48 (WEA 4)
15	05:29	06:15	07:06	07:56	15:05 (WEA 4)	07:52	13:50 (WEA 4)	08:34	14:20 (WEA 4)
	21:48	20:59	19:50	18:41	43 15:48 (WEA 4)	16:43	68 14:58 (WEA 4)	16:21	26 14:46 (WEA 4)
16	05:30	06:17	07:07	07:58	15:03 (WEA 4)	07:53	13:50 (WEA 4)	08:35	14:21 (WEA 4)
	21:47	20:57	19:48	18:39	46 15:49 (WEA 4)	16:41	67 14:57 (WEA 4)	16:21	26 14:47 (WEA 4)
17	05:32	06:18	07:09	08:00	15:01 (WEA 4)	07:55	13:51 (WEA 4)	08:36	14:22 (WEA 4)
	21:46	20:55	19:45	18:36	50 15:51 (WEA 4)	16:40	66 14:57 (WEA 4)	16:21	25 14:47 (WEA 4)
18	05:33	06:20	07:11	08:01	14:59 (WEA 4)	07:57	13:51 (WEA 4)	08:37	14:23 (WEA 4)
	21:44	20:53	19:43	18:34	53 15:52 (WEA 4)	16:39	65 14:56 (WEA 4)	16:21	24 14:47 (WEA 4)
19	05:34	06:22	07:12	08:03	14:56 (WEA 4)	07:59	13:52 (WEA 4)	08:38	14:24 (WEA 4)
	21:43	20:51	19:41	18:32	56 15:52 (WEA 4)	16:37	64 14:56 (WEA 4)	16:22	24 14:48 (WEA 4)
20	05:36	06:23	07:14	08:05	14:55 (WEA 4)	08:00	13:53 (WEA 4)	08:38	14:24 (WEA 4)
	21:42	20:49	19:38	18:30	59 15:54 (WEA 4)	16:36	63 14:56 (WEA 4)	16:22	23 14:47 (WEA 4)
21	05:37	06:25	07:16	08:07	14:54 (WEA 4)	08:02	13:54 (WEA 4)	08:39	14:25 (WEA 4)
	21:41	20:46	19:36	18:28	60 15:54 (WEA 4)	16:35	62 14:56 (WEA 4)	16:23	23 14:48 (WEA 4)
22	05:38	06:27	07:17	08:08	14:53 (WEA 4)	08:04	13:55 (WEA 4)	08:39	14:25 (WEA 4)
	21:40	20:44	19:34	18:26	62 15:55 (WEA 4)	16:34	60 14:55 (WEA 4)	16:23	23 14:48 (WEA 4)
23	05:40	06:28	07:19	08:10	14:52 (WEA 4)	08:05	13:56 (WEA 4)	08:40	14:26 (WEA 4)
	21:38	20:42	19:31	18:24	64 15:56 (WEA 4)	16:33	59 14:55 (WEA 4)	16:23	23 14:49 (WEA 4)
24	05:41	06:30	07:21	08:12	14:51 (WEA 4)	08:07	13:56 (WEA 4)	08:40	14:26 (WEA 4)
	21:37	20:40	19:29	18:22	66 15:57 (WEA 4)	16:31	58 14:54 (WEA 4)	16:24	23 14:49 (WEA 4)
25	05:42	06:31	07:22	07:14	13:50 (WEA 4)	08:09	13:57 (WEA 4)	08:41	14:26 (WEA 4)
	21:35	20:38	19:26	17:20	67 14:57 (WEA 4)	16:30	57 14:54 (WEA 4)	16:25	24 14:50 (WEA 4)
26	05:44	06:33	07:24	07:16	13:49 (WEA 4)	08:10	13:59 (WEA 4)	08:41	14:26 (WEA 4)
	21:34	20:36	19:24	17:18	69 14:58 (WEA 4)	16:29	55 14:54 (WEA 4)	16:25	24 14:50 (WEA 4)
27	05:45	06:35	07:26	07:17	13:49 (WEA 4)	08:12	14:00 (WEA 4)	08:41	14:27 (WEA 4)
	21:33	20:33	19:22	17:16	69 14:58 (WEA 4)	16:29	54 14:54 (WEA 4)	16:26	25 14:52 (WEA 4)
28	05:47	06:36	07:27	07:19	13:48 (WEA 4)	08:13	14:00 (WEA 4)	08:41	14:27 (WEA 4)
	21:31	20:31	19:19	17:14	70 14:58 (WEA 4)	16:28	53 14:53 (WEA 4)	16:27	26 14:53 (WEA 4)
29	05:48	06:38	07:29	07:21	13:48 (WEA 4)	08:15	14:02 (WEA 4)	08:42	14:27 (WEA 4)
	21:30	20:29	19:17	17:12	71 14:59 (WEA 4)	16:27	51 14:53 (WEA 4)	16:28	27 14:54 (WEA 4)
30	05:50	06:40	07:31	07:23	13:46 (WEA 4)	08:16	14:03 (WEA 4)	08:42	14:27 (WEA 4)
	21:28	20:27	19:15	17:10	72 14:58 (WEA 4)	16:26	50 14:53 (WEA 4)	16:29	28 14:55 (WEA 4)
31	05:51	06:41	07:25	07:25	13:46 (WEA 4)			08:42	14:26 (WEA 4)
	21:26	20:25	17:08	14:58 (WEA 4)	72			16:30	30 14:56 (WEA 4)
Sonnenscheinstunden	503	454	381	331		266	1955	243	953
astr.max.mögl.Beschattung					1150				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 10-SO - IP 10-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	29	17:16 (WEA 4) 17:45 (WEA 4)	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	27	17:16 (WEA 4) 17:43 (WEA 4)	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15	9	16:52 (WEA 4) 17:01 (WEA 4)	25	17:17 (WEA 4) 17:42 (WEA 4)	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	23	16:45 (WEA 4) 17:08 (WEA 4)	22	17:18 (WEA 4) 17:40 (WEA 4)	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	31	16:40 (WEA 4) 17:11 (WEA 4)	20	17:18 (WEA 4) 17:38 (WEA 4)	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	37	16:37 (WEA 4) 17:14 (WEA 4)	18	17:19 (WEA 4) 17:37 (WEA 4)	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	41	16:35 (WEA 4) 17:16 (WEA 4)	16	17:20 (WEA 4) 17:36 (WEA 4)	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	45	16:32 (WEA 4) 17:17 (WEA 4)	13	17:22 (WEA 4) 17:35 (WEA 4)	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	47	16:30 (WEA 4) 17:17 (WEA 4)	11	17:22 (WEA 4) 17:33 (WEA 4)	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	47	16:29 (WEA 4) 17:16 (WEA 4)	8	17:24 (WEA 4) 17:32 (WEA 4)	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	47	16:28 (WEA 4) 17:15 (WEA 4)	5	17:25 (WEA 4) 17:30 (WEA 4)	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	48	16:25 (WEA 4) 17:13 (WEA 4)	2	17:27 (WEA 4) 17:29 (WEA 4)	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	47	16:24 (WEA 4) 17:11 (WEA 4)		05:43 21:16	05:12 21:54	
14	08:36 16:48	07:52 17:43	06:52 18:34	47	16:23 (WEA 4) 17:10 (WEA 4)		05:42 21:18	05:12 21:54	
15	08:35 16:50	07:50 17:45	06:49 18:36	46	16:22 (WEA 4) 17:08 (WEA 4)		05:40 21:19	05:12 21:55	
16	08:34 16:51	07:48 17:47	06:47 18:38	46	16:21 (WEA 4) 17:07 (WEA 4)		05:39 21:21	05:12 21:55	
17	08:34 16:53	07:46 17:49	06:45 18:39	46	16:20 (WEA 4) 17:06 (WEA 4)		05:37 21:23	05:12 21:56	
18	08:33 16:54	07:44 17:51	06:42 18:41	45	16:19 (WEA 4) 17:04 (WEA 4)		05:36 21:24	05:12 21:56	
19	08:32 16:56	07:42 17:53	06:40 18:43	45	16:18 (WEA 4) 17:03 (WEA 4)		05:34 21:26	05:12 21:57	
20	08:31 16:58	07:40 17:54	06:38 18:45	44	16:18 (WEA 4) 17:02 (WEA 4)		05:33 21:27	05:12 21:57	
21	08:29 16:59	07:38 17:56	06:35 18:46	43	16:17 (WEA 4) 17:00 (WEA 4)		05:31 21:28	05:12 21:57	
22	08:28 17:01	07:36 17:58	06:33 18:48	42	16:17 (WEA 4) 16:59 (WEA 4)		05:30 21:30	05:12 21:57	
23	08:27 17:03	07:34 18:00	06:31 18:50	41	16:17 (WEA 4) 16:58 (WEA 4)		05:29 21:31	05:12 21:57	
24	08:26 17:05	07:32 18:02	06:29 18:52	40	16:16 (WEA 4) 16:56 (WEA 4)		05:28 21:33	05:13 21:58	
25	08:25 17:06	07:30 18:04	06:26 18:53	39	16:16 (WEA 4) 16:55 (WEA 4)		05:26 21:34	05:13 21:58	
26	08:23 17:08	07:27 18:06	06:24 18:55	37	16:16 (WEA 4) 16:53 (WEA 4)		05:25 21:35	05:13 21:58	
27	08:22 17:10	07:25 18:07	06:22 18:57	36	16:15 (WEA 4) 16:51 (WEA 4)		05:24 21:37	05:14 21:58	
28	08:21 17:12	07:23 18:09	06:19 18:58	35	16:15 (WEA 4) 16:50 (WEA 4)		05:23 21:38	05:14 21:57	
29	08:19 17:14		07:17 20:00	33	17:16 (WEA 4) 17:49 (WEA 4)		05:22 21:39	05:15 21:57	
30	08:18 17:15		07:15 20:02	32	17:15 (WEA 4) 17:47 (WEA 4)		05:21 21:40	05:15 21:57	
31	08:16 17:17		07:12 20:04	30	17:16 (WEA 4) 17:46 (WEA 4)		05:20 21:42		
Sonnenscheinstunden	258	277	367		416		486	500	
astr.max.mögl.Beschattung				1149		196			

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 10-SO - IP 10-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember		
1	05:16 21:57	05:53 21:25	06:43 20:22	17:24 (WEA 4) 17:29 (WEA 4)	07:32 19:12	17:05 (WEA 4) 17:52 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	17:23 (WEA 4) 17:31 (WEA 4)	07:34 19:10	17:05 (WEA 4) 17:52 (WEA 4)	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	17:20 (WEA 4) 17:31 (WEA 4)	07:36 19:08	17:06 (WEA 4) 17:53 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	17:19 (WEA 4) 17:32 (WEA 4)	07:37 19:06	17:08 (WEA 4) 17:54 (WEA 4)	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:50 20:13	17:16 (WEA 4) 17:32 (WEA 4)	07:39 19:03	17:08 (WEA 4) 17:54 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	17:15 (WEA 4) 17:33 (WEA 4)	07:41 19:01	17:10 (WEA 4) 17:53 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	17:14 (WEA 4) 17:34 (WEA 4)	07:42 18:59	17:12 (WEA 4) 17:51 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	17:12 (WEA 4) 17:35 (WEA 4)	07:44 18:56	17:15 (WEA 4) 17:48 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	17:11 (WEA 4) 17:36 (WEA 4)	07:46 18:54	17:17 (WEA 4) 17:44 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	17:10 (WEA 4) 17:36 (WEA 4)	07:48 18:52	17:22 (WEA 4) 17:40 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	17:09 (WEA 4) 17:37 (WEA 4)	07:49 18:50		07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	17:07 (WEA 4) 17:37 (WEA 4)	07:51 18:47		07:46 16:47	08:32 16:21
13	05:27 21:50	06:12 21:03	07:03 19:55	17:07 (WEA 4) 17:38 (WEA 4)	07:53 18:45		07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	17:06 (WEA 4) 17:39 (WEA 4)	07:54 18:43		07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	17:05 (WEA 4) 17:39 (WEA 4)	07:56 18:41		07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	17:05 (WEA 4) 17:41 (WEA 4)	07:58 18:39		07:53 16:41	08:35 16:21
17	05:32 21:46	06:18 20:55	07:09 19:45	17:03 (WEA 4) 17:41 (WEA 4)	08:00 18:36		07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	17:03 (WEA 4) 17:42 (WEA 4)	08:01 18:34		07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	17:03 (WEA 4) 17:43 (WEA 4)	08:03 18:32		07:59 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	17:02 (WEA 4) 17:43 (WEA 4)	08:05 18:30		08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	17:02 (WEA 4) 17:44 (WEA 4)	08:07 18:28		08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	07:17 19:34	17:02 (WEA 4) 17:45 (WEA 4)	08:08 18:26		08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	17:02 (WEA 4) 17:45 (WEA 4)	08:10 18:24		08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	17:02 (WEA 4) 17:46 (WEA 4)	08:12 18:22		08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	17:01 (WEA 4) 17:46 (WEA 4)	07:14 17:20		08:09 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	17:02 (WEA 4) 17:48 (WEA 4)	07:16 17:18		08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	17:02 (WEA 4) 17:49 (WEA 4)	07:17 17:16		08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	17:02 (WEA 4) 17:49 (WEA 4)	07:19 17:14		08:13 16:28	08:41 16:27
29	05:48 21:30	06:38 20:29	07:29 19:17	17:03 (WEA 4) 17:50 (WEA 4)	07:21 17:12		08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	17:04 (WEA 4) 17:51 (WEA 4)	07:23 17:10		08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	17:27 (WEA 4) 17:29 (WEA 4)		07:25 17:08			08:42 16:30
Sonnenscheinstunden	503	454	2	381	331		266	243
astr.max.mögl.Beschattung			2	966	393			

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 10-SW - IP 10-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	66	17:14 (WEA 4) 18:20 (WEA 4)	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	6	16:51 (WEA 4) 16:57 (WEA 4)	65	17:14 (WEA 4) 18:19 (WEA 4)	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15	21	16:43 (WEA 4) 17:04 (WEA 4)	63	17:15 (WEA 4) 18:18 (WEA 4)	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	30	16:39 (WEA 4) 17:09 (WEA 4)	62	17:16 (WEA 4) 18:18 (WEA 4)	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	36	16:35 (WEA 4) 17:11 (WEA 4)	60	17:16 (WEA 4) 18:16 (WEA 4)	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	41	16:32 (WEA 4) 17:13 (WEA 4)	58	17:17 (WEA 4) 18:15 (WEA 4)	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	45	16:30 (WEA 4) 17:15 (WEA 4)	56	17:18 (WEA 4) 18:14 (WEA 4)	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	48	16:28 (WEA 4) 17:16 (WEA 4)	53	17:20 (WEA 4) 18:13 (WEA 4)	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	52	16:26 (WEA 4) 17:18 (WEA 4)	50	17:20 (WEA 4) 18:10 (WEA 4)	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	55	16:25 (WEA 4) 17:20 (WEA 4)	47	17:22 (WEA 4) 18:09 (WEA 4)	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	57	16:24 (WEA 4) 17:21 (WEA 4)	43	17:24 (WEA 4) 18:07 (WEA 4)	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	59	16:22 (WEA 4) 17:21 (WEA 4)	40	17:26 (WEA 4) 18:06 (WEA 4)	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	61	16:21 (WEA 4) 17:22 (WEA 4)	35	17:28 (WEA 4) 18:03 (WEA 4)	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	63	16:20 (WEA 4) 17:23 (WEA 4)	30	17:30 (WEA 4) 18:00 (WEA 4)	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	65	16:18 (WEA 4) 17:23 (WEA 4)	23	17:34 (WEA 4) 17:57 (WEA 4)	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	67	16:17 (WEA 4) 17:24 (WEA 4)	12	17:39 (WEA 4) 17:51 (WEA 4)	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	67	16:17 (WEA 4) 17:24 (WEA 4)			05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	69	16:15 (WEA 4) 17:24 (WEA 4)			05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	70	16:15 (WEA 4) 17:25 (WEA 4)			05:34 21:26	05:12 21:57
20	08:31 16:58	07:40 17:54	06:38 18:45	70	16:15 (WEA 4) 17:25 (WEA 4)			05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	70	16:14 (WEA 4) 17:24 (WEA 4)			05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	71	16:14 (WEA 4) 17:25 (WEA 4)			05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	71	16:14 (WEA 4) 17:25 (WEA 4)			05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:29 18:52	71	16:13 (WEA 4) 17:24 (WEA 4)			05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	71	16:13 (WEA 4) 17:24 (WEA 4)			05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	71	16:13 (WEA 4) 17:24 (WEA 4)			05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	71	16:12 (WEA 4) 17:23 (WEA 4)			05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	70	16:13 (WEA 4) 17:23 (WEA 4)			05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	70	17:13 (WEA 4) 18:23 (WEA 4)			05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	68	17:13 (WEA 4) 18:21 (WEA 4)			05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	68	17:13 (WEA 4) 18:21 (WEA 4)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416	763	486	500	
astr.max.mögl.Beschattung				1754					

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 10-SW - IP 10-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember		
1	05:16 21:57	05:53 21:25	06:43 20:22	17:23 (WEA 4) 18:06 (WEA 4)	07:32 19:12	17:01 (WEA 4) 18:01 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	17:21 (WEA 4) 18:08 (WEA 4)	07:34 19:10	17:01 (WEA 4) 17:59 (WEA 4)	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	17:18 (WEA 4) 18:08 (WEA 4)	07:36 19:08	17:02 (WEA 4) 17:58 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	17:17 (WEA 4) 18:10 (WEA 4)	07:37 19:06	17:03 (WEA 4) 17:57 (WEA 4)	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:50 20:13	17:14 (WEA 4) 18:10 (WEA 4)	07:39 19:03	17:04 (WEA 4) 17:54 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	17:13 (WEA 4) 18:11 (WEA 4)	07:41 19:01	17:05 (WEA 4) 17:52 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	17:12 (WEA 4) 18:12 (WEA 4)	07:42 18:59	17:07 (WEA 4) 17:50 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	17:10 (WEA 4) 18:12 (WEA 4)	07:44 18:56	17:10 (WEA 4) 17:48 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	17:09 (WEA 4) 18:12 (WEA 4)	07:46 18:54	17:11 (WEA 4) 17:44 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	17:07 (WEA 4) 18:12 (WEA 4)	07:48 18:52	17:15 (WEA 4) 17:41 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	17:06 (WEA 4) 18:13 (WEA 4)	07:49 18:50	17:19 (WEA 4) 17:36 (WEA 4)	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	17:05 (WEA 4) 18:12 (WEA 4)	07:51 18:47		07:46 16:47	08:32 16:21
13	05:27 21:50	06:12 21:03	07:03 19:55	17:04 (WEA 4) 18:12 (WEA 4)	07:53 18:45		07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	17:04 (WEA 4) 18:13 (WEA 4)	07:54 18:43		07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	17:02 (WEA 4) 18:12 (WEA 4)	07:56 18:41		07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	17:02 (WEA 4) 18:12 (WEA 4)	07:58 18:39		07:53 16:41	08:35 16:21
17	05:32 21:46	06:18 20:55	07:09 19:45	17:00 (WEA 4) 18:11 (WEA 4)	08:00 18:36		07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	17:00 (WEA 4) 18:11 (WEA 4)	08:01 18:34		07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	17:00 (WEA 4) 18:11 (WEA 4)	08:03 18:32		07:59 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	16:59 (WEA 4) 18:10 (WEA 4)	08:05 18:30		08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	16:59 (WEA 4) 18:10 (WEA 4)	08:07 18:28		08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	07:17 19:34	16:59 (WEA 4) 18:10 (WEA 4)	08:08 18:26		08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	16:58 (WEA 4) 18:09 (WEA 4)	08:10 18:24		08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	16:59 (WEA 4) 18:08 (WEA 4)	08:12 18:22		08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	16:58 (WEA 4) 18:07 (WEA 4)	07:14 17:20		08:09 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	16:58 (WEA 4) 18:06 (WEA 4)	07:16 17:18		08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	17:40 (WEA 4) 17:54 (WEA 4)	07:26 19:22	16:59 (WEA 4) 18:06 (WEA 4)		08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	17:35 (WEA 4) 17:59 (WEA 4)	07:27 19:19	16:59 (WEA 4) 18:04 (WEA 4)		08:13 16:28	08:41 16:27
29	05:48 21:30	06:38 20:29	17:31 (WEA 4) 18:01 (WEA 4)	07:29 19:17	16:59 (WEA 4) 18:03 (WEA 4)		08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	17:28 (WEA 4) 18:03 (WEA 4)	07:31 19:15	17:00 (WEA 4) 18:02 (WEA 4)		08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	17:26 (WEA 4) 18:06 (WEA 4)		07:25 17:08		08:17 16:25	08:42 16:30
Sonnenscheinstunden	503	454	381		331		266	243
astr.max.mögl.Beschattung		143		1929		482		

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 11-SO - IP 11-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	64	17:23 (WEA 4) 18:27 (WEA 4)	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	62	17:23 (WEA 4) 18:25 (WEA 4)	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15		07:05 20:09	60	17:24 (WEA 4) 18:24 (WEA 4)	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	59	17:25 (WEA 4) 18:24 (WEA 4)	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	19	16:52 (WEA 4) 17:11 (WEA 4)	57	17:25 (WEA 4) 18:22 (WEA 4)	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	28	16:47 (WEA 4) 17:15 (WEA 4)	55	17:26 (WEA 4) 18:21 (WEA 4)	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	34	16:44 (WEA 4) 17:18 (WEA 4)	53	17:27 (WEA 4) 18:20 (WEA 4)	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	39	16:41 (WEA 4) 17:20 (WEA 4)	51	17:28 (WEA 4) 18:19 (WEA 4)	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	43	16:39 (WEA 4) 17:22 (WEA 4)	48	17:29 (WEA 4) 18:17 (WEA 4)	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	47	16:37 (WEA 4) 17:24 (WEA 4)	44	17:31 (WEA 4) 18:15 (WEA 4)	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	49	16:36 (WEA 4) 17:25 (WEA 4)	42	17:32 (WEA 4) 18:14 (WEA 4)	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	53	16:33 (WEA 4) 17:26 (WEA 4)	37	17:35 (WEA 4) 18:12 (WEA 4)	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	55	16:32 (WEA 4) 17:27 (WEA 4)	32	17:37 (WEA 4) 18:09 (WEA 4)	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	57	16:31 (WEA 4) 17:28 (WEA 4)	27	17:39 (WEA 4) 18:06 (WEA 4)	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	59	16:29 (WEA 4) 17:28 (WEA 4)	19	17:43 (WEA 4) 18:02 (WEA 4)	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	61	16:28 (WEA 4) 17:29 (WEA 4)	3	17:51 (WEA 4) 17:54 (WEA 4)	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	62	16:28 (WEA 4) 17:30 (WEA 4)			05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	64	16:26 (WEA 4) 17:30 (WEA 4)			05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	64	16:26 (WEA 4) 17:30 (WEA 4)			05:34 21:26	05:12 21:57
20	08:31 16:58	07:40 17:54	06:38 18:45	66	16:25 (WEA 4) 17:31 (WEA 4)			05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	66	16:24 (WEA 4) 17:30 (WEA 4)			05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	66	16:24 (WEA 4) 17:30 (WEA 4)			05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	67	16:24 (WEA 4) 17:31 (WEA 4)			05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	67	16:23 (WEA 4) 17:30 (WEA 4)			05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	67	16:23 (WEA 4) 17:30 (WEA 4)			05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	67	16:23 (WEA 4) 17:30 (WEA 4)			05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	67	16:22 (WEA 4) 17:29 (WEA 4)			05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	67	16:22 (WEA 4) 17:29 (WEA 4)			05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	66	17:23 (WEA 4) 18:29 (WEA 4)			05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	65	17:22 (WEA 4) 18:27 (WEA 4)			05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	64	17:23 (WEA 4) 18:27 (WEA 4)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416	713	486	500	
astr.max.mögl.Beschattung			1529						

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 11-SO - IP 11-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember		
1	05:16 21:57	05:53 21:25	06:43 20:22	17:31 (WEA 4) 19:12	07:32 18:06 (WEA 4)	07:26 17:06	08:18 16:25	
2	05:17 21:56	05:54 21:23	06:45 20:20	17:30 (WEA 4) 18:14 (WEA 4)	07:34 19:10	17:13 (WEA 4) 18:04 (WEA 4)	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	17:27 (WEA 4) 18:15 (WEA 4)	07:36 19:08	17:14 (WEA 4) 18:02 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	17:26 (WEA 4) 18:16 (WEA 4)	07:37 19:06	17:16 (WEA 4) 18:01 (WEA 4)	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:50 20:13	17:23 (WEA 4) 18:16 (WEA 4)	07:39 19:03	17:17 (WEA 4) 17:58 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	17:22 (WEA 4) 18:17 (WEA 4)	07:41 19:01	17:19 (WEA 4) 17:55 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	17:21 (WEA 4) 18:18 (WEA 4)	07:42 18:59	17:22 (WEA 4) 17:53 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	17:19 (WEA 4) 18:18 (WEA 4)	07:44 18:56	17:25 (WEA 4) 17:49 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	17:18 (WEA 4) 18:19 (WEA 4)	07:46 18:54	17:30 (WEA 4) 17:43 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	17:16 (WEA 4) 18:18 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21	
11	05:25 21:51	06:09 21:07	06:59 19:59	17:16 (WEA 4) 18:19 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21	
12	05:26 21:50	06:10 21:05	07:01 19:57	17:14 (WEA 4) 18:18 (WEA 4)	07:51 18:47	07:46 16:47	08:32 16:21	
13	05:27 21:50	06:12 21:03	07:03 19:55	17:14 (WEA 4) 18:19 (WEA 4)	07:53 18:45	07:48 16:46	08:33 16:21	
14	05:28 21:49	06:14 21:01	07:04 19:52	17:13 (WEA 4) 18:19 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21	
15	05:29 21:48	06:15 20:59	07:06 19:50	17:12 (WEA 4) 18:18 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21	
16	05:30 21:47	06:17 20:57	07:07 19:48	17:12 (WEA 4) 18:18 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21	
17	05:32 21:46	06:18 20:55	07:09 19:45	17:10 (WEA 4) 18:17 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21	
18	05:33 21:44	06:20 20:53	07:11 19:43	17:10 (WEA 4) 18:17 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21	
19	05:34 21:43	06:22 20:51	07:12 19:41	17:10 (WEA 4) 18:17 (WEA 4)	08:03 18:32	07:59 16:37	08:38 16:22	
20	05:36 21:42	06:23 20:49	07:14 19:38	17:09 (WEA 4) 18:16 (WEA 4)	08:05 18:30	08:00 16:36	08:38 16:22	
21	05:37 21:41	06:25 20:46	07:16 19:36	17:09 (WEA 4) 18:16 (WEA 4)	08:07 18:28	08:02 16:35	08:39 16:23	
22	05:38 21:40	06:27 20:44	07:17 19:34	17:10 (WEA 4) 18:16 (WEA 4)	08:08 18:26	08:04 16:34	08:39 16:23	
23	05:40 21:38	06:28 20:42	07:19 19:31	17:09 (WEA 4) 18:14 (WEA 4)	08:10 18:24	08:05 16:33	08:40 16:23	
24	05:41 21:37	06:30 20:40	07:21 19:29	17:09 (WEA 4) 18:14 (WEA 4)	08:12 18:22	08:07 16:31	08:40 16:24	
25	05:42 21:35	06:31 20:38	07:22 19:26	17:09 (WEA 4) 18:12 (WEA 4)	07:14 17:20	08:09 16:30	08:41 16:25	
26	05:44 21:34	06:33 20:36	07:24 19:24	17:09 (WEA 4) 18:12 (WEA 4)	07:16 17:18	08:10 16:29	08:41 16:25	
27	05:45 21:33	06:35 20:33	17:51 (WEA 4) 17:58 (WEA 4)	07:26 19:22	17:10 (WEA 4) 18:11 (WEA 4)	08:12 16:29	08:45 16:26	
28	05:47 21:31	06:36 20:31	17:44 (WEA 4) 18:04 (WEA 4)	07:27 19:19	17:10 (WEA 4) 18:09 (WEA 4)	08:13 16:28	08:41 16:27	
29	05:48 21:30	06:38 20:29	17:40 (WEA 4) 18:07 (WEA 4)	07:29 19:17	17:11 (WEA 4) 18:08 (WEA 4)	08:15 16:27	08:42 16:28	
30	05:50 21:28	06:40 20:27	17:37 (WEA 4) 18:10 (WEA 4)	07:31 19:15	17:12 (WEA 4) 18:07 (WEA 4)	08:16 16:26	08:42 16:29	
31	05:51 21:26	06:41 20:25	17:34 (WEA 4) 18:12 (WEA 4)		07:25 17:08		08:42 16:30	
Sonnenscheinstunden	503	454	381	331	266	243		
astr.max.mögl.Beschattung		125	1810	342				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 11-SW - IP 11-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	63	17:22 (WEA 4) 18:25 (WEA 4)	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	62	17:21 (WEA 4) 18:23 (WEA 4)	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15	14	16:53 (WEA 4) 17:07 (WEA 4)	60	17:22 (WEA 4) 18:22 (WEA 4)	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	24	16:48 (WEA 4) 17:12 (WEA 4)	59	17:23 (WEA 4) 18:22 (WEA 4)	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	32	16:43 (WEA 4) 17:15 (WEA 4)	56	17:24 (WEA 4) 18:20 (WEA 4)	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	37	16:40 (WEA 4) 17:17 (WEA 4)	54	17:25 (WEA 4) 18:19 (WEA 4)	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	42	16:38 (WEA 4) 17:20 (WEA 4)	52	17:26 (WEA 4) 18:18 (WEA 4)	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	46	16:35 (WEA 4) 17:21 (WEA 4)	48	17:28 (WEA 4) 18:16 (WEA 4)	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	48	16:34 (WEA 4) 17:22 (WEA 4)	46	17:28 (WEA 4) 18:14 (WEA 4)	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	52	16:32 (WEA 4) 17:24 (WEA 4)	42	17:30 (WEA 4) 18:12 (WEA 4)	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	54	16:31 (WEA 4) 17:25 (WEA 4)	38	17:32 (WEA 4) 18:10 (WEA 4)	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	57	16:29 (WEA 4) 17:26 (WEA 4)	33	17:35 (WEA 4) 18:08 (WEA 4)	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	59	16:28 (WEA 4) 17:27 (WEA 4)	28	17:38 (WEA 4) 18:06 (WEA 4)	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	61	16:27 (WEA 4) 17:28 (WEA 4)	21	17:40 (WEA 4) 18:01 (WEA 4)	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	62	16:26 (WEA 4) 17:28 (WEA 4)	8	17:47 (WEA 4) 17:55 (WEA 4)	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	63	16:25 (WEA 4) 17:28 (WEA 4)			05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	65	16:24 (WEA 4) 17:29 (WEA 4)			05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	66	16:23 (WEA 4) 17:29 (WEA 4)			05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	66	16:23 (WEA 4) 17:29 (WEA 4)			05:34 21:26	05:12 21:57
20	08:31 16:58	07:40 17:54	06:38 18:45	68	16:22 (WEA 4) 17:30 (WEA 4)			05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	68	16:21 (WEA 4) 17:29 (WEA 4)			05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	68	16:21 (WEA 4) 17:29 (WEA 4)			05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	68	16:21 (WEA 4) 17:29 (WEA 4)			05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	68	16:20 (WEA 4) 17:28 (WEA 4)			05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	69	16:20 (WEA 4) 17:29 (WEA 4)			05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	67	16:21 (WEA 4) 17:28 (WEA 4)			05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	67	16:20 (WEA 4) 17:27 (WEA 4)			05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	67	16:20 (WEA 4) 17:27 (WEA 4)			05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	66	17:21 (WEA 4) 18:27 (WEA 4)			06:09 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	66	17:20 (WEA 4) 18:26 (WEA 4)			06:07 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	64	17:21 (WEA 4) 18:25 (WEA 4)			06:11 21:42	05:14 21:57
Sonnenscheinstunden	258	277	367		416	670	486	500	
astr.max.mögl.Beschattung			1654						

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 11-SW - IP 11-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	17:31 (WEA 4) 18:09 (WEA 4)	07:32 19:12	17:08 (WEA 4) 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	17:29 (WEA 4) 18:11 (WEA 4)	07:34 19:10	17:09 (WEA 4) 18:04 (WEA 4)	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	17:26 (WEA 4) 18:12 (WEA 4)	07:36 19:08	17:10 (WEA 4) 18:03 (WEA 4)	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	17:25 (WEA 4) 18:13 (WEA 4)	07:37 19:06	17:11 (WEA 4) 18:01 (WEA 4)	08:22 16:23
5	05:19 21:55	05:59 21:18	06:50 20:13	17:22 (WEA 4) 18:14 (WEA 4)	07:39 19:03	17:12 (WEA 4) 17:58 (WEA 4)	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	17:21 (WEA 4) 18:15 (WEA 4)	07:41 19:01	17:13 (WEA 4) 17:57 (WEA 4)	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	17:20 (WEA 4) 18:16 (WEA 4)	07:42 18:59	17:15 (WEA 4) 17:55 (WEA 4)	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	17:18 (WEA 4) 18:16 (WEA 4)	07:44 18:56	17:18 (WEA 4) 17:52 (WEA 4)	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	17:17 (WEA 4) 18:16 (WEA 4)	07:46 18:54	17:20 (WEA 4) 17:48 (WEA 4)	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	17:15 (WEA 4) 18:16 (WEA 4)	07:48 18:52	17:24 (WEA 4) 17:44 (WEA 4)	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	17:14 (WEA 4) 18:17 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	17:12 (WEA 4) 18:16 (WEA 4)	07:51 18:47	07:46 16:47	08:32 16:21
13	05:27 21:50	06:12 21:03	07:03 19:55	17:12 (WEA 4) 18:17 (WEA 4)	07:53 18:45	07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	17:11 (WEA 4) 18:17 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	17:10 (WEA 4) 18:17 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	17:09 (WEA 4) 18:17 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:46	06:18 20:55	07:09 19:45	17:08 (WEA 4) 18:16 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	17:08 (WEA 4) 18:16 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	17:08 (WEA 4) 18:16 (WEA 4)	08:03 18:32	07:59 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	17:07 (WEA 4) 18:15 (WEA 4)	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	17:07 (WEA 4) 18:15 (WEA 4)	08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	07:17 19:34	17:07 (WEA 4) 18:15 (WEA 4)	08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	17:06 (WEA 4) 18:13 (WEA 4)	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	17:06 (WEA 4) 18:13 (WEA 4)	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	17:05 (WEA 4) 18:11 (WEA 4)	07:14 17:20	08:09 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	17:06 (WEA 4) 18:11 (WEA 4)	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	17:06 (WEA 4) 18:10 (WEA 4)	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	17:06 (WEA 4) 17:57 (WEA 4)	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:30	06:38 20:29	07:29 19:17	17:41 (WEA 4) 18:02 (WEA 4)	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	17:37 (WEA 4) 18:06 (WEA 4)	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	07:35 18:08 (WEA 4)	17:35 (WEA 4)	07:25 17:08	08:17 16:30	08:42 16:30
Sonnenscheinstunden	503	454	381	331	266	243	
astr.max.mögl.Beschattung		92	1827	428			

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 12-SO - IP 12-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	11	18:22 (WEA 4) 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	10	18:20 (WEA 4) 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15		07:05 20:09	11	18:18 (WEA 4) 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	10	18:18 (WEA 4) 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	10	18:16 (WEA 4) 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	9	18:15 (WEA 4) 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	8	18:15 (WEA 4) 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	8	18:14 (WEA 4) 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	7	18:13 (WEA 4) 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	7	18:12 (WEA 4) 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	5	18:12 (WEA 4) 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	4	18:12 (WEA 4) 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	3	18:12 (WEA 4) 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	2	18:11 (WEA 4) 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29		05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31		05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33		05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34		05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36		05:34 21:26	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45		06:27 20:38		05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40		05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41		05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43		05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52		06:19 20:45		05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	17:42 (WEA 4)	06:17 20:46		05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	1 17:43 (WEA 4) 5 17:41 (WEA 4)	06:15 20:48		05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	7 17:32 (WEA 4)	06:13 20:50		05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	8 17:39 (WEA 4)	06:11 20:52		05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	8 17:38 (WEA 4) 10 18:37 (WEA 4)	06:09 20:53		05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	10 18:25 (WEA 4)	06:07 20:55		05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	11 18:35 (WEA 4) 11 18:23 (WEA 4)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416		486	500
astr.max.mögl.Beschattung			52		105			

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 12-SO - IP 12-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	18:11 (WEA 4) 18:16 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	18:11 (WEA 4) 18:18 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	18:11 (WEA 4) 18:18 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	18:11 (WEA 4) 18:19 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	18:11 (WEA 4) 18:19 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	18:11 (WEA 4) 18:21 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	18:12 (WEA 4) 18:22 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	18:12 (WEA 4) 18:22 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	18:13 (WEA 4) 18:23 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	18:13 (WEA 4) 18:23 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	18:14 (WEA 4) 18:25 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	18:14 (WEA 4) 18:25 (WEA 4)	07:51 18:47	07:46 16:47	08:32 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55	18:16 (WEA 4) 18:26 (WEA 4)	07:53 18:45	07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	18:17 (WEA 4) 18:27 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	18:19 (WEA 4) 18:27 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	18:21 (WEA 4) 18:29 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45	18:23 (WEA 4) 18:29 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	18:28 (WEA 4) 18:30 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41		08:03 18:32	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38		08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36		08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	07:17 19:34		08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31		08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29		08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26		07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24		07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22		07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19		07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	18:12 (WEA 4) 18:14 (WEA 4)	07:29 19:17	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	18:12 (WEA 4) 18:15 (WEA 4)	07:31 19:15	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:12 (WEA 4) 18:16 (WEA 4)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		9	151				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 12-SW - IP 12-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai		Juni		
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	49	18:19 (WEA 4) 19:08 (WEA 4)	06:05 20:57	36	18:20 (WEA 4) 18:56 (WEA 4)	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	52	18:17 (WEA 4) 19:09 (WEA 4)	06:03 20:58	33	18:21 (WEA 4) 18:54 (WEA 4)	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15		07:05 20:09	54	18:16 (WEA 4) 19:10 (WEA 4)	06:01 21:00	29	18:24 (WEA 4) 18:53 (WEA 4)	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	55	18:15 (WEA 4) 19:10 (WEA 4)	05:59 21:02	23	18:27 (WEA 4) 18:50 (WEA 4)	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	57	18:13 (WEA 4) 19:10 (WEA 4)	05:57 21:03	16	18:30 (WEA 4) 18:46 (WEA 4)	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		07:00 20:14	58	18:13 (WEA 4) 19:11 (WEA 4)	05:55 21:05	3	18:36 (WEA 4) 18:39 (WEA 4)	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	59	18:12 (WEA 4) 19:11 (WEA 4)	05:54 21:07			05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	60	18:12 (WEA 4) 19:12 (WEA 4)	05:52 21:08			05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	61	18:10 (WEA 4) 19:11 (WEA 4)	05:50 21:10			05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	61	18:10 (WEA 4) 19:11 (WEA 4)	05:48 21:12			05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	61	18:10 (WEA 4) 19:11 (WEA 4)	05:47 21:13			05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	61	18:10 (WEA 4) 19:11 (WEA 4)	05:45 21:15			05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	61	18:10 (WEA 4) 19:11 (WEA 4)	05:43 21:16			05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	61	18:09 (WEA 4) 19:10 (WEA 4)	05:42 21:18			05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	61	18:09 (WEA 4) 19:10 (WEA 4)	05:40 21:19			05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	61	18:09 (WEA 4) 19:10 (WEA 4)	05:39 21:21			05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	60	18:09 (WEA 4) 19:09 (WEA 4)	05:37 21:23			05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	60	18:09 (WEA 4) 19:09 (WEA 4)	05:36 21:24			05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	59	18:10 (WEA 4) 19:09 (WEA 4)	05:34 21:26			05:12 21:56
20	08:31 16:58	07:40 17:54	06:38 18:45		06:27 20:38	58	18:10 (WEA 4) 19:08 (WEA 4)	05:33 21:27			05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40	56	18:11 (WEA 4) 19:07 (WEA 4)	05:31 21:28			05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41	56	18:11 (WEA 4) 19:07 (WEA 4)	05:30 21:30			05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43	54	18:12 (WEA 4) 19:06 (WEA 4)	05:29 21:31			05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52		06:19 20:45	52	18:13 (WEA 4) 19:05 (WEA 4)	05:28 21:33			05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	18	06:17 17:37 (WEA 4)	51	18:13 (WEA 4) 19:04 (WEA 4)	05:26 21:34			05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	26	06:15 17:32 (WEA 4)	49	18:14 (WEA 4) 19:03 (WEA 4)	05:25 21:35			05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	32	06:13 18:01 (WEA 4)	47	18:15 (WEA 4) 19:02 (WEA 4)	05:24 21:37			05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	37	06:11 17:26 (WEA 4)	45	18:16 (WEA 4) 18:16 (WEA 4)	05:23 21:38			05:14 21:57
29	08:19 17:14		07:17 20:00	41	06:09 19:05 (WEA 4)	42	18:17 (WEA 4) 18:59 (WEA 4)	05:22 21:39			05:15 21:57
30	08:18 17:15		07:15 20:02	44	06:07 19:06 (WEA 4)	40	18:18 (WEA 4) 18:58 (WEA 4)	05:21 21:40			05:15 21:57
31	08:16 17:17		07:12 20:04	47	06:05 19:07 (WEA 4)			05:20 21:42			
Sonnenscheinstunden	258	277	367		416		486			500	
astr.max.mögl.Beschattung			245		1661		140				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 12-SW - IP 12-SW
Annahmen für Schattenwurfberechnung

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

	July	August	September	Oktober	November	Dezember		
1	05:16 21:57	05:53 21:25	06:43 20:22	18:09 (WEA 4) 19:10 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25	
2	05:17 21:56	05:54 21:23	06:45 20:20	18:09 (WEA 4) 19:10 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25	
3	05:18 21:56	05:56 21:21	06:46 20:18	18:08 (WEA 4) 19:09 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24	
4	05:18 21:56	05:58 21:20	06:48 20:15	18:09 (WEA 4) 19:09 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23	
5	05:19 21:55	05:59 21:18	06:49 20:13	18:08 (WEA 4) 19:07 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23	
6	05:20 21:55	06:01 21:16	06:51 20:11	18:09 (WEA 4) 19:07 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22	
7	05:21 21:54	06:02 21:14	18:43 (WEA 4) 18:53 (WEA 4)	06:53 20:09	18:09 (WEA 4) 19:06 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	18:38 (WEA 4) 18:57 (WEA 4)	06:54 20:06	18:09 (WEA 4) 19:05 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	18:35 (WEA 4) 19:00 (WEA 4)	06:56 20:04	18:10 (WEA 4) 19:04 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	18:32 (WEA 4) 19:02 (WEA 4)	06:58 20:02	18:10 (WEA 4) 19:02 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	18:30 (WEA 4) 19:04 (WEA 4)	06:59 19:59	18:11 (WEA 4) 19:01 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	18:28 (WEA 4) 19:05 (WEA 4)	07:01 19:57	18:11 (WEA 4) 18:59 (WEA 4)	07:51 18:47	07:46 16:47	08:32 16:21
13	05:27 21:49	06:12 21:03	18:27 (WEA 4) 19:06 (WEA 4)	07:03 19:55	18:13 (WEA 4) 18:57 (WEA 4)	07:53 18:45	07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	18:24 (WEA 4) 19:07 (WEA 4)	07:04 19:52	18:14 (WEA 4) 18:56 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	18:23 (WEA 4) 19:08 (WEA 4)	07:06 19:50	18:15 (WEA 4) 18:53 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	18:21 (WEA 4) 19:09 (WEA 4)	07:07 19:48	18:18 (WEA 4) 18:51 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	18:21 (WEA 4) 19:10 (WEA 4)	07:09 19:45	18:19 (WEA 4) 18:47 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	18:19 (WEA 4) 19:10 (WEA 4)	07:11 19:43	18:23 (WEA 4) 18:43 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	18:18 (WEA 4) 19:11 (WEA 4)	07:12 19:41	18:31 (WEA 4) 18:32 (WEA 4)	08:03 18:32	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	18:16 (WEA 4) 19:11 (WEA 4)	07:14 19:38	18:35 (WEA 4) 18:30	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	18:16 (WEA 4) 19:12 (WEA 4)	07:16 19:36	18:30 18:28	08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	18:15 (WEA 4) 19:12 (WEA 4)	07:17 19:34	18:26 18:26	08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	18:14 (WEA 4) 19:12 (WEA 4)	07:19 19:31	18:24 18:24	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	18:14 (WEA 4) 19:12 (WEA 4)	07:21 19:29	18:22 18:22	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	18:12 (WEA 4) 19:12 (WEA 4)	07:22 19:26	18:22 17:20	08:12 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	18:12 (WEA 4) 19:12 (WEA 4)	07:24 19:24	18:20 17:18	08:10 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	18:11 (WEA 4) 19:12 (WEA 4)	07:26 19:22	18:18 17:16	08:12 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	18:11 (WEA 4) 19:12 (WEA 4)	07:27 19:19	18:17 17:14	08:13 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	18:10 (WEA 4) 19:11 (WEA 4)	07:29 19:17	18:16 17:12	08:15 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	18:10 (WEA 4) 19:11 (WEA 4)	07:31 19:15	18:16 17:10	08:16 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:10 (WEA 4) 19:11 (WEA 4)		18:16 17:08	08:16 17:08	08:16 16:30	08:42 16:30
Sonnenscheinstunden	503	454		381		331	266	243
astr.max.mögl.Beschattung		1192		886				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 13-NW - IP 13-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	55	18:08 (WEA 4) 19:03 (WEA 4)	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	56	18:07 (WEA 4) 19:03 (WEA 4)	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15		07:05 20:09	57	18:06 (WEA 4) 19:03 (WEA 4)	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	57	18:06 (WEA 4) 19:03 (WEA 4)	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	57	18:05 (WEA 4) 19:02 (WEA 4)	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	56	18:06 (WEA 4) 19:02 (WEA 4)	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	56	18:06 (WEA 4) 19:02 (WEA 4)	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	55	18:06 (WEA 4) 19:01 (WEA 4)	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	55	18:05 (WEA 4) 19:00 (WEA 4)	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	54	18:06 (WEA 4) 19:00 (WEA 4)	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	53	18:06 (WEA 4) 18:59 (WEA 4)	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	51	18:07 (WEA 4) 18:58 (WEA 4)	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	50	18:08 (WEA 4) 18:58 (WEA 4)	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	49	18:07 (WEA 4) 18:56 (WEA 4)	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	47	18:08 (WEA 4) 18:55 (WEA 4)	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	45	18:09 (WEA 4) 18:54 (WEA 4)	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	43	18:10 (WEA 4) 18:53 (WEA 4)	05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	9	17:35 (WEA 4) 17:44 (WEA 4)	39	18:12 (WEA 4) 18:51 (WEA 4)	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	21	17:29 (WEA 4) 17:50 (WEA 4)	37	18:13 (WEA 4) 18:50 (WEA 4)	05:34 21:26	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	27	17:26 (WEA 4) 17:53 (WEA 4)	33	18:15 (WEA 4) 18:48 (WEA 4)	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	33	17:22 (WEA 4) 17:55 (WEA 4)	29	18:17 (WEA 4) 18:46 (WEA 4)	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	37	17:20 (WEA 4) 17:57 (WEA 4)	24	18:19 (WEA 4) 18:43 (WEA 4)	05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	40	17:18 (WEA 4) 17:58 (WEA 4)	18	18:22 (WEA 4) 18:40 (WEA 4)	05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	43	17:16 (WEA 4) 17:59 (WEA 4)	6	18:28 (WEA 4) 18:34 (WEA 4)	05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	45	17:15 (WEA 4) 18:00 (WEA 4)			05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	47	17:13 (WEA 4) 18:00 (WEA 4)			05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	49	17:12 (WEA 4) 18:01 (WEA 4)			05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	51	17:11 (WEA 4) 18:02 (WEA 4)			05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	53	18:10 (WEA 4) 19:03 (WEA 4)			05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	53	18:09 (WEA 4) 19:02 (WEA 4)			05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	55	18:08 (WEA 4) 19:03 (WEA 4)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416		486	500	
astr.max.mögl.Beschattung			563		1082				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 13-NW - IP 13-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	18:05 (WEA 4) 19:12	07:32 17:06	08:18 16:25	
2	05:17 21:56	05:54 21:23	06:45 20:20	18:05 (WEA 4) 18:59 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	18:03 (WEA 4) 18:58 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	18:03 (WEA 4) 18:58 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	18:02 (WEA 4) 18:58 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	18:02 (WEA 4) 18:58 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	18:02 (WEA 4) 18:58 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	18:01 (WEA 4) 18:57 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	18:01 (WEA 4) 18:57 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	18:00 (WEA 4) 18:56 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	18:00 (WEA 4) 18:56 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	17:59 (WEA 4) 18:54 (WEA 4)	07:51 18:47	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55	18:00 (WEA 4) 18:54 (WEA 4)	07:53 18:45	07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	18:00 (WEA 4) 18:53 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	18:00 (WEA 4) 18:52 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	18:01 (WEA 4) 18:51 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45	18:01 (WEA 4) 18:49 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	18:02 (WEA 4) 18:48 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	18:03 (WEA 4) 18:47 (WEA 4)	08:03 18:32	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	18:03 (WEA 4) 18:44 (WEA 4)	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	18:05 (WEA 4) 18:43 (WEA 4)	08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	07:17 19:34	18:07 (WEA 4) 18:41 (WEA 4)	08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	18:08 (WEA 4) 18:37 (WEA 4)	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	18:11 (WEA 4) 18:34 (WEA 4)	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	18:14 (WEA 4) 18:29 (WEA 4)	07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	18:13 (WEA 4) 18:56 (WEA 4)	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	18:11 (WEA 4) 18:56 (WEA 4)	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	18:10 (WEA 4) 18:57 (WEA 4)	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	18:08 (WEA 4) 18:57 (WEA 4)	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	18:07 (WEA 4) 18:58 (WEA 4)	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:07 (WEA 4) 18:58 (WEA 4)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		482	1190				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 13-SW - IP 13-SW
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März		April		Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	55	18:10 (WEA 4) 19:05 (WEA 4)	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	55	18:09 (WEA 4) 19:04 (WEA 4)	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15		07:05 20:09	56	18:08 (WEA 4) 19:04 (WEA 4)	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	57	18:08 (WEA 4) 19:05 (WEA 4)	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	57	18:07 (WEA 4) 19:04 (WEA 4)	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	57	18:07 (WEA 4) 19:04 (WEA 4)	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	57	18:07 (WEA 4) 19:04 (WEA 4)	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	57	18:07 (WEA 4) 19:04 (WEA 4)	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	55	18:07 (WEA 4) 19:02 (WEA 4)	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	55	18:07 (WEA 4) 19:02 (WEA 4)	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	54	18:07 (WEA 4) 19:01 (WEA 4)	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	53	18:08 (WEA 4) 19:01 (WEA 4)	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	52	18:08 (WEA 4) 19:00 (WEA 4)	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	51	18:08 (WEA 4) 18:59 (WEA 4)	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	49	18:09 (WEA 4) 18:58 (WEA 4)	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	47	18:10 (WEA 4) 18:57 (WEA 4)	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	45	18:11 (WEA 4) 18:56 (WEA 4)	05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	43	18:12 (WEA 4) 18:55 (WEA 4)	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	10	17:36 (WEA 4) 17:46 (WEA 4)	40	18:13 (WEA 4) 18:53 (WEA 4)	05:34 21:26	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	22	17:30 (WEA 4) 17:52 (WEA 4)	37	18:15 (WEA 4) 18:52 (WEA 4)	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	28	17:26 (WEA 4) 17:54 (WEA 4)	34	18:16 (WEA 4) 18:50 (WEA 4)	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	33	17:24 (WEA 4) 17:57 (WEA 4)	30	18:18 (WEA 4) 18:48 (WEA 4)	05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	37	17:22 (WEA 4) 17:59 (WEA 4)	26	18:20 (WEA 4) 18:46 (WEA 4)	05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	40	17:19 (WEA 4) 17:59 (WEA 4)	20	18:23 (WEA 4) 18:43 (WEA 4)	05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	43	17:18 (WEA 4) 18:01 (WEA 4)	10	18:28 (WEA 4) 18:38 (WEA 4)	05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	46	17:15 (WEA 4) 18:01 (WEA 4)			05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	48	17:14 (WEA 4) 18:02 (WEA 4)			05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	50	17:13 (WEA 4) 18:03 (WEA 4)			05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	51	18:03 (WEA 4) 19:04 (WEA 4)			05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	53	18:11 (WEA 4) 19:04 (WEA 4)			05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	54	18:10 (WEA 4) 19:04 (WEA 4)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416		486	500	
astr.max.mögl.Beschattung			515		1152				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 13-SW - IP 13-SW
Annahmen für Schattenwurfberechnung

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

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	18:06 (WEA 4) 19:00 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	18:06 (WEA 4) 19:01 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	18:05 (WEA 4) 19:00 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	18:04 (WEA 4) 19:01 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	18:03 (WEA 4) 19:00 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	18:03 (WEA 4) 19:00 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	18:03 (WEA 4) 19:00 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	18:02 (WEA 4) 18:59 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	18:02 (WEA 4) 18:59 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	18:02 (WEA 4) 18:57 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	18:02 (WEA 4) 18:57 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	18:02 (WEA 4) 18:56 (WEA 4)	07:51 18:47	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55	18:02 (WEA 4) 18:55 (WEA 4)	07:53 18:45	07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	18:03 (WEA 4) 18:55 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	18:03 (WEA 4) 18:53 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	18:03 (WEA 4) 18:52 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45	18:03 (WEA 4) 18:50 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	18:05 (WEA 4) 18:49 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	18:06 (WEA 4) 18:47 (WEA 4)	08:03 18:32	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	18:07 (WEA 4) 18:45 (WEA 4)	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	18:09 (WEA 4) 18:43 (WEA 4)	08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	07:17 19:34	18:11 (WEA 4) 18:40 (WEA 4)	08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	18:13 (WEA 4) 18:36 (WEA 4)	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	18:17 (WEA 4) 18:32 (WEA 4)	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	18:15 (WEA 4) 18:58 (WEA 4)	07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	18:13 (WEA 4) 18:59 (WEA 4)	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	18:12 (WEA 4) 18:59 (WEA 4)	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	18:11 (WEA 4) 19:00 (WEA 4)	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	18:09 (WEA 4) 19:00 (WEA 4)	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	18:08 (WEA 4) 19:00 (WEA 4)	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:08 (WEA 4) 19:01 (WEA 4)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		542	1145				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 14-NW - IP 14-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	46	18:27 (WEA 4) 19:13 (WEA 4)	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	48	18:25 (WEA 4) 19:13 (WEA 4)	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15		07:05 20:09	50	18:24 (WEA 4) 19:14 (WEA 4)	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	51	18:23 (WEA 4) 19:14 (WEA 4)	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	52	18:22 (WEA 4) 19:14 (WEA 4)	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	53	18:21 (WEA 4) 19:14 (WEA 4)	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	54	18:21 (WEA 4) 19:15 (WEA 4)	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	54	18:21 (WEA 4) 19:15 (WEA 4)	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	54	18:20 (WEA 4) 19:14 (WEA 4)	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	54	18:20 (WEA 4) 19:14 (WEA 4)	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	54	18:20 (WEA 4) 19:14 (WEA 4)	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	54	18:20 (WEA 4) 19:14 (WEA 4)	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	53	18:20 (WEA 4) 19:13 (WEA 4)	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	53	18:19 (WEA 4) 19:12 (WEA 4)	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	52	18:20 (WEA 4) 19:12 (WEA 4)	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	51	18:20 (WEA 4) 19:11 (WEA 4)	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	49	18:21 (WEA 4) 19:10 (WEA 4)	05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	49	18:21 (WEA 4) 19:10 (WEA 4)	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	47	18:22 (WEA 4) 19:09 (WEA 4)	05:34 21:26	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45		06:27 20:38	45	18:23 (WEA 4) 19:08 (WEA 4)	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40	43	18:24 (WEA 4) 19:07 (WEA 4)	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41	41	18:25 (WEA 4) 19:06 (WEA 4)	05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43	38	18:26 (WEA 4) 19:04 (WEA 4)	05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	12	06:19 20:45	36	18:27 (WEA 4) 19:03 (WEA 4)	05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	22	06:17 20:46	33	18:28 (WEA 4) 19:01 (WEA 4)	05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	28	06:15 20:48	29	17:37 (WEA 4) 18:05 (WEA 4)	05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	32	06:13 20:50	25	18:05 (WEA 4) 18:07 (WEA 4)	05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	36	06:11 20:52	19	17:33 (WEA 4) 18:09 (WEA 4)	05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	40	06:09 20:53	10	18:31 (WEA 4) 19:11 (WEA 4)	05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	42	06:07 20:55		18:29 (WEA 4) 19:11 (WEA 4)	05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	44			18:28 (WEA 4) 19:12 (WEA 4)	05:20 21:42	
Sonnenscheinstunden	258	277	367		416		486	500	
astr.max.mögl.Beschattung			256		1297				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 14-NW - IP 14-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	18:19 (WEA 4) 19:13 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	18:19 (WEA 4) 19:13 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	18:18 (WEA 4) 19:12 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	18:18 (WEA 4) 19:12 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	18:17 (WEA 4) 19:11 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	18:18 (WEA 4) 19:10 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	18:18 (WEA 4) 19:10 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	18:18 (WEA 4) 19:09 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	18:18 (WEA 4) 19:08 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	18:18 (WEA 4) 19:06 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	18:19 (WEA 4) 19:06 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	18:19 (WEA 4) 19:04 (WEA 4)	07:51 18:47	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55	18:20 (WEA 4) 19:03 (WEA 4)	07:53 18:45	07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	18:45 (WEA 4) 19:52	07:04 18:21 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	18:42 (WEA 4) 19:50	07:06 18:59 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	18:38 (WEA 4) 19:48	07:07 18:57 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	18:36 (WEA 4) 19:45	07:09 19:06 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	18:34 (WEA 4) 19:43	07:11 19:07 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	18:32 (WEA 4) 19:41	07:12 19:09 (WEA 4)	08:03 18:32	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	18:30 (WEA 4) 19:38	07:14 19:09 (WEA 4)	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	18:29 (WEA 4) 19:36	07:16 19:11 (WEA 4)	08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	18:28 (WEA 4) 19:34	07:17 19:12 (WEA 4)	08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	18:26 (WEA 4) 19:31	07:19 19:12 (WEA 4)	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	18:26 (WEA 4) 19:29	07:21 19:13 (WEA 4)	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	18:24 (WEA 4) 19:26	07:22 19:13 (WEA 4)	07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	18:23 (WEA 4) 19:24	07:24 19:13 (WEA 4)	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	18:22 (WEA 4) 19:22	07:26 19:13 (WEA 4)	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	18:22 (WEA 4) 19:19	07:27 19:13 (WEA 4)	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	18:20 (WEA 4) 19:17	07:29 19:13 (WEA 4)	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	18:20 (WEA 4) 19:15	07:31 19:13 (WEA 4)	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:20 (WEA 4) 19:14 (WEA 4)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381	331	266	243	
astr.max.mögl.Beschattung		738	835				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 14-SW - IP 14-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	45	18:29 (WEA 4) 19:14 (WEA 4)	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	47	18:27 (WEA 4) 19:14 (WEA 4)	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15		07:05 20:09	48	18:27 (WEA 4) 19:15 (WEA 4)	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	50	18:26 (WEA 4) 19:16 (WEA 4)	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	51	18:24 (WEA 4) 19:15 (WEA 4)	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	52	18:24 (WEA 4) 19:16 (WEA 4)	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	53	18:23 (WEA 4) 19:16 (WEA 4)	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	53	18:23 (WEA 4) 19:16 (WEA 4)	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	54	18:22 (WEA 4) 19:16 (WEA 4)	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	55	18:21 (WEA 4) 19:16 (WEA 4)	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	55	18:21 (WEA 4) 19:16 (WEA 4)	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	55	18:21 (WEA 4) 19:16 (WEA 4)	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	53	18:22 (WEA 4) 19:15 (WEA 4)	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	53	18:21 (WEA 4) 19:14 (WEA 4)	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	53	18:21 (WEA 4) 19:14 (WEA 4)	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	52	18:21 (WEA 4) 19:13 (WEA 4)	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	51	18:22 (WEA 4) 19:13 (WEA 4)	05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	50	18:22 (WEA 4) 19:12 (WEA 4)	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	49	18:23 (WEA 4) 19:12 (WEA 4)	05:34 21:26	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45		06:27 20:38	48	18:23 (WEA 4) 19:11 (WEA 4)	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40	46	18:24 (WEA 4) 19:10 (WEA 4)	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41	44	18:25 (WEA 4) 19:09 (WEA 4)	05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43	42	18:26 (WEA 4) 19:08 (WEA 4)	05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52		06:19 20:45	39	18:27 (WEA 4) 19:06 (WEA 4)	05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	12	06:17 18:00 (WEA 4)	37	18:28 (WEA 4) 19:05 (WEA 4)	05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	22	06:15 17:42 (WEA 4)	33	18:30 (WEA 4) 19:03 (WEA 4)	05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	28	06:13 17:39 (WEA 4)	30	18:31 (WEA 4) 19:01 (WEA 4)	05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	33	06:11 17:36 (WEA 4)	26	18:33 (WEA 4) 18:59 (WEA 4)	05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	36	06:09 19:11 (WEA 4)	20	18:35 (WEA 4) 18:56 (WEA 4)	05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	40	06:07 19:12 (WEA 4)	13	18:32 (WEA 4) 18:52 (WEA 4)	05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	42	06:05 19:13 (WEA 4)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416		486	500	
astr.max.mögl.Beschattung			213		1357				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 14-SW - IP 14-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	18:20 (WEA 4) 19:15 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	18:20 (WEA 4) 19:15 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18	18:20 (WEA 4) 19:14 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	18:20 (WEA 4) 19:14 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	18:19 (WEA 4) 19:12 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	18:20 (WEA 4) 19:12 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	18:20 (WEA 4) 19:12 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	18:20 (WEA 4) 19:10 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	18:21 (WEA 4) 19:09 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	18:21 (WEA 4) 19:08 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	18:22 (WEA 4) 19:07 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	18:22 (WEA 4) 19:04 (WEA 4)	07:51 18:47	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	18:47 (WEA 4) 19:02 (WEA 4)	07:03 19:55	18:23 (WEA 4) 19:03 (WEA 4)	07:53 18:45	08:33 16:46
14	05:28 21:49	06:14 21:01	18:43 (WEA 4) 19:05 (WEA 4)	07:04 19:52	18:25 (WEA 4) 19:02 (WEA 4)	07:54 18:43	08:33 16:44
15	05:29 21:48	06:15 20:59	18:40 (WEA 4) 19:07 (WEA 4)	07:06 19:50	18:25 (WEA 4) 18:59 (WEA 4)	07:56 18:41	08:34 16:43
16	05:30 21:47	06:17 20:57	18:37 (WEA 4) 19:08 (WEA 4)	07:07 19:48	18:28 (WEA 4) 18:57 (WEA 4)	07:58 18:39	08:35 16:41
17	05:32 21:45	06:18 20:55	18:36 (WEA 4) 19:10 (WEA 4)	07:09 19:45	18:30 (WEA 4) 18:53 (WEA 4)	08:00 18:36	08:36 16:40
18	05:33 21:44	06:20 20:53	18:34 (WEA 4) 19:11 (WEA 4)	07:11 19:43	18:34 (WEA 4) 18:49 (WEA 4)	08:01 18:34	08:37 16:39
19	05:34 21:43	06:22 20:51	18:32 (WEA 4) 19:12 (WEA 4)	07:12 19:41	08:03 18:32	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	18:30 (WEA 4) 19:12 (WEA 4)	07:14 19:38	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	18:29 (WEA 4) 19:14 (WEA 4)	07:16 19:36	08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	18:29 (WEA 4) 19:15 (WEA 4)	07:17 19:34	08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	18:27 (WEA 4) 19:15 (WEA 4)	07:19 19:31	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	18:26 (WEA 4) 19:15 (WEA 4)	07:21 19:29	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	18:25 (WEA 4) 19:15 (WEA 4)	07:22 19:26	07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	18:24 (WEA 4) 19:16 (WEA 4)	07:24 19:24	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	18:23 (WEA 4) 19:15 (WEA 4)	07:26 19:22	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	18:23 (WEA 4) 19:16 (WEA 4)	07:27 19:19	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	18:22 (WEA 4) 19:15 (WEA 4)	07:29 19:17	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	18:21 (WEA 4) 19:15 (WEA 4)	07:31 19:15	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:21 (WEA 4) 19:16 (WEA 4)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		805	785				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 15-NW - IP 15-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April		Mai		Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05		06:05 20:57	18:47 (WEA 4)	05:19 21:43	19:08 (WEA 4) 19:28 (WEA 4)
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07		06:03 20:58	18:47 (WEA 4)	05:18 21:44	19:10 (WEA 4) 19:27 (WEA 4)
3	08:41 16:33	08:11 17:23	07:17 18:15	07:05 20:09		06:01 21:00	18:47 (WEA 4)	05:18 21:45	19:13 (WEA 4) 19:25 (WEA 4)
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10		05:59 21:02	18:47 (WEA 4)	05:17 21:46	19:16 (WEA 4) 19:22 (WEA 4)
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12		05:57 21:03	18:47 (WEA 4)	05:16 21:47	
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14		05:55 21:05	18:47 (WEA 4)	05:15 21:48	
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16		05:54 21:07	18:47 (WEA 4)	05:15 21:49	
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17		05:52 21:08	18:47 (WEA 4)	05:14 21:50	
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19		05:50 21:10	18:47 (WEA 4)	05:14 21:51	
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21		05:48 21:12	18:48 (WEA 4)	05:13 21:51	
11	08:38 16:43	07:58 17:38	06:59 18:29	06:47 20:22		05:47 21:13	18:48 (WEA 4)	05:13 21:52	
12	08:38 16:45	07:56 17:40	06:56 18:31	06:45 20:24	13	19:14 (WEA 4) 21:15	05:45 18:49 (WEA 4)	05:13 21:53	
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26	23	19:09 (WEA 4) 21:16	05:43 18:49 (WEA 4)	05:12 21:54	
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	28	19:05 (WEA 4) 21:18	05:42 18:50 (WEA 4)	05:12 21:54	
15	08:35 16:50	07:50 17:45	06:49 18:36	06:38 20:29	34	19:02 (WEA 4) 21:19	05:40 18:50 (WEA 4)	05:12 21:55	
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	38	19:00 (WEA 4) 21:21	05:39 18:51 (WEA 4)	05:12 21:55	
17	08:34 16:53	07:46 17:49	06:45 18:39	06:34 20:33	41	18:58 (WEA 4) 21:22	05:37 18:52 (WEA 4)	05:12 21:56	
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	43	19:39 (WEA 4) 21:24	05:36 18:52 (WEA 4)	05:12 21:56	
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	45	18:56 (WEA 4) 21:25	05:34 18:53 (WEA 4)	05:12 21:56	
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	48	18:54 (WEA 4) 21:27	05:33 18:54 (WEA 4)	05:12 21:57	
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	50	18:53 (WEA 4) 21:28	05:31 18:55 (WEA 4)	05:12 21:57	
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	52	18:52 (WEA 4) 21:30	05:30 18:56 (WEA 4)	05:12 21:57	
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	53	18:51 (WEA 4) 21:31	05:29 18:57 (WEA 4)	05:12 21:57	
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	54	18:51 (WEA 4) 21:33	05:28 18:58 (WEA 4)	05:13 21:58	
25	08:25 17:06	07:30 18:04	06:26 18:53	06:17 20:46	55	18:50 (WEA 4) 21:34	05:26 18:59 (WEA 4)	05:13 21:58	
26	08:23 17:08	07:27 18:06	06:24 18:55	06:15 20:48	56	18:49 (WEA 4) 21:35	05:25 19:01 (WEA 4)	05:13 21:58	
27	08:22 17:10	07:25 18:07	06:22 18:57	06:13 20:50	56	18:49 (WEA 4) 21:37	05:24 19:03 (WEA 4)	05:14 21:58	
28	08:21 17:12	07:23 18:09	06:19 18:58	06:11 20:52	57	18:48 (WEA 4) 21:38	05:23 19:02 (WEA 4)	05:14 21:57	
29	08:19 17:14		07:17 20:00	06:09 20:53	57	18:48 (WEA 4) 21:39	05:22 19:03 (WEA 4)	05:15 21:57	
30	08:18 17:15		07:15 20:02	06:07 20:55	58	18:47 (WEA 4) 21:40	05:21 19:05 (WEA 4)	05:15 21:57	
31	08:16 17:17		07:12 20:04			05:20 21:42	19:07 (WEA 4)		
	Sonnenscheinstunden	258	277	367	416	486		500	
	astr.max.mögl.Beschattung				861	1447		55	

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 15-NW - IP 15-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli		August		September	Oktober	November	Dezember
1	05:16		05:53	18:59 (WEA 4)	06:43	07:32	07:26	08:18
	21:57		21:25	55 19:54 (WEA 4)	20:22	19:12	17:06	16:25
2	05:17		05:54	18:58 (WEA 4)	06:45	07:34	07:28	08:19
	21:56		21:23	56 19:54 (WEA 4)	20:20	19:10	17:04	16:25
3	05:18		05:56	18:58 (WEA 4)	06:46	07:36	07:30	08:21
	21:56		21:21	56 19:54 (WEA 4)	20:18	19:08	17:02	16:24
4	05:18		05:58	18:58 (WEA 4)	06:48	07:37	07:32	08:22
	21:56		21:20	56 19:54 (WEA 4)	20:15	19:06	17:01	16:23
5	05:19		05:59	18:58 (WEA 4)	06:49	07:39	07:34	08:23
	21:55		21:18	57 19:55 (WEA 4)	20:13	19:03	16:59	16:23
6	05:20		06:01	18:57 (WEA 4)	06:51	07:41	07:35	08:25
	21:55		21:16	57 19:54 (WEA 4)	20:11	19:01	16:57	16:22
7	05:21		06:02	18:57 (WEA 4)	06:53	07:42	07:37	08:26
	21:54		21:14	58 19:55 (WEA 4)	20:09	18:59	16:55	16:22
8	05:22		06:04	18:56 (WEA 4)	06:54	07:44	07:39	08:27
	21:53		21:12	58 19:54 (WEA 4)	20:06	18:56	16:54	16:22
9	05:23	11 19:20 (WEA 4)	06:05	18:56 (WEA 4)	06:56	07:46	07:41	08:28
	21:53		21:11	59 19:55 (WEA 4)	20:04	18:54	16:52	16:21
10	05:24	15 19:18 (WEA 4)	06:07	18:56 (WEA 4)	06:58	07:48	07:43	08:29
	21:52		21:09	58 19:54 (WEA 4)	20:02	18:52	16:50	16:21
11	05:25	18 19:17 (WEA 4)	06:09	18:56 (WEA 4)	06:59	07:49	07:44	08:30
	21:51		21:07	58 19:54 (WEA 4)	19:59	18:50	16:49	16:21
12	05:26	22 19:15 (WEA 4)	06:10	18:55 (WEA 4)	07:01	07:51	07:46	08:31
	21:50		21:05	59 19:54 (WEA 4)	19:57	18:47	16:47	16:21
13	05:27	24 19:14 (WEA 4)	06:12	18:56 (WEA 4)	07:03	07:53	07:48	08:32
	21:49		21:03	58 19:54 (WEA 4)	19:55	18:45	16:46	16:21
14	05:28	26 19:14 (WEA 4)	06:14	18:55 (WEA 4)	07:04	07:54	07:50	08:33
	21:49		21:01	58 19:53 (WEA 4)	19:52	18:43	16:44	16:21
15	05:29	29 19:12 (WEA 4)	06:15	18:56 (WEA 4)	07:06	07:56	07:52	08:34
	21:48		20:59	57 19:53 (WEA 4)	19:50	18:41	16:43	16:21
16	05:30	31 19:11 (WEA 4)	06:17	18:55 (WEA 4)	07:07	07:58	07:53	08:35
	21:47		20:57	57 19:52 (WEA 4)	19:48	18:39	16:41	16:21
17	05:32	33 19:10 (WEA 4)	06:18	18:56 (WEA 4)	07:09	08:00	07:55	08:36
	21:45		20:55	56 19:52 (WEA 4)	19:45	18:36	16:40	16:21
18	05:33	35 19:09 (WEA 4)	06:20	18:56 (WEA 4)	07:11	08:01	07:57	08:37
	21:44		20:53	54 19:50 (WEA 4)	19:43	18:34	16:39	16:21
19	05:34	37 19:08 (WEA 4)	06:22	18:56 (WEA 4)	07:12	08:03	07:58	08:38
	21:43		20:51	54 19:50 (WEA 4)	19:41	18:32	16:37	16:22
20	05:36	39 19:08 (WEA 4)	06:23	18:56 (WEA 4)	07:14	08:05	08:00	08:38
	21:42		20:49	53 19:49 (WEA 4)	19:38	18:30	16:36	16:22
21	05:37	40 19:07 (WEA 4)	06:25	18:57 (WEA 4)	07:16	08:07	08:02	08:39
	21:41		20:46	51 19:48 (WEA 4)	19:36	18:28	16:35	16:23
22	05:38	42 19:06 (WEA 4)	06:27	18:58 (WEA 4)	07:17	08:08	08:04	08:39
	21:40		20:44	50 19:48 (WEA 4)	19:34	18:26	16:34	16:23
23	05:40	44 19:04 (WEA 4)	06:28	18:58 (WEA 4)	07:19	08:10	08:05	08:40
	21:38		20:42	48 19:46 (WEA 4)	19:31	18:24	16:33	16:24
24	05:41	46 19:04 (WEA 4)	06:30	19:00 (WEA 4)	07:21	08:12	08:07	08:40
	21:37		20:40	45 19:45 (WEA 4)	19:29	18:22	16:31	16:24
25	05:42	48 19:03 (WEA 4)	06:31	19:00 (WEA 4)	07:22	07:14	08:08	08:41
	21:35		20:38	43 19:43 (WEA 4)	19:26	17:20	16:30	16:25
26	05:44	49 19:02 (WEA 4)	06:33	19:01 (WEA 4)	07:24	07:16	08:10	08:41
	21:34		20:36	41 19:42 (WEA 4)	19:24	17:18	16:29	16:25
27	05:45	51 19:02 (WEA 4)	06:35	19:02 (WEA 4)	07:26	07:17	08:12	08:41
	21:33		20:33	37 19:39 (WEA 4)	19:22	17:16	16:29	16:26
28	05:47	52 19:01 (WEA 4)	06:36	19:04 (WEA 4)	07:27	07:19	08:13	08:41
	21:31		20:31	33 19:37 (WEA 4)	19:19	17:14	16:28	16:27
29	05:48	53 19:01 (WEA 4)	06:38	19:06 (WEA 4)	07:29	07:21	08:15	08:42
	21:29		20:29	28 19:34 (WEA 4)	19:17	17:12	16:27	16:28
30	05:50	54 19:00 (WEA 4)	06:40	19:09 (WEA 4)	07:31	07:23	08:16	08:42
	21:28		20:27	22 19:31 (WEA 4)	19:15	17:10	16:26	16:29
31	05:51		06:41	19:14 (WEA 4)		07:25		08:42
	21:26		20:25	13 19:27 (WEA 4)		17:08		16:30
Sonnenscheinstunden	503		454		381	331	266	243
astr.max.mögl.Beschattung	846		1545					

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 15-SW - IP 15-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April		Mai		Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05		06:05 20:57		05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07		06:03 20:58	59	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15	07:05 20:09		06:01 21:00	58	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10		05:59 21:02	59	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12		05:57 21:03	59	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14		05:55 21:05	59	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16		05:54 21:07	59	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17		05:52 21:08	58	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19		05:50 21:10	58	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21		05:48 21:12	58	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	06:47 20:22		05:47 21:13	57	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	06:45 20:24		05:45 21:15	57	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26	7	19:19 (WEA 4) 19:26 (WEA 4)	56	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	19	19:12 (WEA 4) 19:31 (WEA 4)	55	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	06:38 20:29	26	19:08 (WEA 4) 19:34 (WEA 4)	54	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	32	19:05 (WEA 4) 19:37 (WEA 4)	53	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	06:34 20:33	36	19:03 (WEA 4) 19:39 (WEA 4)	52	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	40	19:01 (WEA 4) 19:41 (WEA 4)	51	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	42	19:00 (WEA 4) 19:42 (WEA 4)	50	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	45	18:58 (WEA 4) 19:43 (WEA 4)	49	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	47	18:57 (WEA 4) 19:44 (WEA 4)	48	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	49	18:56 (WEA 4) 19:45 (WEA 4)	47	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	51	18:55 (WEA 4) 19:46 (WEA 4)	45	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	52	18:54 (WEA 4) 19:46 (WEA 4)	44	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	06:17 20:46	54	18:53 (WEA 4) 19:47 (WEA 4)	42	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	06:15 20:48	55	18:52 (WEA 4) 19:47 (WEA 4)	41	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	06:13 20:50	56	18:51 (WEA 4) 19:47 (WEA 4)	39	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	06:11 20:52	57	18:51 (WEA 4) 19:48 (WEA 4)	38	05:14 21:57
29	08:19 17:14		07:17 20:00	06:09 20:53	58	18:50 (WEA 4) 19:48 (WEA 4)	36	05:15 21:57
30	08:18 17:15		07:15 20:02	06:07 20:55	58	18:50 (WEA 4) 19:48 (WEA 4)	34	05:15 21:57
31	08:16 17:17		07:12 20:04			05:20 21:42	33	05:14 19:37 (WEA 4)
Sonnenscheinstunden	258	277	367	416		486		500
astr.max.mögl.Beschattung				784		1567		217

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 15-SW - IP 15-SW
Annahmen für Schattenwurfberechnung

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

	Juli		August		September		Oktober		November		Dezember	
1	05:16		05:53		19:00 (WEA 4)	06:43	07:32		07:26	08:18		
	21:57		21:25	57	19:57 (WEA 4)	20:22	19:12		17:06	16:25		
2	05:17	19:24 (WEA 4)	05:54		19:00 (WEA 4)	06:45	07:34		07:28	08:19		
	21:56	8	21:23	57	19:57 (WEA 4)	20:20	19:10		17:04	16:25		
3	05:18	19:21 (WEA 4)	05:56		19:00 (WEA 4)	06:46	07:36		07:30	08:21		
	21:56	12	21:21	58	19:58 (WEA 4)	20:18	19:08		17:02	16:24		
4	05:18	19:20 (WEA 4)	05:58		18:59 (WEA 4)	06:48	07:37		07:32	08:22		
	21:56	15	21:20	58	19:57 (WEA 4)	20:15	19:06		17:01	16:23		
5	05:19	19:19 (WEA 4)	05:59		18:59 (WEA 4)	06:49	07:39		07:34	08:23		
	21:55	17	21:18	59	19:58 (WEA 4)	20:13	19:03		16:59	16:23		
6	05:20	19:18 (WEA 4)	06:01		18:58 (WEA 4)	06:51	07:41		07:35	08:25		
	21:55	20	21:16	59	19:57 (WEA 4)	20:11	19:01		16:57	16:22		
7	05:21	19:17 (WEA 4)	06:02		18:59 (WEA 4)	06:53	07:42		07:37	08:26		
	21:54	22	21:14	59	19:58 (WEA 4)	20:09	18:59		16:55	16:22		
8	05:22	19:16 (WEA 4)	06:04		18:58 (WEA 4)	06:54	07:44		07:39	08:27		
	21:53	24	21:12	59	19:57 (WEA 4)	20:06	18:56		16:54	16:22		
9	05:23	19:15 (WEA 4)	06:05		18:58 (WEA 4)	06:56	07:46		07:41	08:28		
	21:53	26	21:11	59	19:57 (WEA 4)	20:04	18:54		16:52	16:21		
10	05:24	19:14 (WEA 4)	06:07		18:58 (WEA 4)	06:58	07:48		07:43	08:29		
	21:52	28	21:09	59	19:57 (WEA 4)	20:02	18:52		16:50	16:21		
11	05:25	19:13 (WEA 4)	06:09		18:58 (WEA 4)	06:59	07:49		07:44	08:30		
	21:51	30	21:07	59	19:57 (WEA 4)	19:59	18:50		16:49	16:21		
12	05:26	19:12 (WEA 4)	06:10		18:58 (WEA 4)	07:01	07:51		07:46	08:31		
	21:50	32	21:05	58	19:56 (WEA 4)	19:57	18:47		16:47	16:21		
13	05:27	19:11 (WEA 4)	06:12		18:58 (WEA 4)	07:03	07:53		07:48	08:32		
	21:49	34	21:03	58	19:56 (WEA 4)	19:55	18:45		16:46	16:21		
14	05:28	19:12 (WEA 4)	06:14		18:58 (WEA 4)	07:04	07:54		07:50	08:33		
	21:49	35	21:01	57	19:55 (WEA 4)	19:52	18:43		16:44	16:21		
15	05:29	19:11 (WEA 4)	06:15		18:58 (WEA 4)	07:06	07:56		07:52	08:34		
	21:48	37	20:59	57	19:55 (WEA 4)	19:50	18:41		16:43	16:21		
16	05:30	19:10 (WEA 4)	06:17		18:58 (WEA 4)	07:07	07:58		07:53	08:35		
	21:47	38	20:57	56	19:54 (WEA 4)	19:48	18:39		16:41	16:21		
17	05:32	19:09 (WEA 4)	06:18		18:59 (WEA 4)	07:09	08:00		07:55	08:36		
	21:45	40	20:55	55	19:54 (WEA 4)	19:45	18:36		16:40	16:21		
18	05:33	19:08 (WEA 4)	06:20		18:59 (WEA 4)	07:11	08:01		07:57	08:37		
	21:44	42	20:53	53	19:52 (WEA 4)	19:43	18:34		16:39	16:21		
19	05:34	19:07 (WEA 4)	06:22		18:59 (WEA 4)	07:12	08:03		07:58	08:38		
	21:43	43	20:51	53	19:52 (WEA 4)	19:41	18:32		16:37	16:22		
20	05:36	19:07 (WEA 4)	06:23		18:59 (WEA 4)	07:14	08:05		08:00	08:38		
	21:42	45	20:49	51	19:50 (WEA 4)	19:38	18:30		16:36	16:22		
21	05:37	19:06 (WEA 4)	06:25		19:01 (WEA 4)	07:16	08:07		08:02	08:39		
	21:41	46	20:46	48	19:49 (WEA 4)	19:36	18:28		16:35	16:23		
22	05:38	19:05 (WEA 4)	06:27		19:02 (WEA 4)	07:17	08:08		08:04	08:39		
	21:40	48	20:44	47	19:49 (WEA 4)	19:34	18:26		16:34	16:23		
23	05:40	19:04 (WEA 4)	06:28		19:02 (WEA 4)	07:19	08:10		08:05	08:40		
	21:38	49	20:42	45	19:47 (WEA 4)	19:31	18:24		16:33	16:24		
24	05:41	19:05 (WEA 4)	06:30		19:04 (WEA 4)	07:21	08:12		08:07	08:40		
	21:37	49	20:40	42	19:46 (WEA 4)	19:29	18:22		16:31	16:24		
25	05:42	19:04 (WEA 4)	06:31		19:04 (WEA 4)	07:22	07:14		08:08	08:41		
	21:35	50	20:38	39	19:43 (WEA 4)	19:26	17:20		16:30	16:25		
26	05:44	19:03 (WEA 4)	06:33		19:06 (WEA 4)	07:24	07:16		08:10	08:41		
	21:34	51	20:36	36	19:42 (WEA 4)	19:24	17:18		16:29	16:25		
27	05:45	19:03 (WEA 4)	06:35		19:07 (WEA 4)	07:26	07:17		08:12	08:41		
	21:33	53	20:33	32	19:39 (WEA 4)	19:22	17:16		16:29	16:26		
28	05:47	19:02 (WEA 4)	06:36		19:10 (WEA 4)	07:27	07:19		08:13	08:41		
	21:31	54	20:31	26	19:36 (WEA 4)	19:19	17:14		16:28	16:27		
29	05:48	19:02 (WEA 4)	06:38		19:13 (WEA 4)	07:29	07:21		08:15	08:42		
	21:29	55	20:29	19	19:32 (WEA 4)	19:17	17:12		16:27	16:28		
30	05:50	19:01 (WEA 4)	06:40		19:20 (WEA 4)	07:31	07:23		08:16	08:42		
	21:28	56	20:27	5	19:25 (WEA 4)	19:15	17:10		16:26	16:29		
31	05:51	19:00 (WEA 4)	06:41				07:25			08:42		
	21:26	56	20:25				17:08			16:30		
Sonnenscheinstunden	503		454			381		331		266		243
astr.max.mögl.Beschattung		1115		1480								

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 16-NW - IP 16-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April		Mai		Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05		06:05 20:57	51	18:43 (WEA 4) 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07		06:03 20:58	50	18:43 (WEA 4) 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09		06:01 21:00	50	18:44 (WEA 4) 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10		05:59 21:02	48	18:45 (WEA 4) 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12		05:57 21:03	47	18:45 (WEA 4) 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14	12	19:08 (WEA 4) 19:20 (WEA 4)	45	05:55 18:46 (WEA 4) 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16	22	19:03 (WEA 4) 19:25 (WEA 4)	44	05:54 18:47 (WEA 4) 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17	27	19:00 (WEA 4) 19:27 (WEA 4)	41	05:52 18:48 (WEA 4) 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19	33	18:56 (WEA 4) 19:29 (WEA 4)	40	05:50 18:48 (WEA 4) 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21	36	18:55 (WEA 4) 19:31 (WEA 4)	37	05:48 18:50 (WEA 4) 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	06:47 20:22	39	18:53 (WEA 4) 19:32 (WEA 4)	35	05:47 18:51 (WEA 4) 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	06:45 20:24	42	18:51 (WEA 4) 19:33 (WEA 4)	33	05:45 18:52 (WEA 4) 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26	44	18:50 (WEA 4) 19:34 (WEA 4)	30	05:43 18:53 (WEA 4) 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	46	18:48 (WEA 4) 19:34 (WEA 4)	26	05:42 18:56 (WEA 4) 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	06:38 20:29	48	18:47 (WEA 4) 19:35 (WEA 4)	23	05:40 18:57 (WEA 4) 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	50	18:46 (WEA 4) 19:36 (WEA 4)	18	05:39 19:00 (WEA 4) 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	06:34 20:33	50	18:46 (WEA 4) 19:36 (WEA 4)	12	05:37 19:03 (WEA 4) 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	52	18:45 (WEA 4) 19:37 (WEA 4)		05:36 21:24 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	53	18:44 (WEA 4) 19:37 (WEA 4)		05:34 21:25 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	53	18:44 (WEA 4) 19:37 (WEA 4)		05:33 21:27 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	54	18:43 (WEA 4) 19:37 (WEA 4)		05:31 21:28 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	54	18:43 (WEA 4) 19:37 (WEA 4)		05:30 21:30 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	54	18:43 (WEA 4) 19:37 (WEA 4)		05:29 21:31 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	54	18:43 (WEA 4) 19:37 (WEA 4)		05:28 21:33 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	06:17 20:46	54	18:43 (WEA 4) 19:37 (WEA 4)		05:26 21:34 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	06:15 20:48	55	18:42 (WEA 4) 19:37 (WEA 4)		05:25 21:35 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	06:13 20:50	54	18:42 (WEA 4) 19:36 (WEA 4)		05:24 21:37 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	06:11 20:52	54	18:42 (WEA 4) 19:36 (WEA 4)		05:23 21:38 21:57
29	08:19 17:14		07:17 20:00	06:09 20:53	52	18:43 (WEA 4) 19:35 (WEA 4)		05:22 21:39 21:57
30	08:18 17:15		07:15 20:02	06:07 20:55	52	18:43 (WEA 4) 19:35 (WEA 4)		05:21 21:40 21:57
31	08:16 17:17		07:12 20:04			05:20 21:42		
Sonnenscheinstunden	258	277	367	416		486		500
astr.max.mögl.Beschattung				1144		630		

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 16-NW - IP 16-NW
Annahmen für Schattenwurfberechnung

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

	July	August	September	Oktober	November	Dezember		
1	05:16 21:57	05:53 21:25	19:02 (WEA 4) 19:36 (WEA 4)	06:43 20:22	18:52 (WEA 4) 19:31 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	19:01 (WEA 4) 19:37 (WEA 4)	06:45 20:20	18:54 (WEA 4) 19:29 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	19:00 (WEA 4) 19:38 (WEA 4)	06:46 20:18	18:54 (WEA 4) 19:27 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	18:58 (WEA 4) 19:39 (WEA 4)	06:48 20:15	18:57 (WEA 4) 19:25 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	18:58 (WEA 4) 19:40 (WEA 4)	06:49 20:13	18:59 (WEA 4) 19:21 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	18:56 (WEA 4) 19:40 (WEA 4)	06:51 20:11	19:03 (WEA 4) 19:16 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	18:56 (WEA 4) 19:41 (WEA 4)	06:53 20:09		07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	18:54 (WEA 4) 19:41 (WEA 4)	06:54 20:06		07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	18:54 (WEA 4) 19:42 (WEA 4)	06:56 20:04		07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	18:53 (WEA 4) 19:42 (WEA 4)	06:58 20:02		07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	18:52 (WEA 4) 19:43 (WEA 4)	06:59 19:59		07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	18:51 (WEA 4) 19:43 (WEA 4)	07:01 19:57		07:51 18:47	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	18:51 (WEA 4) 19:43 (WEA 4)	07:03 19:55		07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:49	06:14 21:01	18:50 (WEA 4) 19:43 (WEA 4)	07:04 19:52		07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	18:50 (WEA 4) 19:44 (WEA 4)	07:06 19:50		07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	18:49 (WEA 4) 19:43 (WEA 4)	07:07 19:48		07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	18:49 (WEA 4) 19:43 (WEA 4)	07:09 19:45		08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	18:48 (WEA 4) 19:43 (WEA 4)	07:11 19:43		08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	18:48 (WEA 4) 19:43 (WEA 4)	07:12 19:41		08:03 18:32	07:58 16:37	08:37 16:22
20	05:36 21:42	06:23 20:49	18:48 (WEA 4) 19:42 (WEA 4)	07:14 19:38		08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	18:48 (WEA 4) 19:42 (WEA 4)	07:16 19:36		08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	18:48 (WEA 4) 19:42 (WEA 4)	07:17 19:34		08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	18:48 (WEA 4) 19:41 (WEA 4)	07:19 19:31		08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	18:48 (WEA 4) 19:41 (WEA 4)	07:21 19:29		08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	18:48 (WEA 4) 19:39 (WEA 4)	07:22 19:26		07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	19:16 (WEA 4) 19:22 (WEA 4)	06:33 20:36	18:48 (WEA 4) 19:24	07:24 19:24	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	6 19:12 (WEA 4) 15 19:27 (WEA 4)	06:35 20:33	18:48 (WEA 4) 19:22	07:26 19:22	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	19:09 (WEA 4) 20 19:29 (WEA 4)	06:36 20:31	18:49 (WEA 4) 19:19	07:27 19:19	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	19:08 (WEA 4) 24 19:32 (WEA 4)	06:38 20:29	18:49 (WEA 4) 19:17	07:29 19:17	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	19:05 (WEA 4) 28 19:33 (WEA 4)	06:40 20:27	18:50 (WEA 4) 19:15	07:31 19:15	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	19:03 (WEA 4) 31 19:34 (WEA 4)	06:41 20:25	18:51 (WEA 4) 19:33 (WEA 4)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503		454	381		331	266	243
astr.max.mögl.Beschattung		124	1503	170				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 16-SW - IP 16-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April		Mai		Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05		06:05 20:57	53	18:45 (WEA 4) 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07		06:03 20:58	52	18:45 (WEA 4) 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09		06:01 21:00	50	18:47 (WEA 4) 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10		05:59 21:02	49	18:47 (WEA 4) 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12		05:57 21:03	49	18:47 (WEA 4) 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14		05:55 21:05	48	18:47 (WEA 4) 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16	5	19:14 (WEA 4) 19:19 (WEA 4)	46	05:54 21:07
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17	19	19:07 (WEA 4) 19:26 (WEA 4)	44	05:52 21:08
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19	25	19:03 (WEA 4) 19:28 (WEA 4)	42	05:50 21:10
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21	31	19:00 (WEA 4) 19:31 (WEA 4)	41	05:48 21:12
11	08:38 16:43	07:58 17:38	06:59 18:29	06:47 20:22	35	18:58 (WEA 4) 19:33 (WEA 4)	39	05:47 21:13
12	08:38 16:45	07:56 17:40	06:56 18:31	06:45 20:24	38	18:56 (WEA 4) 19:34 (WEA 4)	37	05:45 21:15
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26	41	18:55 (WEA 4) 19:36 (WEA 4)	34	05:43 21:16
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	43	18:53 (WEA 4) 19:36 (WEA 4)	32	05:42 21:18
15	08:35 16:50	07:50 17:45	06:49 18:36	06:38 20:29	46	18:51 (WEA 4) 19:37 (WEA 4)	29	05:40 21:19
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	48	18:50 (WEA 4) 19:38 (WEA 4)	26	05:39 21:21
17	08:34 16:53	07:46 17:49	06:45 18:39	06:34 20:33	48	18:50 (WEA 4) 19:38 (WEA 4)	22	05:37 21:22
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	50	18:49 (WEA 4) 19:39 (WEA 4)	17	05:36 21:24
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	51	18:48 (WEA 4) 19:39 (WEA 4)	10	05:34 21:25
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	53	18:47 (WEA 4) 19:40 (WEA 4)		05:33 21:27
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	53	18:47 (WEA 4) 19:40 (WEA 4)		05:31 21:28
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	53	18:47 (WEA 4) 19:40 (WEA 4)		05:30 21:30
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	54	18:46 (WEA 4) 19:40 (WEA 4)		05:29 21:31
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	54	18:46 (WEA 4) 19:40 (WEA 4)		05:28 21:33
25	08:25 17:06	07:30 18:04	06:26 18:53	06:17 20:46	54	18:46 (WEA 4) 19:40 (WEA 4)		05:26 21:34
26	08:23 17:08	07:27 18:06	06:24 18:55	06:15 20:48	55	18:45 (WEA 4) 19:40 (WEA 4)		05:25 21:35
27	08:22 17:10	07:25 18:07	06:22 18:57	06:13 20:50	54	18:45 (WEA 4) 19:39 (WEA 4)		05:24 21:37
28	08:21 17:12	07:23 18:09	06:19 18:58	06:11 20:52	54	18:45 (WEA 4) 19:39 (WEA 4)		05:23 21:38
29	08:19 17:14		07:17 20:00	06:09 20:53	54	18:45 (WEA 4) 19:39 (WEA 4)		05:22 21:39
30	08:18 17:15		07:15 20:02	06:07 20:55	53	18:45 (WEA 4) 19:38 (WEA 4)		05:21 21:40
31	08:16 17:17		07:12 20:04			05:20 21:42		
Sonnenscheinstunden	258	277	367	416		486		500
astr.max.mögl.Beschattung				1071		720		

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 16-SW - IP 16-SW
Annahmen für Schattenwurfberechnung

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

	Juli		August		September		Oktober		November		Dezember	
1	05:16		05:53	19:03 (WEA 4)	06:43	18:57 (WEA 4)	07:32	07:26	08:18			
	21:57		21:25	38 19:41 (WEA 4)	20:22	35 19:32 (WEA 4)	19:12	17:06	16:25			
2	05:17		05:54	19:02 (WEA 4)	06:45	18:59 (WEA 4)	07:34	07:28	08:19			
	21:56		21:23	39 19:41 (WEA 4)	20:20	31 19:30 (WEA 4)	19:10	17:04	16:25			
3	05:18		05:56	19:01 (WEA 4)	06:46	19:01 (WEA 4)	07:36	07:30	08:21			
	21:56		21:21	42 19:43 (WEA 4)	20:18	25 19:26 (WEA 4)	19:08	17:02	16:24			
4	05:18		05:58	19:00 (WEA 4)	06:48	19:04 (WEA 4)	07:37	07:32	08:22			
	21:56		21:20	43 19:43 (WEA 4)	20:15	19 19:23 (WEA 4)	19:06	17:01	16:23			
5	05:19		05:59	18:59 (WEA 4)	06:49	19:10 (WEA 4)	07:39	07:34	08:23			
	21:55		21:18	45 19:44 (WEA 4)	20:13	6 19:16 (WEA 4)	19:03	16:59	16:23			
6	05:20		06:01	18:58 (WEA 4)	06:51		07:41	07:35	08:25			
	21:55		21:16	46 19:44 (WEA 4)	20:11		19:01	16:57	16:22			
7	05:21		06:02	18:58 (WEA 4)	06:53		07:42	07:37	08:26			
	21:54		21:14	47 19:45 (WEA 4)	20:09		18:59	16:55	16:22			
8	05:22		06:04	18:56 (WEA 4)	06:54		07:44	07:39	08:27			
	21:53		21:12	49 19:45 (WEA 4)	20:06		18:56	16:54	16:22			
9	05:23		06:05	18:56 (WEA 4)	06:56		07:46	07:41	08:28			
	21:53		21:11	50 19:46 (WEA 4)	20:04		18:54	16:52	16:21			
10	05:24		06:07	18:55 (WEA 4)	06:58		07:48	07:43	08:29			
	21:52		21:09	51 19:46 (WEA 4)	20:02		18:52	16:50	16:21			
11	05:25		06:09	18:55 (WEA 4)	06:59		07:49	07:44	08:30			
	21:51		21:07	52 19:47 (WEA 4)	19:59		18:50	16:49	16:21			
12	05:26		06:10	18:54 (WEA 4)	07:01		07:51	07:46	08:31			
	21:50		21:05	52 19:46 (WEA 4)	19:57		18:47	16:47	16:21			
13	05:27		06:12	18:54 (WEA 4)	07:03		07:53	07:48	08:32			
	21:49		21:03	53 19:47 (WEA 4)	19:55		18:45	16:46	16:21			
14	05:28		06:14	18:53 (WEA 4)	07:04		07:54	07:50	08:33			
	21:49		21:01	53 19:46 (WEA 4)	19:52		18:43	16:44	16:21			
15	05:29		06:15	18:53 (WEA 4)	07:06		07:56	07:52	08:34			
	21:48		20:59	54 19:47 (WEA 4)	19:50		18:41	16:43	16:21			
16	05:30		06:17	18:52 (WEA 4)	07:07		07:58	07:53	08:35			
	21:47		20:57	54 19:46 (WEA 4)	19:48		18:39	16:41	16:21			
17	05:32		06:18	18:52 (WEA 4)	07:09		08:00	07:55	08:36			
	21:45		20:55	54 19:46 (WEA 4)	19:45		18:36	16:40	16:21			
18	05:33		06:20	18:51 (WEA 4)	07:11		08:01	07:57	08:37			
	21:44		20:53	54 19:45 (WEA 4)	19:43		18:34	16:39	16:21			
19	05:34		06:22	18:51 (WEA 4)	07:12		08:03	07:58	08:37			
	21:43		20:51	55 19:46 (WEA 4)	19:41		18:32	16:37	16:22			
20	05:36		06:23	18:51 (WEA 4)	07:14		08:05	08:00	08:38			
	21:42		20:49	54 19:45 (WEA 4)	19:38		18:30	16:36	16:22			
21	05:37		06:25	18:51 (WEA 4)	07:16		08:07	08:02	08:39			
	21:41		20:46	54 19:45 (WEA 4)	19:36		18:28	16:35	16:23			
22	05:38		06:27	18:52 (WEA 4)	07:17		08:08	08:04	08:39			
	21:40		20:44	52 19:44 (WEA 4)	19:34		18:26	16:34	16:23			
23	05:40		06:28	18:51 (WEA 4)	07:19		08:10	08:05	08:40			
	21:38		20:42	52 19:43 (WEA 4)	19:31		18:24	16:33	16:23			
24	05:41		06:30	18:52 (WEA 4)	07:21		08:12	08:07	08:40			
	21:37	3	19:21 (WEA 4)	20:40	51 19:43 (WEA 4)	19:29	18:22	16:31	16:24			
25	05:42		06:31	18:52 (WEA 4)	07:22		07:14	08:08	08:41			
	21:35	14	19:29 (WEA 4)	20:38	49 19:41 (WEA 4)	19:26	17:20	16:30	16:25			
26	05:44		06:33	18:52 (WEA 4)	07:24		07:16	08:10	08:41			
	21:34	20	19:32 (WEA 4)	20:36	49 19:41 (WEA 4)	19:24	17:18	16:29	16:25			
27	05:45		06:35	18:52 (WEA 4)	07:26		07:17	08:12	08:41			
	21:33	23	19:34 (WEA 4)	20:33	47 19:39 (WEA 4)	19:22	17:16	16:29	16:26			
28	05:47		06:36	18:53 (WEA 4)	07:27		07:19	08:13	08:41			
	21:31	27	19:36 (WEA 4)	20:31	46 19:39 (WEA 4)	19:19	17:14	16:28	16:27			
29	05:48		06:38	18:54 (WEA 4)	07:29		07:21	08:15	08:42			
	21:29	31	19:38 (WEA 4)	20:29	43 19:37 (WEA 4)	19:17	17:12	16:27	16:28			
30	05:50		06:40	18:55 (WEA 4)	07:31		07:23	08:16	08:42			
	21:28	33	19:39 (WEA 4)	20:27	41 19:36 (WEA 4)	19:15	17:10	16:26	16:29			
31	05:51		06:41	18:56 (WEA 4)			07:25		08:42			
	21:26	35	19:39 (WEA 4)	20:25	38 19:34 (WEA 4)		17:08		16:30			
Sonnenscheinstunden	503		454		381		331	266	243			
astr.max.mögl.Beschattung		186		1507		116						

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 17-SW - IP 17-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April		Mai		Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05		06:05 20:57	50	19:05 (WEA 4) 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07		06:03 20:58	50	19:05 (WEA 4) 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09		06:01 21:00	49	19:06 (WEA 4) 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10		05:59 21:02	49	19:06 (WEA 4) 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12		05:57 21:03	50	19:05 (WEA 4) 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14		05:55 21:05	49	19:05 (WEA 4) 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16		05:54 21:07	49	19:06 (WEA 4) 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17		05:52 21:08	48	19:06 (WEA 4) 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19		05:50 21:10	47	19:06 (WEA 4) 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21		05:48 21:11	46	19:07 (WEA 4) 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	06:47 20:22		05:47 21:13	45	19:07 (WEA 4) 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	06:45 20:24		05:45 21:15	44	19:08 (WEA 4) 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26		05:43 21:16	43	19:08 (WEA 4) 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28		05:42 21:18	42	19:09 (WEA 4) 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	06:38 20:29	11	19:28 (WEA 4) 19:39 (WEA 4)	05:40 21:19	19:09 (WEA 4) 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	20	19:23 (WEA 4) 19:43 (WEA 4)	05:39 21:21	19:10 (WEA 4) 21:55
17	08:33 16:53	07:46 17:49	06:45 18:39	06:34 20:33	26	19:20 (WEA 4) 19:46 (WEA 4)	05:37 21:22	19:11 (WEA 4) 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	30	19:18 (WEA 4) 19:48 (WEA 4)	05:36 21:24	19:12 (WEA 4) 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	33	19:16 (WEA 4) 19:49 (WEA 4)	05:34 21:25	19:13 (WEA 4) 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	37	19:14 (WEA 4) 19:51 (WEA 4)	05:33 21:27	19:14 (WEA 4) 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	39	19:13 (WEA 4) 19:52 (WEA 4)	05:31 21:28	19:15 (WEA 4) 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	41	19:12 (WEA 4) 19:53 (WEA 4)	05:30 21:30	19:16 (WEA 4) 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	42	19:11 (WEA 4) 19:53 (WEA 4)	05:29 21:31	19:17 (WEA 4) 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	44	19:10 (WEA 4) 19:54 (WEA 4)	05:28 21:33	19:19 (WEA 4) 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	06:17 20:46	45	19:09 (WEA 4) 19:54 (WEA 4)	05:26 21:34	19:21 (WEA 4) 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	06:15 20:48	47	19:08 (WEA 4) 19:55 (WEA 4)	05:25 21:35	19:23 (WEA 4) 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	06:13 20:50	48	19:07 (WEA 4) 19:55 (WEA 4)	05:24 21:37	19:25 (WEA 4) 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	06:11 20:52	48	19:07 (WEA 4) 19:55 (WEA 4)	05:23 21:38	19:30 (WEA 4) 21:57
29	08:19 17:14		07:17 20:00	06:09 20:53	49	19:06 (WEA 4) 19:55 (WEA 4)	05:22 21:39	19:33 (WEA 4) 21:57
30	08:18 17:15		07:15 20:02	06:07 20:55	49	19:06 (WEA 4) 19:55 (WEA 4)	05:21 21:40	19:33 (WEA 4) 21:57
31	08:16 17:17		07:12 20:04				05:20 21:42	
Sonnenscheinstunden	258	277	367	416		486		500
astr.max.mögl.Beschattung				609		1046		

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 17-SW - IP 17-SW
Annahmen für Schattenwurfberechnung

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

	Juli		August		September		Oktober		November		Dezember	
1	05:16		05:53	19:18 (WEA 4)	06:43	07:32	07:26	08:18				
	21:57		21:25	45 20:03 (WEA 4)	20:22	19:12	17:06	16:25				
2	05:17		05:54	19:17 (WEA 4)	06:45	07:34	07:28	08:19				
	21:56		21:23	46 20:03 (WEA 4)	20:20	19:10	17:04	16:25				
3	05:18		05:56	19:17 (WEA 4)	06:46	07:36	07:30	08:21				
	21:56		21:21	47 20:04 (WEA 4)	20:18	19:08	17:02	16:24				
4	05:18		05:58	19:16 (WEA 4)	06:48	07:37	07:32	08:22				
	21:56		21:20	48 20:04 (WEA 4)	20:15	19:06	17:01	16:23				
5	05:19		05:59	19:16 (WEA 4)	06:49	07:39	07:34	08:23				
	21:55		21:18	48 20:04 (WEA 4)	20:13	19:03	16:59	16:23				
6	05:20		06:01	19:15 (WEA 4)	06:51	07:41	07:35	08:25				
	21:55		21:16	49 20:04 (WEA 4)	20:11	19:01	16:57	16:22				
7	05:21		06:02	19:16 (WEA 4)	06:53	07:42	07:37	08:26				
	21:54		21:14	49 20:05 (WEA 4)	20:09	18:59	16:55	16:22				
8	05:22		06:04	19:15 (WEA 4)	06:54	07:44	07:39	08:27				
	21:53		21:12	49 20:04 (WEA 4)	20:06	18:56	16:54	16:22				
9	05:23		06:05	19:15 (WEA 4)	06:56	07:46	07:41	08:28				
	21:53		21:11	50 20:05 (WEA 4)	20:04	18:54	16:52	16:21				
10	05:24		06:07	19:14 (WEA 4)	06:58	07:48	07:43	08:29				
	21:52		21:09	50 20:04 (WEA 4)	20:02	18:52	16:50	16:21				
11	05:25		06:09	19:15 (WEA 4)	06:59	07:49	07:44	08:30				
	21:51		21:07	49 20:04 (WEA 4)	19:59	18:50	16:49	16:21				
12	05:26		06:10	19:14 (WEA 4)	07:01	07:51	07:46	08:31				
	21:50		21:05	49 20:03 (WEA 4)	19:57	18:47	16:47	16:21				
13	05:27		06:12	19:14 (WEA 4)	07:03	07:53	07:48	08:32				
	21:49		21:03	50 20:04 (WEA 4)	19:55	18:45	16:46	16:21				
14	05:28		06:14	19:14 (WEA 4)	07:04	07:54	07:50	08:33				
	21:49		21:01	49 20:03 (WEA 4)	19:52	18:43	16:44	16:21				
15	05:29		06:15	19:15 (WEA 4)	07:06	07:56	07:52	08:34				
	21:48		20:59	48 20:03 (WEA 4)	19:50	18:41	16:43	16:21				
16	05:30	19:36 (WEA 4)	06:17	19:14 (WEA 4)	07:07	07:58	07:53	08:35				
	21:47	9 19:45 (WEA 4)	20:57	47 20:01 (WEA 4)	19:48	18:39	16:41	16:21				
17	05:32	19:33 (WEA 4)	06:18	19:15 (WEA 4)	07:09	08:00	07:55	08:36				
	21:45	15 19:48 (WEA 4)	20:55	46 20:01 (WEA 4)	19:45	18:36	16:40	16:21				
18	05:33	19:31 (WEA 4)	06:20	19:15 (WEA 4)	07:11	08:01	07:57	08:37				
	21:44	19 19:50 (WEA 4)	20:53	45 20:00 (WEA 4)	19:43	18:34	16:39	16:21				
19	05:34	19:29 (WEA 4)	06:22	19:16 (WEA 4)	07:12	08:03	07:58	08:37				
	21:43	22 19:51 (WEA 4)	20:51	43 19:59 (WEA 4)	19:41	18:32	16:37	16:22				
20	05:36	19:29 (WEA 4)	06:23	19:16 (WEA 4)	07:14	08:05	08:00	08:38				
	21:42	25 19:54 (WEA 4)	20:49	42 19:58 (WEA 4)	19:38	18:30	16:36	16:22				
21	05:37	19:27 (WEA 4)	06:25	19:17 (WEA 4)	07:16	08:07	08:02	08:39				
	21:41	28 19:55 (WEA 4)	20:46	40 19:57 (WEA 4)	19:36	18:28	16:35	16:23				
22	05:38	19:26 (WEA 4)	06:27	19:18 (WEA 4)	07:17	08:08	08:04	08:39				
	21:39	29 19:55 (WEA 4)	20:44	38 19:56 (WEA 4)	19:34	18:26	16:34	16:23				
23	05:40	19:24 (WEA 4)	06:28	19:18 (WEA 4)	07:19	08:10	08:05	08:40				
	21:38	32 19:56 (WEA 4)	20:42	36 19:54 (WEA 4)	19:31	18:24	16:33	16:23				
24	05:41	19:24 (WEA 4)	06:30	19:20 (WEA 4)	07:21	08:12	08:07	08:40				
	21:37	34 19:58 (WEA 4)	20:40	33 19:53 (WEA 4)	19:29	18:22	16:31	16:24				
25	05:42	19:23 (WEA 4)	06:31	19:21 (WEA 4)	07:22	07:14	08:08	08:41				
	21:35	35 19:58 (WEA 4)	20:38	29 19:50 (WEA 4)	19:26	17:20	16:30	16:25				
26	05:44	19:22 (WEA 4)	06:33	19:23 (WEA 4)	07:24	07:16	08:10	08:41				
	21:34	37 19:59 (WEA 4)	20:36	25 19:48 (WEA 4)	19:24	17:18	16:29	16:25				
27	05:45	19:21 (WEA 4)	06:35	19:25 (WEA 4)	07:26	07:17	08:12	08:41				
	21:33	39 20:00 (WEA 4)	20:33	20 19:45 (WEA 4)	19:22	17:16	16:29	16:26				
28	05:47	19:20 (WEA 4)	06:36	19:30 (WEA 4)	07:27	07:19	08:13	08:41				
	21:31	41 20:01 (WEA 4)	20:31	10 19:40 (WEA 4)	19:19	17:14	16:28	16:27				
29	05:48	19:20 (WEA 4)	06:38		07:29	07:21	08:15	08:42				
	21:29	42 20:02 (WEA 4)	20:29		19:17	17:12	16:27	16:28				
30	05:50	19:19 (WEA 4)	06:40		07:31	07:23	08:16	08:42				
	21:28	43 20:02 (WEA 4)	20:27		19:15	17:10	16:26	16:29				
31	05:51	19:18 (WEA 4)	06:41			07:25		08:42				
	21:26	44 20:02 (WEA 4)	20:25			17:08		16:30				
Sonnenscheinstunden	503		454		381	331	266	243				
astr.max.mögl.Beschattung	494		1180									

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 18-NW - IP 18-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai		Juni		
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	28	18:53 (WEA 4) 19:21 (WEA 4)	06:05 20:57	9	18:56 (WEA 4) 19:05 (WEA 4)	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	32	18:50 (WEA 4) 19:22 (WEA 4)	06:03 20:58			05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15		07:05 20:09	35	18:49 (WEA 4) 19:24 (WEA 4)	06:01 21:00			05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	38	18:47 (WEA 4) 19:25 (WEA 4)	05:59 21:02			05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	40	18:45 (WEA 4) 19:25 (WEA 4)	05:57 21:03			05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	42	18:44 (WEA 4) 19:26 (WEA 4)	05:55 21:05			05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	44	18:43 (WEA 4) 19:27 (WEA 4)	05:54 21:07			05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	45	18:43 (WEA 4) 19:28 (WEA 4)	05:52 21:08			05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	46	18:41 (WEA 4) 19:27 (WEA 4)	05:50 21:10			05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	46	18:41 (WEA 4) 19:27 (WEA 4)	05:48 21:11			05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	48	18:40 (WEA 4) 19:28 (WEA 4)	05:47 21:13			05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	48	18:40 (WEA 4) 19:28 (WEA 4)	05:45 21:15			05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	48	18:40 (WEA 4) 19:28 (WEA 4)	05:43 21:16			05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	48	18:39 (WEA 4) 19:27 (WEA 4)	05:42 21:18			05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	48	18:39 (WEA 4) 19:27 (WEA 4)	05:40 21:19			05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	47	18:39 (WEA 4) 19:26 (WEA 4)	05:39 21:21			05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	47	18:39 (WEA 4) 19:26 (WEA 4)	05:37 21:22			05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	47	18:39 (WEA 4) 19:26 (WEA 4)	05:36 21:24			05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	45	18:40 (WEA 4) 19:25 (WEA 4)	05:34 21:25			05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45		06:27 20:38	44	18:40 (WEA 4) 19:24 (WEA 4)	05:33 21:27			05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40	43	18:41 (WEA 4) 19:24 (WEA 4)	05:31 21:28			05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41	42	18:41 (WEA 4) 19:23 (WEA 4)	05:30 21:30			05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43	40	18:42 (WEA 4) 19:22 (WEA 4)	05:29 21:31			05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52		06:19 20:45	38	18:43 (WEA 4) 19:21 (WEA 4)	05:28 21:33			05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53		06:17 20:46	35	18:44 (WEA 4) 19:19 (WEA 4)	05:26 21:34			05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55		06:15 20:48	33	18:45 (WEA 4) 19:18 (WEA 4)	05:25 21:35			05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57		06:13 20:50	30	18:46 (WEA 4) 19:16 (WEA 4)	05:24 21:37			05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58		06:11 20:52	27	18:48 (WEA 4) 19:15 (WEA 4)	05:23 21:38			05:14 21:57
29	08:19 17:14		07:17 20:00		06:09 20:53	22	18:50 (WEA 4) 19:12 (WEA 4)	05:22 21:39			05:15 21:57
30	08:18 17:15		07:15 20:02	17	18:59 (WEA 4) 19:16 (WEA 4)	06:07 20:55	18:52 (WEA 4) 19:09 (WEA 4)	05:21 21:40			05:15 21:57
31	08:16 17:17		07:12 20:04	23	18:56 (WEA 4) 19:19 (WEA 4)			05:20 21:42			
Sonnenscheinstunden	258	277	367		416			486			500
astr.max.mögl.Beschattung			40		1193			9			

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 18-NW - IP 18-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	18:39 (WEA 4) 19:27 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	18:40 (WEA 4) 19:26 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18	18:39 (WEA 4) 19:25 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	18:40 (WEA 4) 19:25 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	18:39 (WEA 4) 19:23 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	18:40 (WEA 4) 19:22 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	18:41 (WEA 4) 19:21 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	18:41 (WEA 4) 19:19 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	18:43 (WEA 4) 19:18 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	18:43 (WEA 4) 19:16 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	18:45 (WEA 4) 19:14 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	19:03 (WEA 4) 19:15 (WEA 4)	07:01 19:57	18:47 (WEA 4) 19:11 (WEA 4)	07:51 18:47	08:31 16:47
13	05:27 21:49	06:12 21:03	19:00 (WEA 4) 19:19 (WEA 4)	07:03 19:55	18:50 (WEA 4) 19:07 (WEA 4)	07:53 18:45	08:32 16:46
14	05:28 21:49	06:13 21:01	18:57 (WEA 4) 19:20 (WEA 4)	07:04 19:52	18:56 (WEA 4) 19:01 (WEA 4)	07:54 18:43	08:33 16:44
15	05:29 21:48	06:15 20:59	18:55 (WEA 4) 19:23 (WEA 4)	07:06 19:50	07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	18:52 (WEA 4) 19:23 (WEA 4)	07:07 19:48	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	18:51 (WEA 4) 19:25 (WEA 4)	07:09 19:45	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	18:49 (WEA 4) 19:25 (WEA 4)	07:11 19:43	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	18:48 (WEA 4) 19:27 (WEA 4)	07:12 19:41	08:03 18:32	07:58 16:37	08:37 16:22
20	05:36 21:42	06:23 20:49	18:47 (WEA 4) 19:27 (WEA 4)	07:14 19:38	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	18:46 (WEA 4) 19:28 (WEA 4)	07:16 19:36	08:07 18:28	08:02 16:35	08:39 16:22
22	05:38 21:40	06:27 20:44	18:45 (WEA 4) 19:28 (WEA 4)	07:17 19:34	08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	18:44 (WEA 4) 19:28 (WEA 4)	07:19 19:31	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	18:43 (WEA 4) 19:29 (WEA 4)	07:21 19:29	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	18:42 (WEA 4) 19:28 (WEA 4)	07:22 19:26	07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	18:42 (WEA 4) 19:29 (WEA 4)	07:24 19:24	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	18:41 (WEA 4) 19:28 (WEA 4)	07:26 19:22	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	18:41 (WEA 4) 19:28 (WEA 4)	07:27 19:19	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	18:40 (WEA 4) 19:28 (WEA 4)	07:29 19:17	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	18:40 (WEA 4) 19:28 (WEA 4)	07:31 19:15	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:40 (WEA 4) 19:28 (WEA 4)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		768	492				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 18-SW - IP 18-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März		April		Mai		Juni
1	08:42 16:31	08:15 17:19	07:21 18:11		07:10 20:05	18	19:02 (WEA 4) 20:57	22	18:53 (WEA 4) 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	24	18:58 (WEA 4) 20:58	16	18:56 (WEA 4) 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15		07:05 20:09	29	18:56 (WEA 4) 21:00	8	19:01 (WEA 4) 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	32	18:54 (WEA 4) 21:02		05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	36	18:51 (WEA 4) 21:03		05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	38	18:50 (WEA 4) 21:05		05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	40	18:49 (WEA 4) 21:07		05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	42	18:48 (WEA 4) 21:08		05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	44	18:46 (WEA 4) 21:10		05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	45	18:45 (WEA 4) 21:11		05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	46	18:45 (WEA 4) 21:13		05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	47	18:44 (WEA 4) 21:15		05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	47	18:44 (WEA 4) 21:16		05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	47	18:43 (WEA 4) 21:18		05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	47	18:43 (WEA 4) 21:19		05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	47	18:43 (WEA 4) 21:21		05:12 21:55
17	08:33 16:53	07:46 17:49	06:45 18:39		06:34 20:33	47	18:43 (WEA 4) 21:22		05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	47	18:43 (WEA 4) 21:24		05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	46	18:43 (WEA 4) 21:25		05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45		06:27 20:38	46	18:43 (WEA 4) 21:27		05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40	45	18:43 (WEA 4) 21:28		05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41	44	18:44 (WEA 4) 21:30		05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43	43	18:44 (WEA 4) 21:31		05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52		06:19 20:45	41	18:45 (WEA 4) 21:33		05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53		06:17 20:46	39	18:46 (WEA 4) 21:34		05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55		06:15 20:48	38	18:46 (WEA 4) 21:35		05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57		06:13 20:50	36	18:47 (WEA 4) 21:37		05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58		06:11 20:52	33	18:48 (WEA 4) 21:38		05:14 21:57
29	08:19 17:14		07:17 20:00		06:09 20:53	29	18:50 (WEA 4) 21:39		05:15 21:57
30	08:18 17:15		07:15 20:02		06:07 20:55	27	18:51 (WEA 4) 21:40		05:15 21:57
31	08:16 17:17		07:12 20:04	19:08 (WEA 4)			05:20		
			20:04	7 19:15 (WEA 4)			21:42		
Sonnenscheinstunden	258	277	367		416		486		500
astr.max.mögl.Beschattung			7		1190		76		

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 18-SW - IP 18-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	18:44 (WEA 4) 19:30 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	18:44 (WEA 4) 19:29 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18	18:44 (WEA 4) 19:28 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15	18:45 (WEA 4) 19:27 (WEA 4)	07:37 19:06	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	18:45 (WEA 4) 19:25 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	18:46 (WEA 4) 19:24 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	18:47 (WEA 4) 19:23 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	18:48 (WEA 4) 19:21 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	18:50 (WEA 4) 19:19 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	19:07 (WEA 4) 20:02	18:51 (WEA 4) 19:16 (WEA 4)	07:48 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	19:04 (WEA 4) 19:59	18:54 (WEA 4) 19:13 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	19:01 (WEA 4) 19:57	18:58 (WEA 4) 19:07 (WEA 4)	07:51 18:47	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	18:59 (WEA 4) 19:55	18:59 (WEA 4) 19:55	07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:49	06:13 21:01	18:57 (WEA 4) 19:52	18:57 (WEA 4) 19:52	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	18:56 (WEA 4) 19:50	18:56 (WEA 4) 19:50	07:56 18:41	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	18:54 (WEA 4) 19:48	18:54 (WEA 4) 19:48	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	18:53 (WEA 4) 19:45	18:53 (WEA 4) 19:45	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	18:51 (WEA 4) 19:43	18:51 (WEA 4) 19:43	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	18:50 (WEA 4) 19:41	18:50 (WEA 4) 19:41	08:03 18:32	07:58 16:37	08:37 16:21
20	05:36 21:42	06:23 20:49	18:49 (WEA 4) 19:38	18:49 (WEA 4) 19:38	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	18:48 (WEA 4) 19:36	18:48 (WEA 4) 19:36	08:07 18:28	08:02 16:35	08:39 16:22
22	05:38 21:40	06:27 20:44	18:48 (WEA 4) 19:34	18:48 (WEA 4) 19:34	08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	18:47 (WEA 4) 19:31	18:47 (WEA 4) 19:31	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	18:47 (WEA 4) 19:29	18:47 (WEA 4) 19:29	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	18:45 (WEA 4) 19:26	18:45 (WEA 4) 19:26	08:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	18:45 (WEA 4) 19:24	18:45 (WEA 4) 19:24	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	18:44 (WEA 4) 19:22	18:44 (WEA 4) 19:22	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	18:44 (WEA 4) 19:19	18:44 (WEA 4) 19:19	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	18:44 (WEA 4) 19:17	18:44 (WEA 4) 19:17	07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	18:44 (WEA 4) 19:15	18:44 (WEA 4) 19:15	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:44 (WEA 4) 19:31 (WEA 4)	18:44 (WEA 4) 19:31 (WEA 4)	07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		857	406				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 19-NW - IP 19-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	16:42 (WEA 4) 18:11	07:10 20:05	06:05 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	16:41 (WEA 4) 17:23 (WEA 4)	07:08 20:07	06:03 20:58
3	08:41 16:33	08:11 17:23	07:16 18:15	16:41 (WEA 4) 17:23 (WEA 4)	07:05 20:09	06:01 21:00
4	08:41 16:34	08:10 17:25	07:14 18:16	16:41 (WEA 4) 17:24 (WEA 4)	07:03 20:10	05:59 21:02
5	08:41 16:35	08:08 17:26	07:12 18:18	16:40 (WEA 4) 17:23 (WEA 4)	07:01 20:12	05:57 21:03
6	08:41 16:37	08:06 17:28	07:10 18:20	16:39 (WEA 4) 17:23 (WEA 4)	06:58 20:14	05:55 21:05
7	08:40 16:38	08:05 17:30	07:08 18:22	16:40 (WEA 4) 17:24 (WEA 4)	06:56 20:16	05:54 21:07
8	08:40 16:39	08:03 17:32	07:05 18:24	16:39 (WEA 4) 17:23 (WEA 4)	06:54 20:17	05:52 21:08
9	08:39 16:41	08:01 17:34	07:03 18:25	16:39 (WEA 4) 17:22 (WEA 4)	06:52 20:19	05:50 21:10
10	08:39 16:42	07:59 17:36	07:01 18:27	16:40 (WEA 4) 17:22 (WEA 4)	06:49 20:21	05:48 21:12
11	08:38 16:43	07:58 17:38	06:59 18:29	16:40 (WEA 4) 17:22 (WEA 4)	06:47 20:22	05:47 21:13
12	08:38 16:45	07:56 17:40	06:56 18:31	16:40 (WEA 4) 17:20 (WEA 4)	06:45 20:24	05:45 21:15
13	08:37 16:46	07:54 17:41	06:54 18:32	16:41 (WEA 4) 17:20 (WEA 4)	06:43 20:26	05:43 21:16
14	08:36 16:48	07:52 17:43	06:52 18:34	16:42 (WEA 4) 17:19 (WEA 4)	06:40 20:28	05:42 21:18
15	08:35 16:49	07:50 17:45	06:49 18:36	16:42 (WEA 4) 17:17 (WEA 4)	06:38 20:29	05:40 21:19
16	08:34 16:51	07:48 17:47	06:47 18:38	16:44 (WEA 4) 17:16 (WEA 4)	06:36 20:31	05:39 21:21
17	08:34 16:53	07:46 17:49	06:45 18:39	16:45 (WEA 4) 17:14 (WEA 4)	06:34 20:33	05:37 21:23
18	08:33 16:54	07:44 17:51	06:42 18:41	16:46 (WEA 4) 17:11 (WEA 4)	06:32 20:34	05:36 21:24
19	08:32 16:56	07:42 17:53	06:40 18:43	16:49 (WEA 4) 17:09 (WEA 4)	06:29 20:36	05:34 21:26
20	08:31 16:58	07:40 17:54	06:38 18:45	16:53 (WEA 4) 17:05 (WEA 4)	06:27 20:38	05:33 21:27
21	08:29 16:59	07:38 17:56	06:35 18:46	16:56 (WEA 4) 17:10 (WEA 4)	06:25 20:40	05:31 21:28
22	08:28 17:01	07:36 17:58	06:33 18:48	16:53 (WEA 4) 17:14 (WEA 4)	06:23 20:41	05:30 21:30
23	08:27 17:03	07:34 18:00	06:31 18:50	16:51 (WEA 4) 17:16 (WEA 4)	06:21 20:43	05:29 21:31
24	08:26 17:05	07:32 18:02	06:28 18:52	16:49 (WEA 4) 17:18 (WEA 4)	06:19 20:45	05:28 21:33
25	08:25 17:06	07:30 18:04	06:26 18:53	16:47 (WEA 4) 17:19 (WEA 4)	06:17 20:46	05:26 21:34
26	08:23 17:08	07:27 18:06	06:24 18:55	16:45 (WEA 4) 17:20 (WEA 4)	06:15 20:48	05:25 21:35
27	08:22 17:10	07:25 18:07	06:22 18:57	16:44 (WEA 4) 17:21 (WEA 4)	06:13 20:50	05:24 21:37
28	08:21 17:12	07:23 18:09	06:19 18:58	16:43 (WEA 4) 17:22 (WEA 4)	06:11 20:52	05:23 21:38
29	08:19 17:13		07:17 20:00		06:09 20:53	05:22 21:39
30	08:18 17:15		07:15 20:02		06:07 20:55	05:21 21:40
31	08:16 17:17		07:12 20:04			05:20 21:42
Sonnenscheinstunden	258	277	367	416	486	500
astr.max.mögl.Beschattung		232	738			

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 19-NW - IP 19-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September		Oktober		November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22		07:32 19:12	40	17:19 (WEA 4) 17:59 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20		07:34 19:10	41	17:18 (WEA 4) 17:59 (WEA 4)	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18		07:36 19:08	42	17:18 (WEA 4) 18:00 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:57 21:20	06:48 20:15		07:37 19:06	43	17:17 (WEA 4) 18:00 (WEA 4)	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13		07:39 19:03	43	17:16 (WEA 4) 17:59 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11		07:41 19:01	43	17:16 (WEA 4) 17:59 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09		07:42 18:59	44	17:15 (WEA 4) 17:59 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06		07:44 18:56	44	17:15 (WEA 4) 17:59 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04		07:46 18:54	43	17:15 (WEA 4) 17:58 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02		07:48 18:52	43	17:15 (WEA 4) 17:58 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59		07:49 18:50	42	17:15 (WEA 4) 17:57 (WEA 4)	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57		07:51 18:47	41	17:16 (WEA 4) 17:57 (WEA 4)	07:46 16:47	08:32 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55		07:53 18:45	40	17:15 (WEA 4) 17:55 (WEA 4)	07:48 16:46	08:33 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52		07:54 18:43	38	17:16 (WEA 4) 17:54 (WEA 4)	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50		07:56 18:41	36	17:17 (WEA 4) 17:53 (WEA 4)	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48		07:58 18:39	34	17:18 (WEA 4) 17:52 (WEA 4)	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45		08:00 18:36	32	17:19 (WEA 4) 17:51 (WEA 4)	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43		08:01 18:34	28	17:21 (WEA 4) 17:49 (WEA 4)	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41		08:03 18:32	24	17:22 (WEA 4) 17:46 (WEA 4)	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38		08:05 18:30	19	17:24 (WEA 4) 17:43 (WEA 4)	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36		08:07 18:28	11	17:28 (WEA 4) 17:39 (WEA 4)	08:02 16:35	08:39 16:22
22	05:38 21:40	06:27 20:44	07:17 19:34		08:08 18:26			08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	7	08:10 17:39 (WEA 4) 17:46 (WEA 4)			08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	17	08:12 17:34 (WEA 4) 17:51 (WEA 4)			08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	23	07:14 17:30 (WEA 4) 17:53 (WEA 4)			08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	27	07:16 17:28 (WEA 4) 17:55 (WEA 4)			08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	31	07:17 17:26 (WEA 4) 17:57 (WEA 4)			08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	34	07:19 17:23 (WEA 4) 17:57 (WEA 4)			08:13 16:28	08:41 16:27
29	05:48 21:30	06:38 20:29	07:29 19:17	36	07:21 17:22 (WEA 4) 17:58 (WEA 4)			08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	38	07:23 17:21 (WEA 4) 17:59 (WEA 4)			08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25			07:25 17:08				08:42 16:30
Sonnenscheinstunden	503	454	381		331		266	243	
astr.max.mögl.Beschattung			213		771				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 19-SW - IP 19-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11	16:45 (WEA 4) 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	16:44 (WEA 4) 17:24 (WEA 4)	07:08 20:07	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	16:43 (WEA 4) 17:25 (WEA 4)	07:05 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	16:43 (WEA 4) 17:25 (WEA 4)	07:03 20:10	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	16:42 (WEA 4) 17:25 (WEA 4)	07:01 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	16:42 (WEA 4) 17:25 (WEA 4)	06:58 20:14	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	16:42 (WEA 4) 17:25 (WEA 4)	06:56 20:16	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	16:41 (WEA 4) 17:24 (WEA 4)	06:54 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	16:41 (WEA 4) 17:24 (WEA 4)	06:52 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	16:41 (WEA 4) 17:24 (WEA 4)	06:49 20:21	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	16:42 (WEA 4) 17:24 (WEA 4)	06:47 20:22	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	16:41 (WEA 4) 17:23 (WEA 4)	06:45 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	16:42 (WEA 4) 17:22 (WEA 4)	06:43 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	16:43 (WEA 4) 17:21 (WEA 4)	06:40 20:28	05:42 21:18	05:12 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	16:43 (WEA 4) 17:20 (WEA 4)	06:38 20:29	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	16:44 (WEA 4) 17:19 (WEA 4)	06:36 20:31	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	16:46 (WEA 4) 17:17 (WEA 4)	06:34 20:33	05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	16:47 (WEA 4) 17:15 (WEA 4)	06:32 20:34	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	16:49 (WEA 4) 17:13 (WEA 4)	06:29 20:36	05:34 21:26	05:12 21:56
20	08:31 16:58	07:40 17:54	06:38 18:45	16:52 (WEA 4) 17:10 (WEA 4)	06:27 20:38	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	16:56 (WEA 4) 17:05 (WEA 4)	06:25 20:40	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	16:58 (WEA 4) 17:13 (WEA 4)	06:23 20:41	05:30 21:30	05:12 21:57	05:12 21:57
23	08:27 17:03	07:34 18:00	16:55 (WEA 4) 17:16 (WEA 4)	06:21 20:43	05:29 21:31	05:12 21:57	05:12 21:57
24	08:26 17:05	07:32 18:02	16:53 (WEA 4) 17:19 (WEA 4)	06:19 20:45	05:28 21:33	05:13 21:58	05:13 21:58
25	08:25 17:06	07:30 18:04	16:50 (WEA 4) 17:19 (WEA 4)	06:17 20:46	05:26 21:34	05:13 21:58	05:13 21:58
26	08:23 17:08	07:27 18:06	16:49 (WEA 4) 17:21 (WEA 4)	06:15 20:48	05:25 21:35	05:13 21:58	05:13 21:58
27	08:22 17:10	07:25 18:07	16:47 (WEA 4) 17:22 (WEA 4)	06:13 20:50	05:24 21:37	05:14 21:58	05:14 21:58
28	08:21 17:12	07:23 18:09	16:46 (WEA 4) 17:23 (WEA 4)	06:11 20:52	05:23 21:38	05:14 21:57	05:14 21:57
29	08:19 17:13		18:58 20:00	06:09 20:53	05:22 21:39	05:15 21:57	05:15 21:57
30	08:18 17:15		18:57 20:02	06:07 20:55	05:21 21:40	05:15 21:57	05:15 21:57
31	08:16 17:17		18:56 20:04		05:20 21:42		
Sonnenscheinstunden	258	277	367	416	486	500	
astr.max.mögl.Beschattung		195	764				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 19-SW - IP 19-SW
Annahmen für Schattenwurfberechnung

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

	July	August	September		Oktober		November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22		07:32 19:12	41	17:20 (WEA 4) 18:01 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20		07:34 19:10	42	17:20 (WEA 4) 18:02 (WEA 4)	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18		07:36 19:08	43	17:19 (WEA 4) 18:02 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:57 21:20	06:48 20:15		07:37 19:06	43	17:19 (WEA 4) 18:02 (WEA 4)	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13		07:39 19:03	43	17:18 (WEA 4) 18:01 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11		07:41 19:01	43	17:18 (WEA 4) 18:01 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09		07:42 18:59	43	17:18 (WEA 4) 18:01 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06		07:44 18:56	43	17:18 (WEA 4) 18:01 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04		07:46 18:54	43	17:17 (WEA 4) 18:00 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02		07:48 18:52	42	17:17 (WEA 4) 17:59 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59		07:49 18:50	41	17:18 (WEA 4) 17:59 (WEA 4)	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57		07:51 18:47	40	17:18 (WEA 4) 17:58 (WEA 4)	07:46 16:47	08:32 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55		07:53 18:45	38	17:18 (WEA 4) 17:56 (WEA 4)	07:48 16:46	08:33 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52		07:54 18:43	36	17:19 (WEA 4) 17:55 (WEA 4)	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50		07:56 18:41	34	17:20 (WEA 4) 17:54 (WEA 4)	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48		07:58 18:39	32	17:21 (WEA 4) 17:53 (WEA 4)	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45		08:00 18:36	28	17:23 (WEA 4) 17:51 (WEA 4)	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43		08:01 18:34	24	17:25 (WEA 4) 17:49 (WEA 4)	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41		08:03 18:32	19	17:26 (WEA 4) 17:45 (WEA 4)	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38		08:05 18:30	11	17:30 (WEA 4) 17:41 (WEA 4)	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36		08:07 18:28			08:02 16:35	08:39 16:22
22	05:38 21:40	06:27 20:44	07:17 19:34	17:45 (WEA 4)	08:08 18:26			08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	17:46 (WEA 4) 17:53 (WEA 4)	08:10 18:24			08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	17:33 (WEA 4) 17:56 (WEA 4)	08:12 18:22			08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	17:30 (WEA 4) 17:57 (WEA 4)	07:14 17:20			08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	17:28 (WEA 4) 17:59 (WEA 4)	07:16 17:18			08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	17:26 (WEA 4) 18:00 (WEA 4)	07:17 17:16			08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	17:24 (WEA 4) 17:24 (WEA 4)	07:19 17:14			08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	17:23 (WEA 4) 18:01 (WEA 4)	07:21 17:12			08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	17:22 (WEA 4) 18:02 (WEA 4)	07:23 17:10			08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25			07:25 17:08				08:42 16:30
Sonnenscheinstunden	503	454	381		331		266		243
astr.max.mögl.Beschattung			247		729				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 20-NW - IP 20-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21		07:10	06:05	05:19	05:16	05:53	06:43	07:32	17:51 (WEA 4) 07:26 08:18		
	16:31	17:19	18:11		20:05	20:57	21:43	21:57	21:25	20:22	19:12	17:06 16:25		
2	08:42	08:13	07:19		07:08	06:03	05:18	05:17	05:54	06:45	07:34	17:52 (WEA 4) 07:28 08:19		
	16:32	17:21	18:13	1	17:27 (WEA 4) 20:07	20:58	21:44	21:56	21:23	20:20	19:10	18:08 (WEA 4) 17:04 16:25		
3	08:41	08:11	07:16		17:25 (WEA 4) 07:05	06:01	05:18	05:17	05:56	06:46	07:36	17:53 (WEA 4) 07:30 08:21		
	16:33	17:23	18:15	3	17:28 (WEA 4) 20:09	21:00	21:45	21:56	21:21	20:18	19:08	18:08 (WEA 4) 17:02 16:24		
4	08:41	08:10	07:14		17:24 (WEA 4) 07:03	05:59	05:17	05:18	05:57	06:48	07:37	17:54 (WEA 4) 07:32 08:22		
	16:34	17:25	18:16	5	17:29 (WEA 4) 20:10	21:02	21:46	21:56	21:20	20:15	19:06	18:08 (WEA 4) 17:00 16:23		
5	08:41	08:08	07:12		17:22 (WEA 4) 07:01	05:57	05:16	05:19	05:59	06:49	07:39	17:54 (WEA 4) 07:34 08:23		
	16:35	17:26	18:18	7	17:29 (WEA 4) 20:12	21:03	21:47	21:55	21:18	20:13	19:03	18:07 (WEA 4) 16:59 16:23		
6	08:41	08:06	07:10		17:21 (WEA 4) 06:58	05:55	05:15	05:20	06:01	06:51	07:41	17:55 (WEA 4) 07:35 08:25		
	16:37	17:28	18:20	9	17:30 (WEA 4) 20:14	21:05	21:48	21:55	21:16	20:11	19:01	18:06 (WEA 4) 16:57 16:22		
7	08:40	08:05	07:08		17:20 (WEA 4) 06:56	05:54	05:15	05:21	06:02	06:53	07:42	17:56 (WEA 4) 07:37 08:26		
	16:38	17:30	18:22	10	17:30 (WEA 4) 20:16	21:07	21:49	21:54	21:14	20:09	18:59	18:06 (WEA 4) 16:55 16:22		
8	08:40	08:03	07:05		17:18 (WEA 4) 06:54	05:52	05:14	05:22	06:04	06:54	07:44	17:57 (WEA 4) 07:39 08:27		
	16:39	17:32	18:24	12	17:30 (WEA 4) 20:17	21:08	21:50	21:53	21:12	20:06	18:56	18:05 (WEA 4) 16:54 16:22		
9	08:39	08:01	07:03		17:17 (WEA 4) 06:52	05:50	05:14	05:23	06:05	06:56	07:46	17:57 (WEA 4) 07:41 08:28		
	16:41	17:34	18:25	13	17:30 (WEA 4) 20:19	21:10	21:51	21:53	21:11	20:04	18:54	18:04 (WEA 4) 16:52 16:21		
10	08:39	07:59	07:01		17:16 (WEA 4) 06:49	05:48	05:13	05:24	06:07	06:58	07:48	17:58 (WEA 4) 07:43 08:29		
	16:42	17:36	18:27	14	17:30 (WEA 4) 20:21	21:12	21:51	21:52	21:09	20:02	18:52	18:03 (WEA 4) 16:50 16:21		
11	08:38	07:58	06:59		17:15 (WEA 4) 06:47	05:47	05:13	05:25	06:09	06:59	07:49	17:59 (WEA 4) 07:44 08:30		
	16:43	17:38	18:29	15	17:30 (WEA 4) 20:22	21:13	21:52	21:51	21:07	19:59	18:50	18:02 (WEA 4) 16:49 16:21		
12	08:38	07:56	06:56		17:13 (WEA 4) 06:45	05:45	05:13	05:26	06:10	07:01	07:51	18:01 07:46 08:32		
	16:45	17:40	18:31	16	17:29 (WEA 4) 20:24	21:15	21:53	21:50	21:05	19:57	18:47	18:06 16:47 16:21		
13	08:37	07:54	06:54		17:11 (WEA 4) 06:43	05:43	05:12	05:27	06:12	07:03	07:53	18:07 07:48 08:33		
	16:46	17:41	18:32	18	17:29 (WEA 4) 20:26	21:16	21:54	21:49	21:03	19:55	18:45	18:06 16:46 16:21		
14	08:36	07:52	06:52		17:10 (WEA 4) 06:40	05:42	05:12	05:28	06:13	07:04	07:54	18:07 07:50 08:33		
	16:48	17:43	18:34	19	17:29 (WEA 4) 20:28	21:18	21:54	21:49	21:01	19:52	18:43	18:08 16:44 16:21		
15	08:35	07:50	06:49		17:08 (WEA 4) 06:38	05:40	05:12	05:29	06:15	07:06	07:56	18:09 07:52 08:34		
	16:49	17:45	18:36	19	17:27 (WEA 4) 20:29	21:19	21:55	21:48	20:59	19:50	18:41	18:09 16:43 16:21		
16	08:34	07:48	06:47		17:07 (WEA 4) 06:36	05:39	05:12	05:30	06:17	07:07	07:58	18:10 07:53 08:35		
	16:51	17:47	18:38	20	17:27 (WEA 4) 20:31	21:21	21:55	21:47	20:57	19:48	18:39	18:08 16:41 16:21		
17	08:34	07:46	06:45		17:06 (WEA 4) 06:34	05:37	05:12	05:32	06:18	07:09	08:00	18:09 07:55 08:36		
	16:53	17:49	18:39	20	17:26 (WEA 4) 20:33	21:23	21:56	21:45	20:55	19:45	18:36	18:08 16:40 16:21		
18	08:33	07:44	06:42		17:04 (WEA 4) 06:32	05:36	05:12	05:33	06:20	07:11	08:01	18:07 07:57 08:37		
	16:54	17:51	18:41	21	17:25 (WEA 4) 20:34	21:24	21:56	21:44	20:53	19:43	18:34	18:09 16:39 16:21		
19	08:32	07:42	06:40		17:03 (WEA 4) 06:29	05:34	05:12	05:34	06:22	07:12	08:03	18:08 07:58 08:38		
	16:56	17:53	18:43	21	17:24 (WEA 4) 20:36	21:26	21:56	21:43	20:51	19:41	18:32	18:08 16:37 16:22		
20	08:30	07:40	06:38		17:02 (WEA 4) 06:27	05:33	05:12	05:36	06:23	07:14	08:05	18:09 08:00 08:38		
	16:58	17:54	18:45	20	17:22 (WEA 4) 20:38	21:27	21:57	21:42	20:49	19:38	18:30	18:09 16:36 16:22		
21	08:29	07:38	06:35		17:00 (WEA 4) 06:25	05:31	05:12	05:37	06:25	07:16	08:07	18:08 08:02 08:39		
	16:59	17:56	18:46	20	17:20 (WEA 4) 20:40	21:28	21:57	21:41	20:46	19:36	18:28	18:09 16:35 16:22		
22	08:28	07:36	06:33		16:59 (WEA 4) 06:23	05:30	05:12	05:38	06:27	07:17	08:08	18:08 08:04 08:39		
	17:01	17:58	18:48	19	17:18 (WEA 4) 06:21	21:30	21:57	21:40	20:44	19:34	18:26	18:09 16:34 16:23		
23	08:27	07:34	06:31		16:57 (WEA 4) 06:21	05:29	05:12	05:40	06:28	07:19	08:10	18:08 08:05 08:40		
	17:03	18:00	18:50	18	17:15 (WEA 4) 06:23	21:31	21:57	21:38	20:42	19:31	18:24	18:09 16:33 16:23		
24	08:26	07:32	06:28		16:56 (WEA 4) 06:19	05:28	05:13	05:41	06:30	07:21	08:12	18:07 08:07 08:40		
	17:05	18:02	18:52	16	17:12 (WEA 4) 06:25	21:33	21:58	21:37	20:40	19:29	18:22	18:08 16:31 16:24		
25	08:25	07:30	06:26		16:17	05:26	05:13	05:42	06:31	07:22	08:13	18:08 08:08 08:41		
	17:06	18:04	18:53		20:46	21:34	21:58	21:35	20:38	19:26	18:20	18:07 16:30 16:25		
26	08:23	07:27	06:24		06:15	05:25	05:13	05:44	06:33	07:24	08:14	18:08 08:10 08:41		
	17:08	18:06	18:55		20:48	21:35	21:58	21:34	20:36	19:24	18:18	18:08 (WEA 4) 17:18 16:29 16:25		
27	08:22	07:25	06:22		06:13	05:24	05:14	05:45	06:35	07:26	08:17	18:09 08:12 08:41		
	17:10	18:07	18:57		20:50	21:37	21:58	21:33	20:33	19:22	18:16	18:09 (WEA 4) 17:16 16:29 16:26		
28	08:21	07:23	06:19		06:11	05:23	05:14	05:47	06:36	07:27	08:19	18:08 (WEA 4) 17:14 16:28 16:27		
	17:12	18:09	18:58		20:52	21:38	21:57	21:31	20:31	19:19	18:14	18:08 (WEA 4) 17:14 16:28 16:27		
29	08:19	07:17	06:13		06:09	05:22	05:15	05:48	06:38	07:29	08:21	18:09 (WEA 4) 17:15 16:29 16:28		
	17:14	18:11	19:00		20:53	21:39	21:57	21:29	20:29	19:17	18:12	18:08 (WEA 4) 17:12 16:27 16:28		
30	08:18	07:15	06:11		06:07	05:21	05:15	05:50	06:40	07:31	08:23	18:09 (WEA 4) 17:13 16:28 16:29		
	17:15	18:12	19:01		20:55	21:40	21:57	21:28	20:27	19:15	18:10	18:09 (WEA 4) 17:10 16:26 16:29		
31	08:16	07:12	06:08		06:05	05:20	05:14	05:51	06:41	07:32	08:24	18:09 (WEA 4) 17:11 16:27 16:30		
	17:17	18:14	19:03		21:42	21:26	20:25	21:26	20:25	19:15	18:08	18:09 (WEA 4) 17:08 16:26 16:30		
Sonnenscheinstunden	258	277	367		416	486	500	503	454	381	228	119	266	243
astr.max.mögl.Beschattung			336											

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 20-SO - IP 20-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	16:58 (WEA 4) 07:10	06:05 20:05	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	16:56 (WEA 4) 07:08	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	16:55 (WEA 4) 07:05	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	16:54 (WEA 4) 07:03	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	16:52 (WEA 4) 07:01	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	16:51 (WEA 4) 06:58	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	16:50 (WEA 4) 06:56	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	16:49 (WEA 4) 06:54	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	16:49 (WEA 4) 06:52	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	16:48 (WEA 4) 06:49	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	16:48 (WEA 4) 06:47	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	16:47 (WEA 4) 06:45	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	16:47 (WEA 4) 06:43	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	16:48 (WEA 4) 06:40	05:42 21:18	05:12 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	16:47 (WEA 4) 06:38	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	16:47 (WEA 4) 06:36	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	16:48 (WEA 4) 06:34	05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	16:48 (WEA 4) 06:32	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	16:49 (WEA 4) 06:29	05:34 21:26	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	16:50 (WEA 4) 06:27	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	16:50 (WEA 4) 06:25	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	16:52 (WEA 4) 06:23	05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	16:52 (WEA 4) 06:21	05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	16:55 (WEA 4) 06:19	05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	16:56 (WEA 4) 06:17	05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	17:08 (WEA 4) 17:18 (WEA 4)	06:24 18:55	06:15 20:48	05:13 21:58
27	08:22 17:10	07:25 18:07	17:03 (WEA 4) 17:22 (WEA 4)	06:22 18:57	06:13 20:50	05:14 21:58
28	08:21 17:12	07:23 18:09	17:01 (WEA 4) 17:25 (WEA 4)	06:19 18:58	06:11 20:52	05:14 21:57
29	08:19 17:14			07:17 20:00	06:09 20:53	05:15 21:57
30	08:18 17:15			07:15 20:02	06:07 20:55	05:15 21:57
31	08:16 17:17			07:12 20:04	05:20 21:42	
Sonnenscheinstunden	258	277	367	416	486	500
astr.max.mögl.Beschattung		53	367	516		

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 20-SO - IP 20-SO
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September		Oktober		November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22		07:32 19:12	25	17:26 (WEA 4) 17:51 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20		07:34 19:10	26	17:26 (WEA 4) 17:52 (WEA 4)	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18		07:36 19:08	27	17:26 (WEA 4) 17:53 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:57 21:20	06:48 20:15		07:37 19:06	28	17:26 (WEA 4) 17:54 (WEA 4)	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13		07:39 19:03	28	17:26 (WEA 4) 17:54 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11		07:41 19:01	29	17:26 (WEA 4) 17:55 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09		07:42 18:59	29	17:27 (WEA 4) 17:56 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06		07:44 18:56	30	17:27 (WEA 4) 17:57 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04		07:46 18:54	30	17:27 (WEA 4) 17:57 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02		07:48 18:52	30	17:28 (WEA 4) 17:58 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59		07:49 18:50	30	17:29 (WEA 4) 17:59 (WEA 4)	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57		07:51 18:47	30	17:31 (WEA 4) 18:01 (WEA 4)	07:46 16:47	08:32 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55		07:53 18:45	27	17:32 (WEA 4) 17:59 (WEA 4)	07:48 16:46	08:33 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52		07:54 18:43	22	17:34 (WEA 4) 17:56 (WEA 4)	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50		07:56 18:41	16	17:37 (WEA 4) 17:53 (WEA 4)	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48		07:58 18:39			07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45		08:00 18:36			07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43		08:01 18:34			07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41		08:03 18:32			07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	4	17:39 (WEA 4) 17:43 (WEA 4)			08:05 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	6	17:38 (WEA 4) 17:44 (WEA 4)			08:07 16:35	08:39 16:22
22	05:38 21:40	06:27 20:44	07:17 19:34	9	17:36 (WEA 4) 17:45 (WEA 4)			08:08 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	11	17:34 (WEA 4) 17:45 (WEA 4)			08:10 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	13	17:33 (WEA 4) 17:46 (WEA 4)			08:12 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	15	17:31 (WEA 4) 17:46 (WEA 4)			07:14 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	18	17:30 (WEA 4) 17:48 (WEA 4)			07:16 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	20	17:29 (WEA 4) 17:49 (WEA 4)			07:17 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	21	17:28 (WEA 4) 17:49 (WEA 4)			07:19 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	22	17:28 (WEA 4) 17:50 (WEA 4)			07:21 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	24	17:27 (WEA 4) 17:51 (WEA 4)			07:23 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25						07:25 17:08	08:42 16:30
Sonnenscheinstunden	503	454	381		331			266	243
astr.max.mögl.Beschattung			163		407				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 20-SW - IP 20-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	16:54 (WEA 4) 07:10	06:05 20:05	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	16:52 (WEA 4) 07:08	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	16:51 (WEA 4) 07:05	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	16:50 (WEA 4) 07:03	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	16:49 (WEA 4) 07:01	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	16:48 (WEA 4) 06:58	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	16:47 (WEA 4) 06:56	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	16:46 (WEA 4) 06:54	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	16:46 (WEA 4) 06:52	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	16:46 (WEA 4) 06:49	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	16:46 (WEA 4) 06:47	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	16:45 (WEA 4) 06:45	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	16:45 (WEA 4) 06:43	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	16:46 (WEA 4) 06:40	05:42 21:18	05:12 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	16:45 (WEA 4) 06:38	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	16:46 (WEA 4) 06:36	05:39 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	16:46 (WEA 4) 06:34	05:37 21:23	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	16:46 (WEA 4) 06:32	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	16:47 (WEA 4) 06:29	05:34 21:26	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	16:49 (WEA 4) 06:27	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	16:49 (WEA 4) 06:25	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	16:51 (WEA 4) 06:23	05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	16:52 (WEA 4) 06:21	05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	17:18 (WEA 4) 06:19	05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	17:15 (WEA 4) 06:17	05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	17:11 (WEA 4) 06:15	05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	16:58 (WEA 4) 06:13	05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	16:56 (WEA 4) 06:11	05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	17:25 (WEA 4) 07:17	20:52 06:09	21:38 05:22
30	08:18 17:15		07:15 20:02		21:39 06:07	21:57 05:15
31	08:16 17:17		07:12 20:04		21:40 05:20	21:57 05:15
Sonnenscheinstunden	258	277	367	416	486	500
astr.max.mögl.Beschattung		84	947			

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 20-SW - IP 20-SW
Annahmen für Schattenwurfberechnung

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

	July	August	September		Oktober		November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22		07:32 19:12	45	17:24 (WEA 4) 18:09 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20		07:34 19:10	45	17:24 (WEA 4) 18:09 (WEA 4)	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18		07:36 19:08	45	17:24 (WEA 4) 18:09 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:57 21:20	06:48 20:15		07:37 19:06	45	17:24 (WEA 4) 18:09 (WEA 4)	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13		07:39 19:03	45	17:23 (WEA 4) 18:08 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11		07:41 19:01	44	17:23 (WEA 4) 18:07 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09		07:42 18:59	43	17:24 (WEA 4) 18:07 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06		07:44 18:56	42	17:24 (WEA 4) 18:06 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04		07:46 18:54	40	17:24 (WEA 4) 18:04 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02		07:48 18:52	38	17:25 (WEA 4) 18:03 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59		07:49 18:50	36	17:26 (WEA 4) 18:02 (WEA 4)	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57		07:51 18:47	34	17:27 (WEA 4) 18:01 (WEA 4)	07:46 16:47	08:32 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55		07:53 18:45	31	17:27 (WEA 4) 17:58 (WEA 4)	07:48 16:46	08:33 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52		07:54 18:43	27	17:29 (WEA 4) 17:56 (WEA 4)	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50		07:56 18:41	23	17:31 (WEA 4) 17:54 (WEA 4)	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48		07:58 18:39	16	17:35 (WEA 4) 17:51 (WEA 4)	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45		08:00 18:36	3	17:41 (WEA 4) 17:44 (WEA 4)	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	9	17:48 (WEA 4) 17:57 (WEA 4)		08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	19	17:43 (WEA 4) 18:02 (WEA 4)		08:03 18:32	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	25	17:39 (WEA 4) 18:04 (WEA 4)		08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	29	17:37 (WEA 4) 18:06 (WEA 4)		08:07 18:28	08:02 16:35	08:39 16:22
22	05:38 21:40	06:27 20:44	07:17 19:34	32	17:35 (WEA 4) 18:07 (WEA 4)		08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	35	17:33 (WEA 4) 18:08 (WEA 4)		08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	38	17:31 (WEA 4) 18:09 (WEA 4)		08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	40	17:29 (WEA 4) 18:09 (WEA 4)		07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	41	17:28 (WEA 4) 18:09 (WEA 4)		07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	42	17:28 (WEA 4) 18:10 (WEA 4)		07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	43	17:26 (WEA 4) 18:09 (WEA 4)		07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	44	17:26 (WEA 4) 18:10 (WEA 4)		07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	45	17:25 (WEA 4) 18:10 (WEA 4)		07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25			07:25 17:08				08:42 16:30
Sonnenscheinstunden	503	454	381		331		266	243	
astr.max.mögl.Beschattung			442		602				

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

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

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 21-NW - IP 21-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember					
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	17:52 (WEA 4)	07:26	08:18				
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	36	18:28 (WEA 4)	17:06	16:25			
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34		17:53 (WEA 4)	07:28	08:19			
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	34	18:27 (WEA 4)	17:04	16:25			
3	08:41	08:11	07:16	07:05	06:01	05:18	05:17	05:56	06:46	07:36		17:54 (WEA 4)	07:30	08:21			
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	32	18:26 (WEA 4)	17:02	16:24			
4	08:41	08:10	07:14	07:03	05:59	05:17	05:18	05:57	06:48	07:37		17:55 (WEA 4)	07:32	08:22			
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	19:06	29	18:24 (WEA 4)	17:00	16:23			
5	08:41	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:49	07:39		17:56 (WEA 4)	07:34	08:23			
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	26	18:22 (WEA 4)	16:59	16:23			
6	08:41	08:06	07:10	17:27 (WEA 4)	06:58	05:55	05:15	05:20	06:01	06:51		17:58 (WEA 4)	07:35	08:25			
	16:37	17:28	18:20	12	17:39 (WEA 4)	20:14	21:05	21:48	21:55	21:16	20:11	19:01	22	18:20 (WEA 4)	16:57	16:22	
7	08:40	08:05	07:08	17:23 (WEA 4)	06:56	05:54	05:15	05:21	06:02	06:53		17:59 (WEA 4)	07:37	08:26			
	16:38	17:30	18:22	19	17:42 (WEA 4)	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16	18:17 (WEA 4)	16:55	16:22	
8	08:40	08:03	07:05	17:20 (WEA 4)	06:54	05:52	05:14	05:22	06:04	06:54		17:57 (WEA 4)	07:39	08:27			
	16:39	17:32	18:24	24	17:44 (WEA 4)	20:17	21:08	21:50	21:53	21:12	20:06	18:56	5	18:11 (WEA 4)	16:54	16:22	
9	08:39	08:01	07:03	17:18 (WEA 4)	06:52	05:50	05:14	05:23	06:05	06:56		17:56 (WEA 4)	07:41	08:28			
	16:41	17:34	18:25	28	17:46 (WEA 4)	20:19	21:10	21:51	21:53	21:11	20:04	18:54		16:52	16:21		
10	08:39	07:59	07:01	17:17 (WEA 4)	06:49	05:48	05:13	05:24	06:07	06:58		17:57 (WEA 4)	07:43	08:29			
	16:42	17:36	18:27	30	17:47 (WEA 4)	20:21	21:11	21:51	21:52	21:09	20:02	18:52		16:50	16:21		
11	08:38	07:58	06:59	17:15 (WEA 4)	06:47	05:47	05:13	05:25	06:09	06:59		17:58 (WEA 4)	07:44	08:30			
	16:43	17:38	18:29	33	17:48 (WEA 4)	20:22	21:13	21:52	21:51	21:07	19:59	18:50		16:49	16:21		
12	08:38	07:56	06:56	17:14 (WEA 4)	06:45	05:45	05:13	05:26	06:10	07:01		17:59 (WEA 4)	07:46	08:31			
	16:45	17:40	18:31	35	17:49 (WEA 4)	20:24	21:15	21:53	21:50	21:05	19:57	18:47		16:47	16:21		
13	08:37	07:54	06:54	17:13 (WEA 4)	06:43	05:43	05:12	05:27	06:12	07:03		18:12 (WEA 4)	07:53	08:32			
	16:46	17:41	18:32	36	17:49 (WEA 4)	20:26	21:16	21:54	21:49	21:03	19:55	11	18:23 (WEA 4)	18:45	16:21		
14	08:36	07:52	06:52	17:12 (WEA 4)	06:40	05:42	05:12	05:28	06:13	07:04		18:08 (WEA 4)	07:54	08:33			
	16:48	17:43	18:34	38	17:50 (WEA 4)	20:28	21:18	21:54	21:49	21:01	19:52	19	18:27 (WEA 4)	18:43	16:21		
15	08:35	07:50	06:49	17:11 (WEA 4)	06:38	05:40	05:12	05:29	06:15	07:06		18:05 (WEA 4)	07:56	08:34			
	16:49	17:45	18:36	39	17:50 (WEA 4)	20:29	21:19	21:55	21:48	20:59	19:50	23	18:28 (WEA 4)	18:41	16:21		
16	08:34	07:48	06:47	17:11 (WEA 4)	06:36	05:39	05:12	05:30	06:17	07:07		18:03 (WEA 4)	07:58	08:35			
	16:51	17:47	18:38	39	17:50 (WEA 4)	20:31	21:21	21:55	21:47	20:57	19:48	27	18:30 (WEA 4)	18:39	16:21		
17	08:34	07:46	06:45	17:10 (WEA 4)	06:34	05:37	05:12	05:32	06:18	07:09		18:00 (WEA 4)	08:00	07:55	08:36		
	16:53	17:49	18:39	40	17:50 (WEA 4)	20:33	21:22	21:56	21:45	20:55	19:45	30	18:30 (WEA 4)	18:36	16:20		
18	08:33	07:44	06:42	17:09 (WEA 4)	06:32	05:36	05:12	05:33	06:20	07:11		17:59 (WEA 4)	08:01	07:57	08:37		
	16:54	17:51	18:41	40	17:49 (WEA 4)	20:34	21:24	21:56	21:44	20:53	19:43	33	18:32 (WEA 4)	18:34	16:39	16:21	
19	08:32	07:42	06:40	17:10 (WEA 4)	06:29	05:34	05:12	05:34	06:22	07:12		17:58 (WEA 4)	08:03	07:58	08:38		
	16:56	17:53	18:43	39	17:49 (WEA 4)	20:36	21:25	21:56	21:43	20:51	19:41	35	18:33 (WEA 4)	18:32	16:37	16:22	
20	08:30	07:40	06:38	17:10 (WEA 4)	06:27	05:33	05:12	05:36	06:23	07:14		17:56 (WEA 4)	08:05	08:00	08:38		
	16:58	17:54	18:45	39	17:49 (WEA 4)	20:38	21:27	21:57	21:42	20:49	19:38	36	18:32 (WEA 4)	18:30	16:36	16:22	
21	08:29	07:38	06:35	17:09 (WEA 4)	06:25	05:31	05:12	05:37	06:25	07:16		17:56 (WEA 4)	08:07	08:02	08:39		
	16:59	17:56	18:46	39	17:48 (WEA 4)	20:40	21:28	21:57	21:41	20:46	19:36	37	18:33 (WEA 4)	18:28	16:35	16:22	
22	08:28	07:36	06:33	17:10 (WEA 4)	06:23	05:30	05:12	05:38	06:27	07:17		17:55 (WEA 4)	08:08	08:04	08:39		
	17:01	17:58	18:48	38	17:48 (WEA 4)	20:41	21:30	21:57	21:40	20:44	19:33	38	18:33 (WEA 4)	18:26	16:34	16:23	
23	08:27	07:34	06:31	17:10 (WEA 4)	06:21	05:29	05:12	05:40	06:28	07:19		17:54 (WEA 4)	08:10	08:05	08:40		
	17:03	18:00	18:50	36	17:46 (WEA 4)	20:43	21:31	21:57	21:38	20:42	19:31	39	18:33 (WEA 4)	18:24	16:33	16:23	
24	08:26	07:32	06:28	17:10 (WEA 4)	06:19	05:28	05:13	05:41	06:30	07:21		17:53 (WEA 4)	08:12	08:07	08:40		
	17:05	18:02	18:52	35	17:45 (WEA 4)	20:45	21:33	21:58	21:37	20:40	19:29	40	18:33 (WEA 4)	18:22	16:31	16:24	
25	08:25	07:30	06:26	17:11 (WEA 4)	06:17	05:26	05:13	05:42	06:31	07:22		17:52 (WEA 4)	07:14	08:08	08:41		
	17:06	18:04	18:53	33	17:44 (WEA 4)	20:46	21:34	21:58	21:35	20:38	19:26	40	18:32 (WEA 4)	17:20	16:30	16:25	
26	08:23	07:27	06:24	17:12 (WEA 4)	06:15	05:25	05:13	05:44	06:33	07:24		17:52 (WEA 4)	07:16	08:10	08:41		
	17:08	18:06	18:55	30	17:42 (WEA 4)	20:48	21:35	21:58	21:34	20:36	19:24	40	18:32 (WEA 4)	17:18	16:29	16:25	
27	08:22	07:25	06:21	17:13 (WEA 4)	06:13	05:24	05:14	05:45	06:35	07:26		17:52 (WEA 4)	07:17	08:12	08:41		
	17:10	18:07	18:57	28	17:41 (WEA 4)	20:50	21:37	21:58	21:33	20:33	19:22	40	18:32 (WEA 4)	17:16	16:29	16:26	
28	08:21	07:23	06:19	17:15 (WEA 4)	06:11	05:23	05:14	05:47	06:36	07:27		17:51 (WEA 4)	07:19	08:13	08:41		
	17:12	18:09	18:58	24	17:39 (WEA 4)	20:52	21:38	21:57	21:31	20:31	19:19	39	18:30 (WEA 4)	17:14	16:28	16:27	
29	08:19	07:17	06:13	18:17 (WEA 4)	06:09	05:22	05:15	05:48	06:38	07:29		17:52 (WEA 4)	07:21	08:15	08:42		
	17:13	18:10	19:00	20	18:37 (WEA 4)	20:53	21:39	21:57	21:29	20:29	19:17	38	18:30 (WEA 4)	17:12	16:27	16:28	
30	08:18	07:15	06:11	18:20 (WEA 4)	06:07	05:21	05:15	05:50	06:40	07:31		17:52 (WEA 4)	07:23	08:16	08:42		
	17:15	18:12	19:02	13	18:33 (WEA 4)	20:55	21:40	21:57	21:28	20:27	19:15	37	18:29 (WEA 4)	17:10	16:26	16:29	
31	08:16	07:12	06:08		06:05	05:20	05:14	05:51	06:41			07:25		08:12	08:42		
	17:17	18:14	19:04		21:42		21:26	20:25				17:08		16:26	16:30		
Sonnenscheinstunden	258	277	367		416	486	500	503	454	381		602		331		266	243
astr.max.mögl.Beschattung			787									200					

Tabellen-Layout: Die Daten für jeden Tag 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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 21-SW - IP 21-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember			
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	17:55 (WEA 4)	07:26	08:18		
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	18:29 (WEA 4)	17:06	16:25		
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34	17:56 (WEA 4)	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	18:28 (WEA 4)	17:04	16:25		
3	08:41	08:11	07:16	07:05	06:01	05:18	05:17	05:56	06:46	07:36	17:57 (WEA 4)	07:30	08:21		
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	18:26 (WEA 4)	17:02	16:24		
4	08:41	08:10	07:14	07:03	05:59	05:17	05:18	05:57	06:48	07:37	17:59 (WEA 4)	07:32	08:22		
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	19:06	18:25 (WEA 4)	17:00	16:23		
5	08:41	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:49	07:39	18:00 (WEA 4)	07:34	08:23		
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	18:22 (WEA 4)	16:59	16:23		
6	08:41	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41	18:03 (WEA 4)	07:35	08:25		
	16:37	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	18:19 (WEA 4)	16:57	16:22		
7	08:40	08:05	07:08	17:29 (WEA 4)	06:56	05:54	05:15	05:21	06:02	06:53	07:42	18:12 (WEA 4)	07:37	08:26	
	16:38	17:30	18:22	17:40 (WEA 4)	20:16	21:07	21:49	21:54	21:14	20:09	18:59	18:12 (WEA 4)	16:55	16:22	
8	08:40	08:03	07:05	17:24 (WEA 4)	06:54	05:52	05:14	05:22	06:04	06:54	07:44	18:10 (WEA 4)	07:39	08:27	
	16:39	17:32	18:24	17:43 (WEA 4)	20:17	21:08	21:50	21:53	21:12	20:06	18:56	18:10 (WEA 4)	16:54	16:22	
9	08:39	08:01	07:03	17:22 (WEA 4)	06:52	05:50	05:14	05:23	06:05	06:56	07:46	18:09 (WEA 4)	07:41	08:28	
	16:41	17:34	18:25	17:46 (WEA 4)	20:19	21:10	21:51	21:53	21:11	20:04	18:54	18:10 (WEA 4)	16:52	16:21	
10	08:39	07:59	07:01	17:20 (WEA 4)	06:49	05:48	05:13	05:24	06:07	06:58	07:48	18:03 (WEA 4)	07:43	08:29	
	16:42	17:36	18:27	17:48 (WEA 4)	20:21	21:11	21:51	21:52	21:09	20:02	18:52	18:10 (WEA 4)	16:50	16:21	
11	08:38	07:58	06:59	17:19 (WEA 4)	06:47	05:47	05:13	05:25	06:09	06:59	07:49	18:04 (WEA 4)	07:44	08:30	
	16:43	17:38	18:29	17:49 (WEA 4)	20:22	21:13	21:52	21:51	21:07	19:59	18:50	18:10 (WEA 4)	16:49	16:21	
12	08:38	07:56	06:56	17:17 (WEA 4)	06:45	05:45	05:13	05:26	06:10	07:01	07:51	18:14 (WEA 4)	07:46	08:31	
	16:45	17:40	18:31	17:50 (WEA 4)	20:24	21:15	21:53	21:50	21:05	19:57	18:47	18:26 (WEA 4)	16:47	16:21	
13	08:37	07:54	06:54	17:16 (WEA 4)	06:43	05:43	05:12	05:27	06:12	07:03	07:53	18:10 (WEA 4)	07:48	08:32	
	16:46	17:41	18:32	17:51 (WEA 4)	20:26	21:16	21:54	21:49	21:03	19:55	18:45	18:29 (WEA 4)	16:46	16:21	
14	08:36	07:52	06:52	17:15 (WEA 4)	06:40	05:42	05:12	05:28	06:13	07:04	07:54	18:08 (WEA 4)	07:50	08:33	
	16:48	17:43	18:34	17:52 (WEA 4)	20:28	21:18	21:54	21:49	21:01	19:52	18:43	18:32 (WEA 4)	16:44	16:21	
15	08:35	07:50	06:49	17:13 (WEA 4)	06:38	05:40	05:12	05:29	06:15	07:06	07:52	18:05 (WEA 4)	07:52	08:34	
	16:49	17:45	18:36	17:51 (WEA 4)	20:29	21:19	21:55	21:48	20:59	19:50	18:41	18:32 (WEA 4)	16:43	16:21	
16	08:34	07:48	06:47	17:13 (WEA 4)	06:36	05:39	05:12	05:30	06:17	07:07	07:58	18:03 (WEA 4)	07:53	08:35	
	16:51	17:47	18:38	17:52 (WEA 4)	20:31	21:21	21:55	21:47	20:57	19:48	18:39	18:34 (WEA 4)	16:41	16:21	
17	08:34	07:46	06:45	17:13 (WEA 4)	06:34	05:37	05:12	05:32	06:18	07:09	07:59	18:01 (WEA 4)	08:00	07:55	08:36
	16:53	17:49	18:39	17:52 (WEA 4)	20:33	21:22	21:56	21:45	20:55	19:45	18:36	18:34 (WEA 4)	16:40	16:21	
18	08:33	07:44	06:42	17:12 (WEA 4)	06:32	05:36	05:12	05:33	06:20	07:11	08:01	18:00 (WEA 4)	08:01	07:57	08:37
	16:54	17:51	18:41	17:51 (WEA 4)	20:34	21:24	21:56	21:44	20:53	19:43	18:34	18:35 (WEA 4)	16:39	16:21	
19	08:32	07:42	06:40	17:12 (WEA 4)	06:29	05:34	05:12	05:34	06:22	07:12	08:03	17:59 (WEA 4)	08:03	07:58	08:37
	16:56	17:53	18:43	17:52 (WEA 4)	20:36	21:25	21:56	21:43	20:51	19:41	18:32	18:36 (WEA 4)	16:37	16:22	
20	08:30	07:40	06:38	17:12 (WEA 4)	06:27	05:33	05:12	05:36	06:23	07:14	08:05	17:58 (WEA 4)	08:05	08:00	08:38
	16:58	17:54	18:45	17:52 (WEA 4)	20:38	21:27	21:57	21:42	20:49	19:38	18:30	18:35 (WEA 4)	16:36	16:22	
21	08:29	07:38	06:35	17:11 (WEA 4)	06:25	05:31	05:12	05:37	06:25	07:16	08:07	17:57 (WEA 4)	08:07	08:02	08:39
	16:59	17:56	18:46	17:50 (WEA 4)	20:40	21:28	21:57	21:41	20:46	19:36	18:28	18:36 (WEA 4)	16:35	16:22	
22	08:28	07:36	06:33	17:11 (WEA 4)	06:23	05:30	05:12	05:38	06:27	07:17	08:08	17:57 (WEA 4)	08:08	08:04	08:39
	17:01	17:58	18:48	17:50 (WEA 4)	20:41	21:30	21:57	21:40	20:44	19:33	18:26	18:36 (WEA 4)	16:34	16:23	
23	08:27	07:34	06:31	17:11 (WEA 4)	06:21	05:29	05:12	05:40	06:28	07:19	08:10	17:55 (WEA 4)	08:10	08:05	08:40
	17:03	18:00	18:50	17:49 (WEA 4)	20:43	21:31	21:57	21:38	20:42	19:31	18:24	18:35 (WEA 4)	16:33	16:23	
24	08:26	07:32	06:28	17:12 (WEA 4)	06:19	05:28	05:13	05:41	06:30	07:21	08:12	17:55 (WEA 4)	08:12	08:07	08:40
	17:05	18:02	18:52	17:48 (WEA 4)	20:45	21:33	21:58	21:37	20:40	19:29	18:22	18:35 (WEA 4)	16:31	16:24	
25	08:25	07:30	06:26	17:12 (WEA 4)	06:17	05:26	05:13	05:42	06:31	07:22	08:13	17:54 (WEA 4)	07:14	08:08	08:41
	17:06	18:04	18:53	17:48 (WEA 4)	20:46	21:34	21:58	21:35	20:38	19:26	18:20	18:34 (WEA 4)	16:30	16:25	
26	08:23	07:27	06:24	17:13 (WEA 4)	06:15	05:25	05:13	05:44	06:33	07:24	08:15	17:54 (WEA 4)	07:16	08:10	08:41
	17:08	18:06	18:55	17:46 (WEA 4)	20:48	21:35	21:58	21:34	20:36	19:24	18:18	18:34 (WEA 4)	16:29	16:25	
27	08:22	07:25	06:21	17:14 (WEA 4)	06:13	05:24	05:14	05:45	06:35	07:26	08:17	17:55 (WEA 4)	07:17	08:12	08:41
	17:10	18:07	18:57	17:45 (WEA 4)	20:50	21:37	21:58	21:33	20:33	19:22	18:16	18:34 (WEA 4)	16:29	16:26	
28	08:21	07:23	06:19	17:15 (WEA 4)	06:11	05:23	05:14	05:47	06:36	07:27	08:19	17:54 (WEA 4)	07:19	08:13	08:41
	17:12	18:09	18:58	17:43 (WEA 4)	20:52	21:38	21:57	21:31	20:31	19:19	18:14	18:32 (WEA 4)	16:28	16:27	
29	08:19	07:17	06:13	18:17 (WEA 4)	06:09	05:22	05:15	05:48	06:38	07:29	08:21	17:55 (WEA 4)	07:21	08:15	08:42
	17:13	18:10	19:00	18:41 (WEA 4)	20:53	21:39	21:57	21:29	20:29	19:17	18:12	18:32 (WEA 4)	16:27	16:28	
30	08:18	07:15	06:11	18:18 (WEA 4)	06:07	05:21	05:15	05:50	06:40	07:31	08:23	17:55 (WEA 4)	07:23	08:16	08:42
	17:15	18:12	19:02	18:38 (WEA 4)	20:55	21:40	21:57	21:28	20:27	19:15	18:10	18:31 (WEA 4)	16:26	16:29	
31	08:16	07:12	06:08	18:22 (WEA 4)	06:05	05:20	05:15	05:51	06:41	07:32	08:24	17:56 (WEA 4)	07:25	08:18	08:42
	17:17	18:14	19:04	18:35 (WEA 4)	21:42	21:26	20:25	21:26	20:25	19:15	18:10	18:32 (WEA 4)	16:25	16:30	
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243			
astr.max.mögl.Beschattung			789						643	161					

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

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



Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 22-NW - IP 22-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	18:00 (WEA 4)	07:26	08:18			
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	32	18:32 (WEA 4)	17:06	16:25		
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34		18:01 (WEA 4)	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	30	18:31 (WEA 4)	17:04	16:25		
3	08:41	08:11	07:16	07:05	06:01	05:18	05:17	05:56	06:46	07:36		18:02 (WEA 4)	07:30	08:21		
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	29	18:31 (WEA 4)	17:02	16:24		
4	08:41	08:10	07:14	07:03	05:59	05:17	05:18	05:57	06:48	07:37		18:03 (WEA 4)	07:32	08:22		
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	19:06	27	18:30 (WEA 4)	17:00	16:23		
5	08:41	08:08	07:12	17:36 (WEA 4)	07:01	05:57	05:16	05:19	05:59	06:49		18:03 (WEA 4)	07:34	08:23		
	16:35	17:26	18:18	6	17:42 (WEA 4)	20:12	21:03	21:47	21:55	21:18	20:13	19:39	24	18:27 (WEA 4)	16:59	16:23
6	08:41	08:06	07:10	17:31 (WEA 4)	06:58	05:55	05:15	05:20	06:01	06:51		18:04 (WEA 4)	07:35	08:25		
	16:37	17:28	18:20	15	17:46 (WEA 4)	20:14	21:05	21:48	21:55	21:16	20:11	19:41	22	18:26 (WEA 4)	16:57	16:22
7	08:40	08:05	07:08	17:29 (WEA 4)	06:56	05:54	05:15	05:21	06:02	06:53		18:06 (WEA 4)	07:37	08:26		
	16:38	17:30	18:22	20	17:49 (WEA 4)	20:16	21:07	21:49	21:54	21:14	20:09	18:59	18	18:24 (WEA 4)	16:55	16:22
8	08:40	08:03	07:05	17:26 (WEA 4)	06:54	05:52	05:14	05:22	06:04	06:54		18:09 (WEA 4)	07:39	08:27		
	16:39	17:32	18:24	24	17:50 (WEA 4)	20:17	21:08	21:50	21:53	21:12	20:06	18:56	12	18:21 (WEA 4)	16:54	16:22
9	08:39	08:01	07:03	17:25 (WEA 4)	06:52	05:50	05:14	05:23	06:05	06:56		18:09 (WEA 4)	07:41	08:28		
	16:41	17:34	18:25	26	17:51 (WEA 4)	20:19	21:10	21:51	21:53	21:11	20:04	18:54		16:52	16:21	
10	08:39	07:59	07:01	17:24 (WEA 4)	06:49	05:48	05:13	05:24	06:07	06:58		18:00 (WEA 4)	07:42	08:29		
	16:42	17:36	18:27	28	17:52 (WEA 4)	20:21	21:11	21:51	21:52	21:09	20:02	18:52		16:50	16:21	
11	08:38	07:58	06:59	17:23 (WEA 4)	06:47	05:47	05:13	05:25	06:09	06:59		18:00 (WEA 4)	07:43	08:30		
	16:43	17:38	18:29	30	17:53 (WEA 4)	20:22	21:13	21:52	21:51	21:07	19:59	18:50		16:49	16:21	
12	08:38	07:56	06:56	17:22 (WEA 4)	06:45	05:45	05:13	05:26	06:10	07:01		18:00 (WEA 4)	07:44	08:31		
	16:45	17:40	18:31	31	17:53 (WEA 4)	20:24	21:15	21:53	21:50	21:05	19:57	18:47		16:47	16:21	
13	08:37	07:54	06:54	17:21 (WEA 4)	06:43	05:43	05:12	05:27	06:12	07:03		18:00 (WEA 4)	07:45	08:32		
	16:46	17:41	18:32	32	17:53 (WEA 4)	20:26	21:16	21:54	21:49	21:03	19:55	18:45		16:46	16:21	
14	08:36	07:52	06:52	17:21 (WEA 4)	06:40	05:42	05:12	05:28	06:13	07:04		18:00 (WEA 4)	07:46	08:33		
	16:48	17:43	18:34	33	17:54 (WEA 4)	20:28	21:18	21:54	21:49	21:01	19:52	18:43		16:44	16:21	
15	08:35	07:50	06:49	17:20 (WEA 4)	06:38	05:40	05:12	05:29	06:15	07:06		18:00 (WEA 4)	07:47	08:34		
	16:49	17:45	18:36	33	17:53 (WEA 4)	20:29	21:19	21:55	21:48	20:59	19:50	18:41		16:43	16:21	
16	08:34	07:48	06:47	17:20 (WEA 4)	06:36	05:39	05:12	05:30	06:17	07:07		18:00 (WEA 4)	07:48	08:35		
	16:51	17:47	18:38	33	17:53 (WEA 4)	20:31	21:21	21:55	21:47	20:57	19:48	18:39		16:41	16:21	
17	08:33	07:46	06:45	17:21 (WEA 4)	06:34	05:37	05:12	05:32	06:18	07:09		18:00 (WEA 4)	07:49	08:36		
	16:53	17:49	18:39	32	17:53 (WEA 4)	20:33	21:22	21:56	21:45	20:55	19:45	18:36		16:40	16:21	
18	08:33	07:44	06:42	17:20 (WEA 4)	06:32	05:36	05:12	05:33	06:20	07:11	18:18 (WEA 4)	18:01		16:39	16:21	
	16:54	17:51	18:41	31	17:51 (WEA 4)	20:34	21:24	21:56	21:44	20:53	19:43	7	18:25 (WEA 4)	16:39	16:21	
19	08:32	07:42	06:40	17:21 (WEA 4)	06:29	05:34	05:12	05:34	06:22	07:12	18:14 (WEA 4)	18:03		16:38	16:21	
	16:56	17:53	18:43	30	17:51 (WEA 4)	20:36	21:25	21:56	21:43	20:51	19:41	15	18:29 (WEA 4)	16:37	16:22	
20	08:30	07:40	06:38	17:21 (WEA 4)	06:27	05:33	05:12	05:36	06:23	07:14	18:11 (WEA 4)	18:32		16:37	16:22	
	16:58	17:54	18:45	28	17:49 (WEA 4)	20:38	21:27	21:57	21:42	20:49	19:38	20	18:31 (WEA 4)	16:36	16:22	
21	08:29	07:38	06:35	17:22 (WEA 4)	06:25	05:31	05:12	05:37	06:25	07:16	18:09 (WEA 4)	18:30		16:36	16:22	
	16:59	17:56	18:46	26	17:48 (WEA 4)	20:40	21:28	21:57	21:41	20:46	19:36	23	18:32 (WEA 4)	16:35	16:22	
22	08:28	07:36	06:33	17:23 (WEA 4)	06:23	05:30	05:12	05:38	06:27	07:17	18:07 (WEA 4)	18:08		16:35	16:22	
	17:01	17:58	18:48	24	17:47 (WEA 4)	20:41	21:30	21:57	21:39	20:44	19:33	27	18:34 (WEA 4)	16:34	16:23	
23	08:27	07:34	06:31	17:24 (WEA 4)	06:21	05:29	05:12	05:40	06:28	07:19	18:05 (WEA 4)	18:10		16:34	16:23	
	17:03	18:00	18:50	21	17:45 (WEA 4)	20:43	21:31	21:57	21:38	20:42	19:31	29	18:34 (WEA 4)	16:33	16:23	
24	08:26	07:32	06:28	17:26 (WEA 4)	06:19	05:28	05:13	05:41	06:30	07:21	18:05 (WEA 4)	18:12		16:33	16:23	
	17:05	18:02	18:52	16	17:42 (WEA 4)	20:45	21:33	21:58	21:37	20:40	19:29	29	18:34 (WEA 4)	16:31	16:24	
25	08:25	07:29	06:26	17:29 (WEA 4)	06:17	05:26	05:13	05:42	06:31	07:22	18:03 (WEA 4)	18:14		16:31	16:24	
	17:06	18:04	18:53	10	17:39 (WEA 4)	20:46	21:34	21:58	21:35	20:38	19:26	31	18:34 (WEA 4)	16:30	16:25	
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	18:02 (WEA 4)	18:16			16:30	16:25	
	17:08	18:05	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:34 (WEA 4)	17:18			16:29	16:25	
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	06:35	07:26	18:02 (WEA 4)	18:32			16:29	16:25	
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:34 (WEA 4)	17:16			16:29	16:26	
28	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	18:01 (WEA 4)	18:31			16:29	16:26	
	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:34 (WEA 4)	17:14			16:28	16:27	
29	08:19	07:17	06:13	06:09	05:22	05:15	05:48	06:38	07:29	18:01 (WEA 4)	18:31			16:27	16:28	
	17:13	18:10	19:00	20:53	21:39	21:57	21:29	20:29	19:17	18:33 (WEA 4)	17:12			16:27	16:28	
30	08:18	07:15	06:11	06:07	05:21	05:15	05:50	06:40	07:31	18:01 (WEA 4)	18:31			16:26	16:28	
	17:15	18:12	19:02	20:55	21:40	21:57	21:28	20:27	19:15	18:33 (WEA 4)	17:10			16:26	16:29	
31	08:16	07:12	06:08	06:03	05:17	05:11	05:51	06:41	07:32	18:01 (WEA 4)	18:31			16:25	16:29	
	17:17	18:14	19:04	20:59	21:42	21:59	21:26	20:25	19:13	18:33 (WEA 4)	17:08			16:25	16:30	
Sonnenscheinstunden	258	277	367		416	486	500	503	454	381		331		266	243	
astr.max.mögl.Beschattung			529						342		194					

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

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

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 22-SW - IP 22-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	18:01 (WEA 4)	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	31	18:32 (WEA 4)	17:06	16:25
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34		18:02 (WEA 4)	07:28	08:19
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	30	18:32 (WEA 4)	17:04	16:25
3	08:41	08:11	07:16	07:05	06:01	05:18	05:17	05:56	06:46	07:36		18:03 (WEA 4)	07:30	08:21
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	28	18:31 (WEA 4)	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	05:17	05:18	05:57	06:48	07:37		18:04 (WEA 4)	07:32	08:22
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	19:06	26	18:30 (WEA 4)	17:00	16:23
5	08:41	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:49	07:39		18:04 (WEA 4)	07:34	08:23
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	24	18:28 (WEA 4)	16:59	16:23
6	08:41	08:06	07:10	17:34 (WEA 4)	06:58	05:55	05:15	05:20	06:01	06:51		18:06 (WEA 4)	07:35	08:25
	16:37	17:28	18:20	12	17:46 (WEA 4)	20:14	21:05	21:48	21:55	21:16	20	18:26 (WEA 4)	16:57	16:22
7	08:40	08:05	07:08	17:31 (WEA 4)	06:56	05:54	05:15	05:21	06:02	06:53		18:08 (WEA 4)	07:37	08:26
	16:38	17:30	18:22	18	17:49 (WEA 4)	20:16	21:07	21:49	21:54	21:14	20	18:23 (WEA 4)	16:55	16:22
8	08:40	08:03	07:05	17:28 (WEA 4)	06:54	05:52	05:14	05:22	06:04	06:54		18:12 (WEA 4)	07:39	08:27
	16:39	17:32	18:24	22	17:50 (WEA 4)	20:17	21:08	21:50	21:53	21:12	20	18:19 (WEA 4)	16:54	16:22
9	08:39	08:01	07:03	17:26 (WEA 4)	06:52	05:50	05:14	05:23	06:05	06:56			07:41	08:28
	16:41	17:34	18:25	25	17:51 (WEA 4)	20:19	21:10	21:51	21:53	21:11	20	18:18 (WEA 4)	16:52	16:21
10	08:39	07:59	07:01	17:25 (WEA 4)	06:49	05:48	05:13	05:24	06:07	06:58			07:43	08:29
	16:42	17:36	18:27	28	17:53 (WEA 4)	20:21	21:11	21:51	21:52	21:09	20	18:17 (WEA 4)	16:50	16:21
11	08:38	07:58	06:59	17:24 (WEA 4)	06:47	05:47	05:13	05:25	06:09	06:59			07:44	08:30
	16:43	17:38	18:29	30	17:54 (WEA 4)	20:22	21:13	21:52	21:51	21:07	19	18:16 (WEA 4)	16:49	16:21
12	08:38	07:56	06:56	17:23 (WEA 4)	06:45	05:45	05:13	05:26	06:10	07:01			07:51	08:31
	16:45	17:40	18:31	30	17:53 (WEA 4)	20:24	21:15	21:53	21:50	21:05	19	18:15 (WEA 4)	16:47	16:21
13	08:37	07:54	06:54	17:22 (WEA 4)	06:43	05:43	05:12	05:27	06:12	07:03			07:53	08:32
	16:46	17:41	18:32	32	17:54 (WEA 4)	20:26	21:16	21:54	21:49	21:03	19	18:14 (WEA 4)	16:46	16:21
14	08:36	07:52	06:52	17:22 (WEA 4)	06:40	05:42	05:12	05:28	06:13	07:04			07:54	08:33
	16:48	17:43	18:34	32	17:54 (WEA 4)	20:28	21:18	21:54	21:49	21:01	19	18:13 (WEA 4)	16:44	16:21
15	08:35	07:50	06:49	17:21 (WEA 4)	06:38	05:40	05:12	05:29	06:15	07:06			07:52	08:34
	16:49	17:45	18:36	33	17:54 (WEA 4)	20:29	21:19	21:55	21:48	20:59	19	18:12 (WEA 4)	16:43	16:21
16	08:34	07:48	06:47	17:21 (WEA 4)	06:36	05:39	05:12	05:30	06:17	07:07			07:58	08:35
	16:51	17:47	18:38	33	17:54 (WEA 4)	20:31	21:21	21:55	21:47	20:57	19	18:11 (WEA 4)	16:41	16:21
17	08:33	07:46	06:45	17:21 (WEA 4)	06:34	05:37	05:12	05:32	06:18	07:09			08:00	08:36
	16:53	17:49	18:39	33	17:54 (WEA 4)	20:33	21:22	21:56	21:45	20:55	19	18:10 (WEA 4)	16:40	16:21
18	08:33	07:44	06:42	17:20 (WEA 4)	06:32	05:36	05:12	05:33	06:20	07:11		18:16 (WEA 4)	08:31	08:37
	16:54	17:51	18:41	32	17:52 (WEA 4)	20:34	21:24	21:56	21:44	20:53	13	18:29 (WEA 4)	16:39	16:21
19	08:32	07:42	06:40	17:21 (WEA 4)	06:29	05:34	05:12	05:34	06:22	07:12		18:13 (WEA 4)	08:34	08:37
	16:56	17:53	18:43	31	17:52 (WEA 4)	20:36	21:25	21:56	21:43	20:51	19	18:32 (WEA 4)	16:37	16:22
20	08:30	07:40	06:38	17:21 (WEA 4)	06:27	05:33	05:12	05:36	06:23	07:14		18:10 (WEA 4)	08:05	08:38
	16:58	17:54	18:45	29	17:50 (WEA 4)	20:38	21:27	21:57	21:42	20:49	22	18:32 (WEA 4)	16:36	16:22
21	08:29	07:38	06:35	17:22 (WEA 4)	06:25	05:31	05:12	05:37	06:25	07:16		18:09 (WEA 4)	08:30	08:39
	16:59	17:56	18:46	28	17:50 (WEA 4)	20:40	21:28	21:57	21:41	20:46	25	18:34 (WEA 4)	16:35	16:22
22	08:28	07:36	06:33	17:23 (WEA 4)	06:23	05:30	05:12	05:38	06:27	07:17		18:07 (WEA 4)	08:08	08:39
	17:01	17:58	18:48	26	17:49 (WEA 4)	20:41	21:30	21:57	21:39	20:44	28	18:35 (WEA 4)	16:34	16:23
23	08:27	07:34	06:31	17:23 (WEA 4)	06:21	05:29	05:12	05:40	06:28	07:19		18:06 (WEA 4)	08:10	08:40
	17:03	18:00	18:50	23	17:46 (WEA 4)	20:43	21:31	21:57	21:38	20:42	29	18:35 (WEA 4)	16:33	16:23
24	08:26	07:32	06:28	17:25 (WEA 4)	06:19	05:28	05:13	05:41	06:30	07:21		18:05 (WEA 4)	08:12	08:40
	17:05	18:02	18:52	20	17:45 (WEA 4)	20:45	21:33	21:58	21:37	20:40	31	18:36 (WEA 4)	16:31	16:24
25	08:25	07:29	06:26	17:28 (WEA 4)	06:17	05:26	05:13	05:42	06:31	07:22		18:03 (WEA 4)	07:14	08:41
	17:06	18:04	18:53	14	17:42 (WEA 4)	20:46	21:34	21:58	21:35	20:38	32	18:35 (WEA 4)	16:30	16:25
26	08:23	07:27	06:24	17:32 (WEA 4)	06:15	05:25	05:13	05:44	06:33	07:24		18:03 (WEA 4)	07:16	08:41
	17:08	18:05	18:55	4	17:36 (WEA 4)	20:48	21:35	21:58	21:34	20:36	32	18:35 (WEA 4)	16:29	16:25
27	08:22	07:25	06:21		06:13	05:24	05:14	05:45	06:35	07:26		18:03 (WEA 4)	07:17	08:41
	17:10	18:07	18:57		20:50	21:37	21:58	21:33	20:33	19:22	32	18:35 (WEA 4)	16:29	16:26
28	08:21	07:23	06:19		06:11	05:23	05:14	05:47	06:36	07:27		18:02 (WEA 4)	07:19	08:41
	17:12	18:09	18:58		20:52	21:38	21:57	21:31	20:31	19:19	32	18:34 (WEA 4)	16:28	16:27
29	08:19	07:17	06:13		06:09	05:22	05:15	05:48	06:38	07:29		18:02 (WEA 4)	07:21	08:42
	17:13		20:00		20:53	21:39	21:57	21:29	20:29	19:17	32	18:34 (WEA 4)	16:27	16:28
30	08:18	07:15	06:11		06:07	05:21	05:15	05:50	06:40	07:31		18:02 (WEA 4)	07:23	08:42
	17:15		20:02		20:55	21:40	21:57	21:28	20:27	19:15	32	18:34 (WEA 4)	16:26	16:29
31	08:16	07:12	06:08			05:20		05:51	06:41				07:25	08:42
	17:17	20:04				21:42		21:26	20:25				17:08	16:30
	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	359	181	266	243
	astr.max.mögl.Beschattung			535										

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

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

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 23-SW - IP 23-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11	17:20 (WEA 4) 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	17:19 (WEA 4) 18:13	07:08 20:07	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	17:18 (WEA 4) 18:15	07:05 20:09	06:01 21:00	05:17 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	17:17 (WEA 4) 18:16	07:03 20:10	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	17:15 (WEA 4) 18:18	07:01 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	17:15 (WEA 4) 18:20	06:58 20:14	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	17:14 (WEA 4) 18:22	06:56 20:16	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	17:13 (WEA 4) 18:24	06:54 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	17:13 (WEA 4) 18:25	06:52 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	17:14 (WEA 4) 18:27	06:49 20:21	05:48 21:11	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	17:14 (WEA 4) 18:29	06:47 20:22	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	17:14 (WEA 4) 18:31	06:45 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	17:15 (WEA 4) 18:32	06:43 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	17:16 (WEA 4) 18:34	06:40 20:28	05:42 21:18	05:12 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	17:16 (WEA 4) 18:36	06:38 20:29	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	17:18 (WEA 4) 18:38	06:36 20:31	05:39 21:21	05:12 21:55
17	08:33 16:53	07:46 17:49	06:45 18:39	17:20 (WEA 4) 18:39	06:34 20:33	05:37 21:22	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	17:34 (WEA 4) 18:41	06:32 20:34	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	06:40 18:43	06:29 20:36	05:34 21:25	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	06:38 18:45	06:27 20:38	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	06:35 18:46	06:25 20:40	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	06:33 18:48	06:23 20:41	05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	06:31 18:50	06:21 20:43	05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	06:28 18:52	06:19 20:45	05:28 21:33	05:13 21:58
25	08:25 17:06	07:29 18:04	06:26 18:53	06:26 18:53	06:17 20:46	05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:05	06:24 18:55	06:24 18:55	06:15 20:48	05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:21 18:57	17:28 (WEA 4) 18:57	06:13 20:50	05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	17:33 (WEA 4) 17:24 (WEA 4) 17:38 (WEA 4)	06:11 20:52	05:23 21:38	05:14 21:57
29	08:19 17:13		07:17 20:00		06:09 20:53	05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02		06:07 20:55	05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04			05:20 21:42	
Sonnenscheinstunden	258	277	367	416	486	500	
astr.max.mögl.Beschattung		19	428				

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 23-SW - IP 23-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:12	17:53 (WEA 4) 18:20 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10	17:52 (WEA 4) 18:21 (WEA 4)	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18	07:36 19:08	17:52 (WEA 4) 18:21 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:57 21:20	06:48 20:15	07:37 19:06	17:51 (WEA 4) 18:21 (WEA 4)	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	07:39 19:03	17:50 (WEA 4) 18:20 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	17:50 (WEA 4) 18:20 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59	17:50 (WEA 4) 18:20 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	17:51 (WEA 4) 18:19 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	17:50 (WEA 4) 18:18 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	07:47 18:52	17:51 (WEA 4) 18:17 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	17:52 (WEA 4) 18:16 (WEA 4)	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	17:54 (WEA 4) 18:14 (WEA 4)	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55	07:53 18:45	17:54 (WEA 4) 18:11 (WEA 4)	07:48 16:46	08:32 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52	07:54 18:43	17:57 (WEA 4) 18:09 (WEA 4)	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	17:52 (WEA 4) 18:09 (WEA 4)	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	17:53 (WEA 4) 18:39 (WEA 4)	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45	08:00 18:36	17:55 (WEA 4) 18:36 (WEA 4)	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	17:57 (WEA 4) 18:34 (WEA 4)	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	17:58 (WEA 4) 18:32 (WEA 4)	07:58 16:37	08:37 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	17:59 (WEA 4) 18:30 (WEA 4)	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	18:00 (WEA 4) 18:28 (WEA 4)	08:02 16:35	08:39 16:22
22	05:38 21:39	06:27 20:44	07:17 19:33	08:08 18:26	18:00 (WEA 4) 18:26 (WEA 4)	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	18:00 (WEA 4) 18:24 (WEA 4)	08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	18:00 (WEA 4) 18:22 (WEA 4)	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	07:14 17:20	18:00 (WEA 4) 17:20 (WEA 4)	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	18:03 (WEA 4) 18:14 (WEA 4)	17:18 17:18 (WEA 4)	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	18:00 (WEA 4) 18:17 (WEA 4)	17:17 17:16 (WEA 4)	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	17:57 (WEA 4) 18:18 (WEA 4)	17:19 17:14 (WEA 4)	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	17:56 (WEA 4) 18:19 (WEA 4)	17:21 17:12 (WEA 4)	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	17:55 (WEA 4) 18:20 (WEA 4)	17:23 17:10 (WEA 4)	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25		17:25 17:08			08:42 16:30
Sonnenscheinstunden	503	454	381	331	266	243	
astr.max.mögl.Beschattung			97	360			

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 24-S - IP 24-S
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	17:13 (WEA 4) 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	17:12 (WEA 4) 20:07	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	17:12 (WEA 4) 20:09	06:01 21:00	05:17 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	17:12 (WEA 4) 20:10	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	17:11 (WEA 4) 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	17:11 (WEA 4) 20:14	06:58 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	17:12 (WEA 4) 20:16	06:56 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	17:11 (WEA 4) 20:17	06:54 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	17:12 (WEA 4) 20:19	06:52 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	17:13 (WEA 4) 20:21	06:49 21:11	05:13 21:51
11	08:38 16:43	07:58 17:38	06:58 18:29	17:15 (WEA 4) 20:22	06:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	17:16 (WEA 4) 20:24	06:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	17:19 (WEA 4) 20:26	06:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	17:28 (WEA 4) 20:28	06:40 21:18	05:12 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	17:38 (WEA 4) 20:29	06:38 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	17:34 (WEA 4) 20:31	06:36 21:21	05:12 21:55
17	08:33 16:53	07:46 17:49	06:45 18:39	17:36 (WEA 4) 20:33	06:34 21:22	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	17:37 (WEA 4) 20:34	06:32 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	17:38 (WEA 4) 20:36	06:29 21:25	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	17:39 (WEA 4) 20:38	06:27 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	17:40 (WEA 4) 20:40	06:25 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	17:41 (WEA 4) 20:41	06:23 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	17:42 (WEA 4) 20:43	06:21 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	17:43 (WEA 4) 20:45	06:19 21:33	05:13 21:58
25	08:25 17:06	07:29 18:04	06:26 18:53	17:44 (WEA 4) 20:46	06:17 21:34	05:13 21:58
26	08:23 17:08	07:27 18:05	06:24 18:55	17:45 (WEA 4) 20:48	06:15 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:21 18:57	17:46 (WEA 4) 20:50	06:13 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	17:47 (WEA 4) 20:52	06:11 21:38	05:14 21:57
29	08:19 17:13		07:17 20:00	17:48 (WEA 4) 20:53	06:09 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	17:49 (WEA 4) 20:55	06:07 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	17:50 (WEA 4) 21:42	05:20 21:42	
Sonnenscheinstunden	258	277	367	416	486	500
astr.max.mögl.Beschattung		88	303			

Tabellen-Layout: Die Daten für jeden Tag 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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SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 24-S - IP 24-S
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:12	17:56 (WEA 4) 18:09 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10	17:53 (WEA 4) 18:11 (WEA 4)	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18	07:36 19:08	17:52 (WEA 4) 18:12 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:57 21:20	06:48 20:15	07:37 19:06	17:50 (WEA 4) 18:14 (WEA 4)	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13	07:39 19:03	17:48 (WEA 4) 18:13 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	17:48 (WEA 4) 18:14 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59	17:47 (WEA 4) 18:14 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	17:47 (WEA 4) 18:15 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	17:46 (WEA 4) 18:14 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	07:47 18:52	17:46 (WEA 4) 18:13 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	17:46 (WEA 4) 18:13 (WEA 4)	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	17:47 (WEA 4) 18:13 (WEA 4)	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55	07:53 18:45	17:46 (WEA 4) 18:11 (WEA 4)	07:48 16:46	08:32 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52	07:54 18:43	17:47 (WEA 4) 18:10 (WEA 4)	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	17:48 (WEA 4) 18:09 (WEA 4)	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	17:50 (WEA 4) 18:07 (WEA 4)	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45	08:00 18:36	17:52 (WEA 4) 18:05 (WEA 4)	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	17:56 (WEA 4) 18:00 (WEA 4)	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32		07:58 16:37	08:37 16:22
20	05:35 21:42	06:23 20:49	07:14 19:38	08:05 18:30		08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28		08:02 16:35	08:39 16:22
22	05:38 21:39	06:27 20:44	07:17 19:33	08:08 18:26		08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24		08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22		08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	07:14 17:20		08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	07:16 17:18		08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	07:17 17:16		08:12 16:28	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	07:19 17:14		08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	07:21 17:12		08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	18:02 (WEA 4) 18:05 (WEA 4)	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25			07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381	331		266	243
astr.max.mögl.Beschattung			3	392			

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

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

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 24-W - IP 24-W
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	Marz	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21	17:11 (WEA 4)	07:10	06:05	05:19	05:16	05:53	06:43	07:32	17:56 (WEA 4)	07:26	08:18
	16:31	17:19	18:11	26 17:37 (WEA 4)	20:05	20:57	21:43	21:57	21:25	20:22	19:12	18:05 (WEA 4)	17:06	16:25
2	08:42	08:13	07:19	17:10 (WEA 4)	07:08	06:03	05:18	05:17	05:54	06:45	07:34	17:53 (WEA 4)	07:28	08:19
	16:32	17:21	18:13	28 17:38 (WEA 4)	20:07	20:58	21:44	21:56	21:23	20:20	19:10	18:08 (WEA 4)	17:04	16:25
3	08:41	08:11	07:16	17:10 (WEA 4)	07:05	06:01	05:17	05:17	05:56	06:46	07:36	17:51 (WEA 4)	07:30	08:21
	16:33	17:23	18:15	28 17:38 (WEA 4)	20:09	21:00	21:45	21:56	21:21	20:18	19:08	18:10 (WEA 4)	17:02	16:24
4	08:41	08:10	07:14	17:10 (WEA 4)	07:03	05:59	05:17	05:18	05:57	06:48	07:37	17:50 (WEA 4)	07:32	08:22
	16:34	17:25	18:16	28 17:38 (WEA 4)	20:10	21:02	21:46	21:56	21:20	20:15	19:06	18:11 (WEA 4)	17:00	16:23
5	08:41	08:08	07:12	17:09 (WEA 4)	07:01	05:57	05:16	05:19	05:59	06:49	07:39	17:47 (WEA 4)	07:34	08:23
	16:35	17:26	18:18	28 17:37 (WEA 4)	20:12	21:03	21:47	21:55	21:18	20:13	19:03	18:11 (WEA 4)	16:59	16:23
6	08:41	08:06	07:10	17:10 (WEA 4)	06:58	05:55	05:15	05:20	06:01	06:51	07:41	17:47 (WEA 4)	07:35	08:25
	16:37	17:28	18:20	27 17:37 (WEA 4)	20:14	21:05	21:48	21:55	21:16	20:11	19:01	18:12 (WEA 4)	16:57	16:22
7	08:40	08:05	07:08	17:10 (WEA 4)	06:56	05:54	05:15	05:21	06:02	06:53	07:42	17:46 (WEA 4)	07:37	08:26
	16:38	17:30	18:22	26 17:36 (WEA 4)	20:16	21:07	21:49	21:54	21:14	20:09	18:59	18:13 (WEA 4)	16:55	16:22
8	08:40	08:03	07:05	17:10 (WEA 4)	06:54	05:52	05:14	05:22	06:04	06:54	07:44	17:45 (WEA 4)	07:39	08:27
	16:39	17:32	18:24	25 17:35 (WEA 4)	20:17	21:08	21:50	21:53	21:12	20:06	18:56	18:12 (WEA 4)	16:54	16:22
9	08:39	08:01	07:03	17:11 (WEA 4)	06:52	05:50	05:14	05:23	06:05	06:56	07:46	17:44 (WEA 4)	07:41	08:28
	16:41	17:34	18:25	23 17:34 (WEA 4)	20:19	21:10	21:51	21:53	21:11	20:04	18:54	18:12 (WEA 4)	16:52	16:21
10	08:39	07:59	07:01	17:12 (WEA 4)	06:49	05:48	05:13	05:24	06:07	06:58	07:47	17:44 (WEA 4)	07:43	08:29
	16:42	17:36	18:27	21 17:33 (WEA 4)	20:21	21:11	21:51	21:52	21:09	20:02	18:52	18:12 (WEA 4)	16:50	16:21
11	08:38	07:58	06:58	17:14 (WEA 4)	06:47	05:47	05:13	05:25	06:09	06:59	07:49	17:44 (WEA 4)	07:44	08:30
	16:43	17:38	18:29	17 17:31 (WEA 4)	20:22	21:13	21:52	21:51	21:07	19:59	18:50	18:12 (WEA 4)	16:49	16:21
12	08:38	07:56	06:56	17:16 (WEA 4)	06:45	05:45	05:13	05:26	06:10	07:01	07:51	17:45 (WEA 4)	07:46	08:31
	16:45	17:40	18:31	12 17:28 (WEA 4)	20:24	21:15	21:53	21:50	21:05	19:57	18:47	18:11 (WEA 4)	16:47	16:21
13	08:37	07:54	06:54	17:17 (WEA 4)	06:43	05:43	05:12	05:27	06:12	07:03	07:53	17:44 (WEA 4)	07:48	08:32
	16:46	17:41	18:32	20:26	21:16	21:54	21:49	21:49	21:03	19:55	18:45	18:10 (WEA 4)	16:46	16:21
14	08:36	07:52	06:52	17:14 (WEA 4)	06:40	05:42	05:12	05:28	06:13	07:04	07:54	17:45 (WEA 4)	07:50	08:33
	16:48	17:43	18:34	20:28	21:18	21:54	21:49	21:49	21:01	19:52	18:43	18:09 (WEA 4)	16:44	16:21
15	08:35	07:50	06:49	17:15 (WEA 4)	06:38	05:40	05:12	05:29	06:15	07:06	07:56	17:46 (WEA 4)	07:52	08:34
	16:49	17:45	18:36	20:29	21:19	21:55	21:48	21:48	20:59	19:50	18:41	18:08 (WEA 4)	16:43	16:21
16	08:34	07:48	06:47	17:16 (WEA 4)	06:36	05:39	05:12	05:30	06:17	07:07	07:58	17:47 (WEA 4)	07:53	08:35
	16:51	17:47	18:38	20:31	21:21	21:55	21:47	21:47	20:57	19:48	18:39	18:07 (WEA 4)	16:41	16:21
17	08:33	07:46	06:45	17:17 (WEA 4)	06:34	05:37	05:12	05:32	06:18	07:09	08:00	17:49 (WEA 4)	07:55	08:36
	16:53	17:49	18:39	20:33	21:22	21:56	21:45	21:45	20:55	19:45	18:36	18:05 (WEA 4)	16:40	16:21
18	08:33	07:44	06:42	17:18 (WEA 4)	06:32	05:36	05:12	05:33	06:20	07:11	08:01	17:51 (WEA 4)	07:57	08:37
	16:54	17:51	18:41	20:34	21:24	21:56	21:44	21:44	20:53	19:43	18:34	18:02 (WEA 4)	16:39	16:21
19	08:32	07:42	06:40	17:19 (WEA 4)	06:29	05:34	05:12	05:34	06:22	07:12	08:03	17:49 (WEA 4)	07:58	08:37
	16:56	17:53	18:43	20:36	21:25	21:56	21:43	21:43	20:51	19:41	18:32	18:09 (WEA 4)	16:37	16:22
20	08:30	07:40	06:38	17:20 (WEA 4)	06:27	05:33	05:12	05:35	06:23	07:14	08:05	17:49 (WEA 4)	07:58	08:38
	16:58	17:54	18:45	20:38	21:27	21:57	21:42	21:42	20:49	19:38	18:30	18:08 (WEA 4)	16:36	16:22
21	08:29	07:38	06:35	17:21 (WEA 4)	06:25	05:31	05:12	05:37	06:25	07:16	08:07	17:49 (WEA 4)	07:58	08:39
	16:59	17:56	18:46	20:40	21:28	21:57	21:41	21:41	20:46	19:36	18:28	18:09 (WEA 4)	16:35	16:22
22	08:28	07:36	06:33	17:22 (WEA 4)	06:23	05:30	05:12	05:38	06:27	07:17	08:08	17:50 (WEA 4)	07:57	08:39
	17:01	17:58	18:48	20:41	21:30	21:57	21:39	21:39	20:44	19:33	18:26	18:10 (WEA 4)	16:34	16:23
23	08:27	07:34	6:31	17:23 (WEA 4)	06:21	05:29	05:12	05:40	06:28	07:19	08:10	17:51 (WEA 4)	07:58	08:40
	17:03	18:00	5 17:28 (WEA 4)	18:50	20:43	21:31	21:57	21:38	20:42	19:31	18:24	18:11 (WEA 4)	16:33	16:23
24	08:26	07:32	6:28	17:18 (WEA 4)	06:19	05:28	05:13	05:41	06:30	07:21	08:12	17:51 (WEA 4)	07:57	08:40
	17:05	18:02	13 17:31 (WEA 4)	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	18:12 (WEA 4)	16:31	16:24
25	08:25	07:29	6:26	17:16 (WEA 4)	06:17	05:26	05:13	05:42	06:31	07:22	08:13	17:49 (WEA 4)	07:58	08:41
	17:06	18:04	17 17:33 (WEA 4)	18:53	20:46	21:34	21:58	21:35	20:38	19:26	18:20	18:10 (WEA 4)	16:30	16:25
26	08:23	07:27	6:24	17:14 (WEA 4)	06:15	05:25	05:13	05:44	06:33	07:24	08:15	17:49 (WEA 4)	07:58	08:41
	17:08	18:05	21 17:35 (WEA 4)	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:18	18:11 (WEA 4)	16:29	16:25
27	08:22	07:25	6:21	17:13 (WEA 4)	06:13	05:24	05:14	05:45	06:35	07:26	08:17	17:49 (WEA 4)	07:58	08:41
	17:10	18:07	23 17:36 (WEA 4)	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:16	18:12 (WEA 4)	16:28	16:26
28	08:21	07:23	6:19	17:12 (WEA 4)	06:11	05:23	05:14	05:47	06:36	07:27	08:19	17:49 (WEA 4)	07:58	08:41
	17:12	18:09	25 17:37 (WEA 4)	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:14	18:12 (WEA 4)	16:28	16:27
29	08:19		6:17	17:11 (WEA 4)	06:09	05:22	05:15	05:48	06:38	07:29	08:21	17:49 (WEA 4)	07:58	08:42
	17:13		20:00	18:59	20:53	21:39	21:57	21:29	20:29	19:17	18:12	18:13 (WEA 4)	16:27	16:28
30	08:18		6:15	17:10 (WEA 4)	06:07	05:21	05:15	05:50	06:40	07:31	08:23	17:49 (WEA 4)	07:58	08:42
	17:15		20:02	19:00	20:55	21:40	21:57	21:28	20:27	19:15	18:10	18:14 (WEA 4)	16:26	16:29
31	08:16		6:12	17:09 (WEA 4)	06:05	05:20	05:15	05:51	06:41	07:32	08:24	17:49 (WEA 4)	07:58	08:42
	17:17		20:04	19:01	21:42	21:42	21:26	20:25	19:15	18:08	17:08	18:15 (WEA 4)	16:26	16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243		
astr.max.mögl.Beschattung		104	289	416	486	500	503	454	381	331	266	243		

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) Schatteneende (WEA mit letztem Schatten)
	Sonnenuntergang (SS:MM)			

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 25-SW - IP 25-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:42 16:31	08:15 17:19	07:21 18:11	17:27 (WEA 4) 17:41 (WEA 4)	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	17:25 (WEA 4) 17:43 (WEA 4)	07:08 20:07	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	17:24 (WEA 4) 17:45 (WEA 4)	07:05 20:09	06:01 21:00	05:17 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	17:23 (WEA 4) 17:46 (WEA 4)	07:03 20:10	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	17:21 (WEA 4) 17:46 (WEA 4)	07:01 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	17:20 (WEA 4) 17:47 (WEA 4)	06:58 20:14	05:55 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	17:20 (WEA 4) 17:47 (WEA 4)	06:56 20:16	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	17:19 (WEA 4) 17:47 (WEA 4)	06:54 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	17:19 (WEA 4) 17:47 (WEA 4)	06:52 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	17:19 (WEA 4) 17:47 (WEA 4)	06:49 20:21	05:48 21:11	05:13 21:51
11	08:38 16:43	07:58 17:38	06:58 18:29	17:20 (WEA 4) 17:46 (WEA 4)	06:47 20:22	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	17:19 (WEA 4) 17:45 (WEA 4)	06:45 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	17:20 (WEA 4) 17:44 (WEA 4)	06:43 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	17:21 (WEA 4) 17:43 (WEA 4)	06:40 20:28	05:42 21:18	05:12 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	17:22 (WEA 4) 17:41 (WEA 4)	06:38 20:29	05:40 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	17:24 (WEA 4) 17:39 (WEA 4)	06:36 20:31	05:39 21:21	05:12 21:55
17	08:33 16:53	07:46 17:49	06:45 18:39	17:28 (WEA 4) 17:35 (WEA 4)	06:34 20:33	05:37 21:22	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	05:36 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	05:34 21:25	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45		06:27 20:38	05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40	05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41	05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43	05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52		06:19 20:45	05:28 21:33	05:13 21:58
25	08:25 17:06	07:29 18:04	06:26 18:53		06:17 20:46	05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:05	06:24 18:55		06:15 20:48	05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:21 18:57		06:13 20:50	05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	17:32 (WEA 4) 17:38 (WEA 4)	06:11 20:52	05:23 21:38	05:14 21:57
29	08:19 17:13		06:17 20:00		06:09 20:53	05:22 21:39	05:15 21:57
30	08:18 17:15		06:15 20:02		06:07 20:55	05:21 21:40	05:15 21:57
31	08:16 17:17		06:12 20:04			05:20 21:42	
Sonnenscheinstunden	258	277	367	416	486	500	
astr.max.mögl.Beschattung		6	378				

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 25-SW - IP 25-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September		Oktober		November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22		07:32 19:12	24	17:59 (WEA 4) 18:23 (WEA 4)	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	06:45 20:20		07:34 19:10	26	17:58 (WEA 4) 18:24 (WEA 4)	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	06:46 20:18		07:36 19:08	27	17:57 (WEA 4) 18:24 (WEA 4)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:57 21:20	06:48 20:15		07:37 19:06	28	17:57 (WEA 4) 18:25 (WEA 4)	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	06:49 20:13		07:39 19:03	28	17:56 (WEA 4) 18:24 (WEA 4)	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	06:51 20:11		07:41 19:01	27	17:56 (WEA 4) 18:23 (WEA 4)	07:35 16:57	08:25 16:22
7	05:21 21:54	06:02 21:14	06:53 20:09		07:42 18:59	27	17:56 (WEA 4) 18:23 (WEA 4)	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	06:54 20:06		07:44 18:56	26	17:57 (WEA 4) 18:23 (WEA 4)	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:11	06:56 20:04		07:46 18:54	25	17:56 (WEA 4) 18:21 (WEA 4)	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02		07:47 18:52	23	17:57 (WEA 4) 18:20 (WEA 4)	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59		07:49 18:50	20	17:58 (WEA 4) 18:18 (WEA 4)	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57		07:51 18:47	17	18:00 (WEA 4) 18:17 (WEA 4)	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	07:03 19:55		07:53 18:45	11	18:02 (WEA 4) 18:13 (WEA 4)	07:48 16:46	08:32 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52		07:54 18:43			07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50		07:56 18:41			07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48		07:58 18:39			07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09 19:45		08:00 18:36			07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43		08:01 18:34			07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41		08:03 18:32			07:58 16:37	08:37 16:22
20	05:35 21:42	06:23 20:49	07:14 19:38		08:05 18:30			08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36		08:07 18:28			08:02 16:35	08:39 16:22
22	05:38 21:39	06:27 20:44	07:17 19:33		08:08 18:26			08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31		08:10 18:24			08:05 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29		08:12 18:22			08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26		07:14 17:20			08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24		07:16 17:18			08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	12	18:07 (WEA 4) 18:19 (WEA 4)			08:12 16:28	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	18	18:03 (WEA 4) 18:21 (WEA 4)			08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	20	18:02 (WEA 4) 18:22 (WEA 4)			08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	22	18:01 (WEA 4) 18:23 (WEA 4)			08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25			07:25 17:08				08:42 16:30
Sonnenscheinstunden	503	454	381		331			266	243
astr.max.mögl.Beschattung				72		309			

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

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

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 26-SW - IP 26-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	18:07 (WEA 4)	07:26	08:18			
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	26	18:33 (WEA 4)	17:06	16:25		
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34		18:07 (WEA 4)	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	26	18:33 (WEA 4)	17:04	16:25		
3	08:41	08:11	07:16	07:05	06:01	05:17	05:17	05:56	06:46	07:36		18:07 (WEA 4)	07:30	08:21		
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	26	18:33 (WEA 4)	17:02	16:24		
4	08:41	08:10	07:14	17:42 (WEA 4)	07:03	05:59	05:17	05:18	05:57	06:48		18:08 (WEA 4)	07:32	08:22		
	16:34	17:25	18:16	4	17:46 (WEA 4)	20:10	21:02	21:46	21:56	21:20	20:15	19:06	26	18:33 (WEA 4)	17:00	16:23
5	08:41	08:08	07:12	17:36 (WEA 4)	07:01	05:57	05:16	05:19	05:59	06:49		18:07 (WEA 4)	07:34	08:23		
	16:35	17:26	18:18	13	17:49 (WEA 4)	20:12	21:03	21:47	21:55	21:18	20:13	19:39	24	18:31 (WEA 4)	16:59	16:23
6	08:41	08:06	07:10	17:34 (WEA 4)	06:58	05:55	05:15	05:20	06:01	06:51		18:08 (WEA 4)	07:35	08:25		
	16:37	17:28	18:20	18	17:52 (WEA 4)	20:14	21:05	21:48	21:55	21:16	20:11	19:41	22	18:30 (WEA 4)	16:57	16:22
7	08:40	08:05	07:08	17:33 (WEA 4)	06:56	05:54	05:15	05:21	06:02	06:53		18:09 (WEA 4)	07:37	08:26		
	16:38	17:30	18:22	20	17:53 (WEA 4)	20:16	21:07	21:49	21:54	21:14	20:09	18:59	19	18:28 (WEA 4)	16:55	16:22
8	08:40	08:03	07:05	17:31 (WEA 4)	06:54	05:52	05:14	05:22	06:04	06:54		18:11 (WEA 4)	07:39	08:27		
	16:39	17:32	18:24	22	17:53 (WEA 4)	20:17	21:08	21:50	21:53	21:12	20:06	18:56	16	18:27 (WEA 4)	16:54	16:22
9	08:39	08:01	07:03	17:30 (WEA 4)	06:52	05:50	05:14	05:23	06:05	06:56		18:13 (WEA 4)	07:41	08:28		
	16:41	17:34	18:25	24	17:54 (WEA 4)	20:19	21:10	21:51	21:53	21:10	20:04	18:54	10	18:23 (WEA 4)	16:52	16:21
10	08:39	07:59	07:01	17:29 (WEA 4)	06:49	05:48	05:13	05:24	06:07	06:58		18:14		17:03	08:29	
	16:42	17:36	18:27	26	17:55 (WEA 4)	20:21	21:11	21:51	21:52	21:09	20:02	18:52		16:50	16:21	
11	08:38	07:58	06:58	17:29 (WEA 4)	06:47	05:47	05:13	05:25	06:09	06:59		18:15		17:04	08:30	
	16:43	17:38	18:29	26	17:55 (WEA 4)	20:22	21:13	21:52	21:51	21:07	19:59	18:49		16:49	16:21	
12	08:38	07:56	06:56	17:28 (WEA 4)	06:45	05:45	05:13	05:26	06:10	07:01		18:16		17:05	08:31	
	16:45	17:40	18:31	27	17:55 (WEA 4)	20:24	21:15	21:53	21:50	21:05	19:57	18:47		16:47	16:21	
13	08:37	07:54	06:54	17:28 (WEA 4)	06:43	05:43	05:12	05:27	06:12	07:03		18:17		17:06	08:32	
	16:46	17:41	18:32	27	17:55 (WEA 4)	20:26	21:16	21:54	21:49	21:03	19:55	18:45		16:46	16:21	
14	08:36	07:52	06:52	17:28 (WEA 4)	06:40	05:42	05:12	05:28	06:13	07:04		18:18		17:07	08:33	
	16:48	17:43	18:34	27	17:55 (WEA 4)	20:28	21:18	21:54	21:49	21:01	19:52	18:43		16:44	16:21	
15	08:35	07:50	06:49	17:28 (WEA 4)	06:38	05:40	05:12	05:29	06:15	07:06		18:19		17:08	08:34	
	16:49	17:45	18:36	25	17:53 (WEA 4)	20:29	21:19	21:55	21:48	20:59	19:50	18:41		16:43	16:21	
16	08:34	07:48	06:47	17:29 (WEA 4)	06:36	05:39	05:12	05:30	06:17	07:07		18:20		17:09	08:35	
	16:51	17:47	18:38	24	17:53 (WEA 4)	20:31	21:21	21:55	21:47	20:57	19:48	18:39		16:41	16:21	
17	08:33	07:46	06:45	17:30 (WEA 4)	06:34	05:37	05:12	05:32	06:18	07:09		18:21		17:10	08:36	
	16:53	17:49	18:39	22	17:52 (WEA 4)	20:33	21:22	21:56	21:45	20:55	19:45	18:36		16:40	16:21	
18	08:33	07:44	06:42	17:30 (WEA 4)	06:32	05:36	05:12	05:33	06:20	07:11		18:22		17:11	08:37	
	16:54	17:51	18:41	20	17:50 (WEA 4)	20:34	21:24	21:56	21:44	20:53	19:43	18:34		16:39	16:21	
19	08:32	07:42	06:40	17:32 (WEA 4)	06:29	05:34	05:12	05:34	06:22	07:12		18:23		17:12	08:37	
	16:56	17:53	18:43	16	17:48 (WEA 4)	20:36	21:25	21:56	21:43	20:51	19:41	18:32		16:37	16:22	
20	08:30	07:40	06:38	17:33 (WEA 4)	06:27	05:33	05:12	05:35	06:23	07:14		18:24		17:13	08:38	
	16:58	17:54	18:45	11	17:44 (WEA 4)	20:38	21:27	21:57	21:42	20:49	19:38	18:30		16:36	16:22	
21	08:29	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16			18:07		18:02	08:39	
	16:59	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36			18:28		16:35	16:22	
22	08:28	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17			18:08		18:04	08:39	
	17:01	17:58	18:48	20:41	21:30	21:57	21:39	20:44	19:33			18:26		16:34	16:23	
23	08:27	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19			18:19		18:05	08:40	
	17:03	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31			18:28 (WEA 4)		18:24	16:23	
24	08:26	07:32	06:28	06:19	05:28	05:13	05:41	06:30	07:21			18:16 (WEA 4)		18:07	08:40	
	17:04	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29			18:31 (WEA 4)		18:12	16:24	
25	08:25	07:29	06:26	06:17	05:26	05:13	05:42	06:31	07:22			18:13 (WEA 4)		18:08	08:41	
	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26			18:32 (WEA 4)		17:20	16:25	
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24			18:12 (WEA 4)		18:10	08:41	
	17:08	18:05	18:55	20:48	21:35	21:58	21:34	20:36	19:24			18:33 (WEA 4)		17:18	16:25	
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	06:35	07:26			18:11 (WEA 4)		18:12	08:41	
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22			18:34 (WEA 4)		17:16	16:26	
28	08:20	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27			18:09 (WEA 4)		18:13	08:41	
	17:12	18:09	18:58	20:51	21:38	21:57	21:31	20:31	19:19			18:34 (WEA 4)		17:14	16:27	
29	08:19	07:17	06:13	06:09	05:22	05:15	05:48	06:38	07:29			18:08 (WEA 4)		18:15	08:42	
	17:13		20:00	20:53	21:39	21:57	21:29	20:29	19:17			18:34 (WEA 4)		17:12	16:28	
30	08:18	07:15	06:11	06:07	05:21	05:15	05:50	06:40	07:31			18:08 (WEA 4)		18:16	08:42	
	17:15		20:02	20:55	21:40	21:57	21:28	20:27	19:15			18:34 (WEA 4)		17:10	16:29	
31	08:16	07:12	06:08		05:20		05:51	06:41				18:08 (WEA 4)		18:16	08:42	
	17:17	20:04			21:42		21:26	20:25				17:08		16:26	16:30	
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	164	331	266	243			
astr.max.mögl.Beschattung			352								194					

Tabellen-Layout: Die Daten für jeden Tag 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) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 27-SW - IP 27-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	18:12 (WEA 4)	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	26	18:38 (WEA 4)	17:06	16:25
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34		18:13 (WEA 4)	07:28	08:19
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	24	18:37 (WEA 4)	17:04	16:25
3	08:41	08:11	07:16	07:05	06:01	05:17	05:17	05:56	06:46	07:36		18:14 (WEA 4)	07:30	08:21
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	22	18:36 (WEA 4)	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	05:17	05:18	05:57	06:48	07:37		18:15 (WEA 4)	07:32	08:22
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	19:06	20	18:35 (WEA 4)	17:00	16:23
5	08:41	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:49	07:39		18:15 (WEA 4)	07:34	08:23
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	17	18:32 (WEA 4)	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41		18:17 (WEA 4)	07:35	08:25
	16:37	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	13	18:30 (WEA 4)	16:57	16:22
7	08:40	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42		18:23 (WEA 4)	07:37	08:26
	16:38	17:30	18:22	9	17:52 (WEA 4)	20:16	21:07	21:49	20:09	18:59	1	18:24 (WEA 4)	16:55	16:22
8	08:40	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44			07:39	08:27
	16:39	17:32	18:24	15	17:54 (WEA 4)	20:17	21:08	21:50	20:06	18:56			16:54	16:22
9	08:39	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46			07:41	08:28
	16:41	17:34	18:25	19	17:56 (WEA 4)	20:19	21:10	21:51	20:04	18:54			16:52	16:21
10	08:39	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:47			07:43	08:29
	16:42	17:36	18:27	22	17:58 (WEA 4)	20:21	21:11	21:51	20:02	18:52			16:50	16:21
11	08:38	07:58	06:58	06:47	05:47	05:13	05:25	06:09	06:59	07:49			07:44	08:30
	16:43	17:38	18:29	24	17:59 (WEA 4)	20:22	21:13	21:52	19:59	18:50			16:49	16:21
12	08:38	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51			07:46	08:31
	16:45	17:40	18:31	26	17:59 (WEA 4)	20:24	21:15	21:53	19:57	18:47			16:47	16:21
13	08:37	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53			07:48	08:32
	16:46	17:41	18:32	26	17:59 (WEA 4)	20:26	21:16	21:54	19:55	18:45			16:46	16:21
14	08:36	07:52	06:52	06:40	05:42	05:12	05:28	06:13	07:04	07:54			07:50	08:33
	16:48	17:43	18:34	27	18:00 (WEA 4)	20:28	21:18	21:54	19:52	18:43			16:44	16:21
15	08:35	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56			07:52	08:34
	16:49	17:45	18:36	27	17:59 (WEA 4)	20:29	21:19	21:55	19:50	18:41			16:43	16:21
16	08:34	07:48	06:47	06:36	05:39	05:12	05:30	06:17	07:07	07:58			07:53	08:35
	16:51	17:47	18:38	27	17:59 (WEA 4)	20:31	21:21	21:55	19:48	18:39			16:41	16:21
17	08:33	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00			07:55	08:36
	16:53	17:49	18:39	27	17:59 (WEA 4)	20:33	21:22	21:56	19:45	18:36			16:40	16:21
18	08:33	07:44	06:42	06:32	05:36	05:12	05:33	06:20	07:11	08:01			07:57	08:37
	16:54	17:51	18:41	25	17:57 (WEA 4)	20:34	21:24	21:56	19:43	18:34			16:39	16:21
19	08:32	07:42	06:40	06:29	05:34	05:12	05:34	06:22	07:12	08:03			07:58	08:37
	16:56	17:53	18:43	25	17:57 (WEA 4)	20:36	21:25	21:56	19:41	18:32			16:37	16:22
20	08:30	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05			08:00	08:38
	16:58	17:54	18:45	22	17:55 (WEA 4)	20:38	21:27	21:57	19:38	9	18:34 (WEA 4)	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16	08:07			08:02	08:39
	16:59	17:56	18:46	19	17:53 (WEA 4)	20:40	21:28	21:57	19:36	15	18:37 (WEA 4)	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:08			08:04	08:39
	17:01	17:58	18:48	16	17:52 (WEA 4)	20:41	21:30	21:57	19:33	19	18:38 (WEA 4)	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10			08:05	08:40
	17:03	18:00	18:50	10	17:48 (WEA 4)	20:43	21:31	21:57	19:31	22	18:39 (WEA 4)	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	05:28	05:13	05:41	06:30	07:21	08:12			08:07	08:40
	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	24	18:40 (WEA 4)	18:22	16:31	16:24
25	08:25	07:29	06:26	06:17	05:26	05:13	05:42	06:31	07:22	08:13			08:08	08:41
	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26	25	18:40 (WEA 4)	17:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:14			08:10	08:41
	17:08	18:05	18:55	20:48	21:35	21:58	21:34	20:36	19:24	26	18:40 (WEA 4)	17:18	16:29	16:25
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	06:35	07:26	08:14			08:12	08:41
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	27	18:41 (WEA 4)	17:16	16:28	16:26
28	08:20	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:12			08:13	08:41
	17:12	18:09	18:58	20:51	21:38	21:57	21:31	20:31	19:19	28	18:40 (WEA 4)	17:14	16:28	16:27
29	08:19	07:17	06:15	06:09	05:22	05:15	05:48	06:38	07:29	08:12			08:15	08:42
	17:13		20:00	20:53	21:39	21:57	21:29	20:29	19:17	28	18:40 (WEA 4)	17:12	16:27	16:28
30	08:18	07:15	06:13	06:07	05:21	05:15	05:50	06:40	07:31	08:13			08:16	08:42
	17:15		20:02	20:55	21:40	21:57	21:28	20:27	19:15	26	18:39 (WEA 4)	17:10	16:26	16:29
31	08:16	07:12			05:20		05:51	06:41					07:25	08:42
	17:17	20:04			21:42		21:26	20:25					17:08	16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	249			266	243
astr.max.mögl.Beschattung			366							123				

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

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

Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 28-SW - IP 28-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinfallsrichtung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	18:22 (WEA 4)	07:26	08:18			
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	19	18:41 (WEA 4)	17:06	16:25		
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34		18:24 (WEA 4)	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	14	18:38 (WEA 4)	17:04	16:25		
3	08:41	08:11	07:16	07:05	06:01	05:18	05:17	05:56	06:46	07:36		18:28 (WEA 4)	07:30	08:21		
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	6	18:34 (WEA 4)	17:02	16:24		
4	08:41	08:10	07:14	07:03	05:59	05:17	05:18	05:57	06:48	07:37			07:32	08:22		
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	19:06			17:00	16:23		
5	08:41	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:49	07:39			07:34	08:23		
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03			16:59	16:23		
6	08:41	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41			07:35	08:25		
	16:37	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01			16:57	16:22		
7	08:40	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42			07:37	08:26		
	16:38	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59			16:55	16:22		
8	08:40	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44			07:39	08:27		
	16:39	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	18:56			16:54	16:22		
9	08:39	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46			07:41	08:28		
	16:41	17:34	18:25	20:19	21:10	21:51	21:53	21:10	20:04	18:54			16:52	16:21		
10	08:39	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:47			07:43	08:29		
	16:42	17:36	18:27	20:21	21:11	21:51	21:52	21:09	20:02	18:52			16:50	16:21		
11	08:38	07:58	06:58	17:47 (WEA 4)	06:47	05:47	05:13	05:25	06:09	06:59			07:44	08:30		
	16:43	17:38	18:29	12	17:59 (WEA 4)	20:22	21:13	21:52	21:51	21:07	19:59		18:49	16:21		
12	08:38	07:56	06:56	17:44 (WEA 4)	06:45	05:45	05:13	05:26	06:10	07:01			07:46	08:31		
	16:45	17:40	18:31	17	18:01 (WEA 4)	20:24	21:15	21:53	21:50	21:05	19:57		18:47	16:21		
13	08:37	07:54	06:54	17:42 (WEA 4)	06:43	05:43	05:12	05:27	06:12	07:03			07:53	08:32		
	16:46	17:41	18:32	21	18:03 (WEA 4)	20:26	21:16	21:54	21:49	21:03	19:55		18:48	16:21		
14	08:36	07:52	06:52	17:41 (WEA 4)	06:40	05:42	05:12	05:28	06:13	07:04			07:54	08:33		
	16:48	17:43	18:34	23	18:04 (WEA 4)	20:28	21:18	21:54	21:49	21:01	19:52		18:43	16:21		
15	08:35	07:50	06:49	17:39 (WEA 4)	06:38	05:40	05:12	05:29	06:15	07:06			07:52	08:34		
	16:49	17:45	18:36	25	18:04 (WEA 4)	20:29	21:19	21:55	21:48	20:59	19:50	4	18:36 (WEA 4)	18:41	16:21	
16	08:34	07:48	06:47	17:38 (WEA 4)	06:36	05:39	05:12	05:30	06:17	07:07			18:31 (WEA 4)	07:58	08:35	
	16:51	17:47	18:38	27	18:05 (WEA 4)	20:31	21:21	21:55	21:47	20:57	19:48	13	18:44 (WEA 4)	18:39	16:21	
17	08:33	07:46	06:45	17:38 (WEA 4)	06:34	05:37	05:12	05:32	06:18	07:09			18:28 (WEA 4)	08:00	07:55	08:36
	16:53	17:49	18:39	28	18:06 (WEA 4)	20:33	21:22	21:56	21:45	20:55	19:45	18	18:46 (WEA 4)	18:36	16:40	16:21
18	08:33	07:44	06:42	17:37 (WEA 4)	06:32	05:36	05:12	05:33	06:20	07:11			18:26 (WEA 4)	08:01	07:57	08:37
	16:54	17:51	18:41	28	18:05 (WEA 4)	20:34	21:24	21:56	21:44	20:53	19:43	21	18:47 (WEA 4)	18:34	16:39	16:21
19	08:32	07:42	06:40	17:37 (WEA 4)	06:29	05:34	05:12	05:34	06:22	07:12			18:25 (WEA 4)	08:03	07:58	08:37
	16:56	17:53	18:43	28	18:05 (WEA 4)	20:36	21:25	21:56	21:43	20:51	19:41	23	18:48 (WEA 4)	18:32	16:37	16:22
20	08:30	07:40	06:38	17:36 (WEA 4)	06:27	05:33	05:12	05:36	06:23	07:14			18:23 (WEA 4)	08:05	08:00	08:38
	16:58	17:54	18:45	28	18:04 (WEA 4)	20:38	21:27	21:57	21:42	20:49	19:38	25	18:48 (WEA 4)	18:30	16:36	16:22
21	08:29	07:38	06:35	17:36 (WEA 4)	06:25	05:31	05:12	05:37	06:25	07:16			18:22 (WEA 4)	08:07	08:02	08:39
	16:59	17:56	18:46	28	18:04 (WEA 4)	20:40	21:28	21:57	21:41	20:46	19:36	27	18:49 (WEA 4)	18:28	16:35	16:22
22	08:28	07:36	06:33	17:36 (WEA 4)	06:23	05:30	05:12	05:38	06:27	07:17			18:21 (WEA 4)	08:08	08:04	08:39
	17:01	17:58	18:48	28	18:04 (WEA 4)	20:41	21:30	21:57	21:39	20:44	19:33	27	18:48 (WEA 4)	18:26	16:34	16:23
23	08:27	07:34	06:31	17:36 (WEA 4)	06:21	05:29	05:12	05:40	06:28	07:19			18:20 (WEA 4)	08:10	08:05	08:40
	17:03	18:00	18:50	26	18:02 (WEA 4)	20:43	21:31	21:57	21:38	20:42	19:31	29	18:49 (WEA 4)	18:24	16:33	16:23
24	08:26	07:32	06:28	17:37 (WEA 4)	06:19	05:28	05:13	05:41	06:30	07:21			18:20 (WEA 4)	08:12	08:07	08:40
	17:05	18:02	18:52	24	18:01 (WEA 4)	20:45	21:33	21:58	21:37	20:40	19:29	29	18:49 (WEA 4)	18:22	16:31	16:24
25	08:25	07:29	06:26	17:38 (WEA 4)	06:17	05:26	05:13	05:42	06:31	07:22			18:19 (WEA 4)	07:14	08:08	08:41
	17:06	18:04	18:53	22	18:00 (WEA 4)	20:46	21:34	21:58	21:35	20:38	19:26	29	18:48 (WEA 4)	17:20	16:30	16:25
26	08:23	07:27	06:24	17:39 (WEA 4)	06:15	05:25	05:13	05:44	06:33	07:24			18:19 (WEA 4)	07:16	08:10	08:41
	17:08	18:05	18:55	19	17:58 (WEA 4)	20:48	21:35	21:58	21:34	20:36	19:24	28	18:47 (WEA 4)	17:18	16:29	16:25
27	08:22	07:25	06:21	17:41 (WEA 4)	06:13	05:24	05:14	05:45	06:35	07:26			18:20 (WEA 4)	07:17	08:12	08:41
	17:10	18:07	18:57	14	17:55 (WEA 4)	20:50	21:37	21:58	21:33	20:33	19:22	27	18:47 (WEA 4)	17:16	16:29	16:26
28	08:20	07:23	06:19	17:45 (WEA 4)	06:11	05:23	05:14	05:47	06:36	07:27			18:19 (WEA 4)	07:19	08:13	08:41
	17:12	18:09	18:58	7	17:52 (WEA 4)	20:51	21:38	21:57	21:31	20:31	19:19	26	18:45 (WEA 4)	17:14	16:28	16:27
29	08:19	07:17	06:13	06:09	05:22	05:15	05:48	06:38	07:29				18:20 (WEA 4)	07:21	08:15	08:42
	17:13	07:00	06:00	20:53	21:39	21:57	21:29	20:29	19:17	24	18:44 (WEA 4)	17:12	16:27	16:28		
30	08:18	07:15	06:11	06:07	05:21	05:15	05:50	06:40	07:31				18:21 (WEA 4)	07:23	08:16	08:42
	17:15	07:02	06:02	20:55	21:40	21:57	21:28	20:27	19:15	22	18:43 (WEA 4)	17:10	16:26	16:29		
31	08:16	07:12	06:08	06:05	05:20	05:14	05:51	06:41					07:25	08:42		
	17:17	07:04	06:04	21:42	21:26	20:25	21:26	20:25					17:08	16:30		
Sonnenscheinstunden	258	277	367		416	486	500	503	454	381			331	266	243	
astr.max.mögl.Beschattung			405							372			39			

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

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

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 29-NW - IP 29-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05	18:49 (WEA 4) 20:57	05:19 21:43	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:12	07:26 17:06	08:18 16:25	
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07	18:49 (WEA 4) 20:58	05:18 21:44	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10	07:28 17:04	08:19 16:25	
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09	18:50 (WEA 4) 21:00	05:18 21:45	05:17 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02	08:21 16:24	
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10	18:52 (WEA 4) 21:02	05:17 21:46	05:18 21:56	05:57 21:20	06:48 20:15	07:37 19:06	07:32 17:00	08:22 16:23	
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12	18:53 (WEA 4) 21:03	05:16 21:47	05:19 21:55	05:59 21:18	06:49 20:13	07:39 19:03	07:34 16:59	08:23 16:23	
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14	18:56 (WEA 4) 21:05	05:15 21:48	05:20 21:55	06:01 21:16	06:51 20:11	18:53 (WEA 4) 19:01	07:41 16:57	07:35 16:22	
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16	19:05 (WEA 4) 21:07	05:15 21:49	05:21 21:54	06:02 21:14	06:53 20:09	18:49 (WEA 4) 18:59	07:42 16:55	07:37 16:22	
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17	06:54 21:08	05:14 21:50	05:22 21:53	06:04 21:12	06:54 20:06	18:46 (WEA 4) 19:05 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19	06:52 21:10	05:14 21:51	05:23 21:53	06:05 21:10	06:56 20:04	18:45 (WEA 4) 19:07 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21	06:49 21:11	05:13 21:51	05:24 21:52	06:07 21:09	06:58 20:02	18:42 (WEA 4) 19:07 (WEA 4)	07:47 18:52	07:43 16:50	08:29 16:21
11	08:38 16:43	07:58 17:38	06:58 18:29	06:47 20:22	06:47 21:13	05:13 21:52	05:25 21:51	06:09 21:07	06:59 19:59	18:41 (WEA 4) 19:08 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	08:38 16:45	07:56 17:40	06:56 18:31	06:45 20:24	06:45 21:15	05:13 21:53	05:26 21:50	06:10 21:05	07:01 19:57	18:40 (WEA 4) 19:08 (WEA 4)	07:51 18:47	07:46 16:47	08:31 16:21
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26	06:43 21:16	05:12 21:54	05:27 21:49	06:12 21:03	07:03 19:55	18:39 (WEA 4) 19:08 (WEA 4)	07:53 18:45	07:48 16:46	08:32 16:21
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	06:42 21:18	05:12 21:54	05:28 21:49	06:13 21:01	07:04 19:52	18:39 (WEA 4) 19:08 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21
15	08:35 16:49	07:50 17:45	06:49 18:36	06:38 20:29	06:38 21:19	05:12 21:55	05:29 21:48	06:15 20:59	07:06 19:50	18:38 (WEA 4) 19:08 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	06:36 21:21	05:12 21:55	05:30 21:47	06:17 20:57	07:07 19:48	18:38 (WEA 4) 19:08 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21
17	08:33 16:53	07:46 17:49	06:45 18:39	06:34 20:33	06:34 21:22	05:12 21:56	05:32 21:45	06:18 20:55	07:09 19:45	18:37 (WEA 4) 19:06 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	06:32 21:24	05:12 21:56	05:33 21:44	06:20 20:53	07:11 19:43	18:37 (WEA 4) 19:06 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	06:29 21:25	05:12 21:56	05:34 21:43	06:22 20:51	07:12 19:41	18:38 (WEA 4) 19:06 (WEA 4)	08:03 18:32	07:58 16:37	08:37 16:22
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	06:27 21:27	05:12 21:57	05:36 21:42	06:23 20:49	07:14 19:38	18:38 (WEA 4) 19:04 (WEA 4)	08:05 18:30	07:52 16:36	08:38 16:22
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	06:25 21:28	05:12 21:57	05:37 21:41	06:25 20:46	07:16 19:36	18:39 (WEA 4) 19:03 (WEA 4)	08:02 18:28	08:02 16:35	08:39 16:22
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	06:23 21:28	05:12 21:57	05:38 21:41	06:27 20:44	07:17 19:33	18:39 (WEA 4) 19:01 (WEA 4)	08:08 18:26	08:04 16:34	08:39 16:23
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	06:21 21:31	05:12 21:57	05:40 21:38	06:28 20:42	07:19 19:31	18:41 (WEA 4) 18:59 (WEA 4)	08:10 18:24	08:05 16:33	08:40 16:23
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	06:19 21:33	05:13 21:58	05:41 21:37	06:30 20:40	07:21 19:29	18:43 (WEA 4) 18:56 (WEA 4)	08:12 18:22	08:07 16:31	08:40 16:24
25	08:25 17:06	07:29 18:04	06:26 18:53	06:17 20:46	06:17 21:34	05:13 21:58	05:42 21:35	06:31 20:38	07:22 19:26	18:48 (WEA 4) 18:49 (WEA 4)	07:14 17:20	08:08 16:30	08:41 16:25
26	08:23 17:08	07:27 18:05	06:24 18:55	06:15 20:48	06:15 21:35	05:13 21:58	05:44 21:34	06:33 20:36	07:24 19:24	18:49 (WEA 4) 18:49 (WEA 4)	07:16 17:18	08:10 16:29	08:41 16:25
27	08:22 17:10	07:25 18:07	06:21 18:57	06:13 20:50	06:13 21:37	05:14 21:57	05:45 21:33	06:35 20:33	07:26 19:22	18:49 (WEA 4) 18:49 (WEA 4)	07:17 17:16	08:12 16:29	08:41 16:26
28	08:20 17:12	07:23 18:09	06:19 18:58	06:11 20:51	06:11 21:38	05:14 21:57	05:47 21:31	06:36 20:31	07:27 19:19	18:49 (WEA 4) 18:49 (WEA 4)	07:19 17:14	08:13 16:28	08:41 16:27
29	08:19 17:13	07:17 20:00	06:17 18:48	06:09 20:53	06:09 21:39	05:15 21:57	05:48 21:29	06:38 20:29	07:29 19:17	18:49 (WEA 4) 18:49 (WEA 4)	07:21 17:12	08:15 16:27	08:42 16:28
30	08:18 17:15	07:15 20:02	06:15 18:48	06:07 20:55	06:07 21:41	05:15 21:57	05:50 21:28	06:40 20:27	07:31 19:15	18:49 (WEA 4) 18:49 (WEA 4)	07:23 17:10	08:16 16:26	08:42 16:29
31	08:16 17:17	07:12 20:04	06:12 18:48	06:07 20:55	06:07 21:42	05:15 21:57	05:51 21:26	06:41 20:25	07:31 19:15	18:49 (WEA 4) 18:49 (WEA 4)	07:25 17:08	08:16 16:30	08:42 16:30
	Sonnenscheinstunden astr.max.mögl.Beschattung	258 277	367 329	416 118	486	500	503	454	381	452	331	266	243

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 29-SW - IP 29-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05	18:50 (WEA 4) 19:17 (WEA 4)	06:05 20:57	05:19 21:43	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:12	07:26 17:06	08:18 16:25	
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07	18:50 (WEA 4) 19:16 (WEA 4)	06:03 20:58	05:18 21:44	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10	07:28 17:04	08:19 16:25	
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09	18:51 (WEA 4) 19:15 (WEA 4)	06:01 21:00	05:18 21:45	05:17 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02	08:21 16:24	
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10	18:52 (WEA 4) 19:13 (WEA 4)	05:59 21:02	05:17 21:46	05:18 21:56	05:57 21:20	06:48 20:15	07:37 19:06	07:32 17:00	08:22 16:23	
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12	18:53 (WEA 4) 19:11 (WEA 4)	05:57 21:03	05:16 21:47	05:19 21:55	05:59 21:18	06:49 20:13	07:39 19:03	07:34 16:59	08:23 16:23	
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14	18:55 (WEA 4) 19:08 (WEA 4)	05:55 21:05	05:15 21:48	05:20 21:55	06:01 21:16	06:51 20:11	18:51 (WEA 4) 19:04 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16	05:54 21:07	05:15 21:49	05:21 21:54	06:02 21:14	06:53 20:09	18:49 (WEA 4) 18:59 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22	
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17	05:52 21:08	05:14 21:50	05:22 21:53	06:04 21:12	06:54 20:06	18:46 (WEA 4) 18:56 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22	
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19	05:50 21:10	05:14 21:51	05:23 21:53	06:05 21:10	06:56 20:04	18:45 (WEA 4) 19:09 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21	
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21	05:48 21:11	05:13 21:51	05:24 21:52	06:07 20:02	06:58 20:02	18:43 (WEA 4) 19:09 (WEA 4)	07:47 18:52	07:43 16:50	08:29 16:21	
11	08:38 16:43	07:58 17:38	06:58 18:29	06:47 20:22	05:47 21:13	05:13 21:52	05:25 21:51	06:09 21:07	06:59 19:59	18:42 (WEA 4) 19:09 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21	
12	08:38 16:45	07:56 17:40	06:56 18:31	06:45 20:24	05:45 21:15	05:13 21:53	05:26 21:50	06:10 21:05	07:01 19:57	18:41 (WEA 4) 19:09 (WEA 4)	07:51 18:47	07:46 16:47	08:31 16:21	
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26	05:43 21:16	05:12 21:54	05:27 21:49	06:12 21:03	07:03 19:55	18:40 (WEA 4) 19:09 (WEA 4)	07:53 18:45	07:48 16:46	08:32 16:21	
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	05:42 21:18	05:12 21:54	05:28 21:49	06:13 21:01	07:04 19:52	18:40 (WEA 4) 19:10 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21	
15	08:35 16:49	07:50 17:45	06:49 18:36	06:38 20:29	05:40 21:19	05:12 21:55	05:29 21:48	06:15 20:59	07:06 19:50	18:39 (WEA 4) 19:09 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21	
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	05:39 21:21	05:12 21:55	05:30 21:47	06:17 20:57	07:07 19:48	18:39 (WEA 4) 19:09 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21	
17	08:33 16:53	07:46 17:49	06:45 18:39	06:34 20:33	05:37 21:22	05:12 21:56	05:32 21:45	06:18 20:55	07:09 19:45	18:38 (WEA 4) 19:07 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21	
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	05:36 21:24	05:12 21:56	05:33 21:44	06:20 20:53	07:11 19:43	18:39 (WEA 4) 19:07 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21	
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	05:34 21:25	05:12 21:56	05:34 21:43	06:22 20:51	07:12 19:41	18:40 (WEA 4) 19:06 (WEA 4)	08:03 18:32	07:58 16:37	08:37 16:22	
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	05:33 21:27	05:12 21:57	05:36 21:42	06:23 20:49	07:14 19:38	18:39 (WEA 4) 19:05 (WEA 4)	08:05 18:30	08:00 16:36	08:38 16:22	
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	05:31 21:28	05:12 21:57	05:37 21:41	06:25 20:46	07:16 19:36	18:41 (WEA 4) 19:03 (WEA 4)	08:02 18:28	08:02 16:35	08:39 16:22	
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	05:30 21:30	05:12 21:57	05:38 21:39	06:27 20:44	07:17 19:33	18:41 (WEA 4) 19:01 (WEA 4)	08:08 18:26	08:04 16:34	08:39 16:23	
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	05:29 21:31	05:12 21:57	05:40 21:38	06:28 20:42	07:19 19:31	18:43 (WEA 4) 18:59 (WEA 4)	08:10 18:24	08:05 16:33	08:40 16:23	
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	05:28 21:33	05:13 21:58	05:41 21:37	06:30 20:40	07:21 19:29	18:47 (WEA 4) 18:55 (WEA 4)	08:12 18:22	08:07 16:31	08:40 16:24	
25	08:25 17:06	07:29 18:04	06:26 18:53	06:17 20:46	05:26 21:34	05:13 21:58	05:42 21:35	06:31 20:38	07:22 19:26	18:55 (WEA 4)	07:14 17:20	08:08 16:30	08:41 16:25	
26	08:23 17:08	07:27 18:05	06:24 18:55	06:15 20:48	05:25 21:35	05:13 21:58	05:44 21:34	06:33 20:36	07:24 19:24	18:40 (WEA 4)	07:16 17:18	08:10 16:29	08:41 16:25	
27	08:22 17:10	07:25 18:07	06:21 18:57	06:13 20:50	05:24 21:37	05:14 21:57	05:45 21:33	06:35 20:33	07:26 19:22	18:39 (WEA 4)	07:17 17:16	08:12 16:29	08:41 16:26	
28	08:20 17:12	07:23 18:09	06:19 18:58	06:11 20:51	05:23 21:38	05:14 21:57	05:47 21:31	06:36 20:31	07:27 19:19	18:39 (WEA 4)	07:19 17:14	08:13 16:28	08:41 16:27	
29	08:19 17:13	07:17 20:00	06:17 18:49	06:09 20:53	05:22 21:39	05:15 21:57	05:48 21:29	06:38 20:29	07:29 19:17	18:39 (WEA 4)	07:21 17:12	08:15 16:27	08:42 16:28	
30	08:18 17:15	07:15 20:02	06:15 18:49	06:07 20:55	05:21 21:41	05:15 21:57	05:50 21:28	06:40 20:27	07:31 19:15	18:39 (WEA 4)	07:23 17:10	08:16 16:26	08:42 16:29	
31	08:16 17:17	07:12 20:04	06:12 18:49	06:07 20:55	05:20 21:42	05:15 21:58	05:51 21:26	06:41 20:25	07:31 19:15	18:39 (WEA 4)	07:25 17:08	08:16 16:26	08:42 16:30	
	Sonnenscheinstunden astr.max.mögl.Beschattung	258 277	367 313	416 129	486	500	503	454	381	451	331	266	243	

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 30-NW - IP 30-NW
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März	April	May	Juni	Juli	August	September	Oktober	November	Dezember	
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05	06:05 20:57	05:19 21:43	05:16 21:57	05:53 21:25	06:43 20:22	19:23 (WEA 4) 19:48 (WEA 4)	07:32 19:12	07:26 17:06	08:18 16:25
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44	05:17 21:56	05:54 21:23	06:45 20:20	19:24 (WEA 4) 19:47 (WEA 4)	07:34 19:10	07:28 17:04	08:19 16:25
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09	06:01 21:00	05:18 21:45	05:17 21:56	05:56 21:21	06:46 20:18	19:25 (WEA 4) 19:45 (WEA 4)	07:36 19:08	07:30 17:02	08:21 16:24
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10	05:59 21:02	05:17 21:46	05:18 21:56	05:57 21:20	06:48 20:15	19:27 (WEA 4) 19:43 (WEA 4)	07:37 19:06	07:32 17:00	08:22 16:23
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12	05:57 21:03	05:16 21:47	05:19 21:55	05:59 21:18	06:49 20:13	19:29 (WEA 4) 19:38 (WEA 4)	07:39 19:03	07:34 16:59	08:23 16:23
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14	05:55 21:05	05:15 21:48	05:20 21:55	06:01 21:16	06:51 20:11	19:41 (WEA 4)	07:41 19:01	07:35 16:57	08:25 16:22
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16	19:33 (WEA 4) 19:42 (WEA 4)	05:54 21:07	05:15 21:49	06:02 21:14	06:53 20:09	19:42 (WEA 4)	07:42 18:59	07:37 16:55	08:26 16:22
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17	19:30 (WEA 4) 19:46 (WEA 4)	05:52 21:08	05:14 21:50	06:04 21:12	06:54 20:06	19:43 (WEA 4)	07:44 18:56	07:39 16:54	08:27 16:22
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19	19:27 (WEA 4) 19:47 (WEA 4)	05:50 21:10	05:14 21:51	06:05 21:53	06:56 20:04	19:44 (WEA 4)	07:46 18:54	07:41 16:52	08:28 16:21
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21	19:25 (WEA 4) 19:48 (WEA 4)	05:48 21:11	05:13 21:51	06:07 21:09	06:58 20:02	19:45 (WEA 4)	07:47 18:52	07:43 16:50	08:29 16:21
11	08:38 16:43	07:58 17:38	06:58 18:29	06:47 20:22	19:24 (WEA 4) 19:49 (WEA 4)	05:47 21:13	05:13 21:52	06:09 21:07	06:59 19:59	19:46 (WEA 4)	07:49 18:50	07:44 16:49	08:30 16:21
12	08:38 16:45	07:56 17:40	06:56 18:31	06:45 20:24	19:23 (WEA 4) 19:50 (WEA 4)	05:45 21:15	05:13 21:53	06:10 21:05	07:01 19:57	19:47 (WEA 4)	07:51 18:47	07:46 16:47	08:31 16:21
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26	19:22 (WEA 4) 19:51 (WEA 4)	05:43 21:16	05:12 21:54	06:12 21:03	07:03 19:55	19:48 (WEA 4)	07:53 18:45	07:48 16:46	08:32 16:21
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	19:20 (WEA 4) 19:50 (WEA 4)	05:42 21:18	05:12 21:54	06:13 21:01	07:04 19:52	19:49 (WEA 4)	07:54 18:43	07:50 16:44	08:33 16:21
15	08:35 16:49	07:50 17:45	06:49 18:36	06:38 20:29	19:20 (WEA 4) 19:50 (WEA 4)	05:40 21:19	05:12 21:55	06:15 20:59	07:06 19:50	19:45 (WEA 4)	07:56 18:41	07:52 16:43	08:34 16:21
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	19:20 (WEA 4) 19:50 (WEA 4)	05:39 21:21	05:12 21:55	06:17 20:57	07:07 19:48	19:32 (WEA 4)	07:58 18:39	07:53 16:41	08:35 16:21
17	08:33 16:53	07:46 17:49	06:45 18:39	06:34 20:33	19:19 (WEA 4) 19:50 (WEA 4)	05:37 21:22	05:12 21:56	06:18 20:55	07:09 19:45	19:31 (WEA 4)	08:00 18:36	07:55 16:40	08:36 16:21
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	19:19 (WEA 4) 19:50 (WEA 4)	05:36 21:24	05:12 21:56	06:20 20:53	07:11 19:43	19:28 (WEA 4)	08:01 18:34	07:57 16:39	08:37 16:21
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	19:19 (WEA 4) 19:50 (WEA 4)	05:34 21:25	05:12 21:56	06:22 20:51	07:12 19:41	19:27 (WEA 4)	08:03 18:32	07:58 16:37	08:37 16:22
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	19:20 (WEA 4) 19:49 (WEA 4)	05:33 21:27	05:12 21:57	06:23 20:49	07:14 19:38	19:26 (WEA 4)	08:05 18:30	08:00 16:36	08:38 16:22
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	19:20 (WEA 4) 19:49 (WEA 4)	05:31 21:28	05:12 21:57	06:25 20:46	07:16 19:36	19:25 (WEA 4)	08:07 18:28	08:02 16:35	08:39 16:22
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	19:20 (WEA 4) 19:48 (WEA 4)	05:30 21:30	05:12 21:57	06:27 20:44	07:17 19:33	19:25 (WEA 4)	08:08 18:26	08:04 16:34	08:39 16:23
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	19:21 (WEA 4) 19:47 (WEA 4)	05:29 21:31	05:12 21:57	06:28 20:42	07:19 19:31	19:23 (WEA 4)	08:10 18:24	08:05 16:33	08:40 16:23
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	19:22 (WEA 4) 19:46 (WEA 4)	05:28 21:33	05:13 21:57	06:30 20:40	07:21 19:29	19:23 (WEA 4)	08:12 18:22	08:07 16:31	08:40 16:24
25	08:25 17:06	07:29 18:04	06:26 18:53	06:17 20:46	19:23 (WEA 4) 19:44 (WEA 4)	05:26 21:34	05:13 21:58	06:31 20:38	07:22 19:26	19:22 (WEA 4)	08:14 18:20	08:08 16:30	08:41 16:25
26	08:23 17:08	07:27 18:05	06:24 18:55	06:15 20:48	19:24 (WEA 4) 19:43 (WEA 4)	05:25 21:35	05:13 21:58	06:33 20:36	07:24 19:24	19:22 (WEA 4)	08:16 18:18	08:10 16:29	08:41 16:25
27	08:22 17:10	07:25 18:07	06:21 18:57	06:13 20:50	19:26 (WEA 4) 19:40 (WEA 4)	05:24 21:37	05:14 21:57	06:35 20:33	07:26 19:22	19:21 (WEA 4)	08:17 18:16	08:12 16:29	08:41 16:26
28	08:20 17:12	07:23 18:09	06:19 18:58	06:11 20:51	19:30 (WEA 4) 19:36 (WEA 4)	05:23 21:38	05:14 21:57	06:36 20:31	07:27 19:19	19:22 (WEA 4)	08:19 18:14	08:13 16:28	08:41 16:27
29	08:19 17:13	07:17 18:00	06:17 18:59	06:09 20:53	19:36 (WEA 4)	05:22 21:39	05:15 21:57	06:38 20:29	07:29 19:17	19:21 (WEA 4)	08:21 18:12	08:15 16:27	08:42 16:28
30	08:18 17:15	07:15 18:02	06:15 18:57	06:07 20:55	19:36 (WEA 4)	05:21 21:40	05:15 21:57	06:40 20:27	07:31 19:15	19:22 (WEA 4)	08:23 18:10	08:16 16:26	08:42 16:29
31	08:16 17:17	07:12 18:04	06:12 19:04	06:07 20:58	19:36 (WEA 4)	05:20 21:42	05:14 21:56	06:41 20:25	07:32 19:14	19:23 (WEA 4)	08:25 18:08	08:18 16:25	08:42 16:30
	Sonnenscheinstunden astr.max.mögl.Beschattung	258 277	367 277	416 277	528 486	500 486	503 486	454 441	381 93	331 266	266 243	243 243	243 243

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

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

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 30-SW - IP 30-SW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	May	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	19:25 (WEA 4)	07:32	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	24	19:49 (WEA 4)	19:12	17:06	16:25
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45		19:26 (WEA 4)	07:34	07:28	08:19
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	21	19:47 (WEA 4)	19:10	17:04	16:25
3	08:41	08:11	07:16	07:05	06:01	05:18	05:17	05:56	06:46		19:27 (WEA 4)	07:36	07:30	08:21
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	18	19:45 (WEA 4)	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	05:17	05:18	05:57	06:48		19:30 (WEA 4)	07:37	07:32	08:22
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	12	19:42 (WEA 4)	19:06	17:00	16:23
5	08:41	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:49			07:39	07:34	08:23
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13			19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51			07:41	07:35	08:25
	16:37	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11			19:01	16:57	16:22
7	08:40	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53			07:42	07:37	08:26
	16:38	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09			18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	12	19:33 (WEA 4)	05:52	05:14	06:54			07:44	07:39	08:27
	16:39	17:32	18:24	20:17	12	19:45 (WEA 4)	21:08	21:50	20:06			18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	18	19:29 (WEA 4)	05:50	05:14	06:56			07:46	07:41	08:28
	16:41	17:34	18:25	20:19	18	19:47 (WEA 4)	21:10	21:51	20:04			18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	21	19:27 (WEA 4)	05:48	05:13	06:58			07:47	07:43	08:29
	16:42	17:36	18:27	20:21	21	19:48 (WEA 4)	21:11	21:51	20:02			18:52	16:50	16:21
11	08:38	07:58	06:58	06:47	24	19:26 (WEA 4)	05:47	05:13	06:59			07:49	07:44	08:30
	16:43	17:38	18:29	20:22	24	19:50 (WEA 4)	21:13	21:52	19:59			18:50	16:49	16:21
12	08:38	07:56	06:56	06:45	26	19:25 (WEA 4)	05:45	05:13	07:01			07:51	07:46	08:31
	16:45	17:40	18:31	20:24	26	19:51 (WEA 4)	21:15	21:53	19:57			18:47	16:47	16:21
13	08:37	07:54	06:54	06:43	27	19:24 (WEA 4)	05:43	05:12	07:03			07:53	07:48	08:32
	16:46	17:41	18:32	20:26	27	19:51 (WEA 4)	21:16	21:54	19:55			18:45	16:46	16:21
14	08:36	07:52	06:52	06:40	29	19:22 (WEA 4)	05:42	05:12	07:04			07:54	07:50	08:33
	16:48	17:43	18:34	20:28	29	19:51 (WEA 4)	21:18	21:54	19:52			18:43	16:44	16:21
15	08:35	07:50	06:49	06:38	30	19:21 (WEA 4)	05:40	05:12	07:06			07:56	07:52	08:34
	16:49	17:45	18:36	20:29	30	19:51 (WEA 4)	21:19	21:55	19:50	12	19:36 (WEA 4)	18:41	16:43	16:21
16	08:34	07:48	06:47	06:36	30	19:21 (WEA 4)	05:39	05:12	07:07			07:58	07:53	08:35
	16:51	17:47	18:38	20:31	30	19:51 (WEA 4)	21:21	21:55	19:48	16	19:49 (WEA 4)	18:39	16:41	16:21
17	08:33	07:46	06:45	06:34	30	19:21 (WEA 4)	05:37	05:12	07:09			08:00	07:55	08:36
	16:53	17:49	18:39	20:33	30	19:51 (WEA 4)	21:22	21:56	19:45	20	19:51 (WEA 4)	18:36	16:40	16:21
18	08:33	07:44	06:42	06:32	30	19:21 (WEA 4)	05:36	05:12	07:11			08:01	07:57	08:37
	16:54	17:51	18:41	20:34	30	19:51 (WEA 4)	21:24	21:56	19:43	23	19:52 (WEA 4)	18:34	16:39	16:21
19	08:32	07:42	06:40	06:29	30	19:21 (WEA 4)	05:34	05:12	07:12			08:03	07:58	08:37
	16:56	17:53	18:43	20:36	30	19:51 (WEA 4)	21:25	21:56	19:41	25	19:53 (WEA 4)	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	30	19:21 (WEA 4)	05:33	05:12	07:14			08:05	08:00	08:38
	16:58	17:54	18:45	20:38	30	19:51 (WEA 4)	21:27	21:57	19:38	26	19:53 (WEA 4)	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	29	19:21 (WEA 4)	05:31	05:12	07:16			08:07	08:02	08:39
	16:59	17:56	18:46	20:40	29	19:50 (WEA 4)	21:28	21:57	19:36	28	19:54 (WEA 4)	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	28	19:21 (WEA 4)	05:30	05:12	07:17			08:08	08:04	08:39
	17:01	17:58	18:48	20:41	28	19:49 (WEA 4)	21:30	21:57	19:33	29	19:55 (WEA 4)	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	26	19:22 (WEA 4)	05:29	05:12	07:19			08:10	08:05	08:40
	17:03	18:00	18:50	20:43	26	19:48 (WEA 4)	21:31	21:57	19:31	30	19:54 (WEA 4)	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	24	19:23 (WEA 4)	05:28	05:13	07:21			08:12	08:07	08:40
	17:05	18:02	18:52	20:45	24	19:47 (WEA 4)	21:33	21:57	19:29	31	19:55 (WEA 4)	18:22	16:31	16:24
25	08:25	07:29	06:26	06:17	22	19:24 (WEA 4)	05:26	05:13	07:22			07:14	08:08	08:41
	17:06	18:04	18:53	20:46	22	19:46 (WEA 4)	21:34	21:58	19:26	31	19:54 (WEA 4)	18:20	16:30	16:25
26	08:23	07:27	06:24	06:15	19	19:25 (WEA 4)	05:25	05:13	07:24			07:16	08:10	08:41
	17:08	18:05	18:55	20:48	19	19:44 (WEA 4)	21:35	21:58	19:24	30	19:54 (WEA 4)	18:18	16:29	16:25
27	08:22	07:25	06:21	06:13	16	19:26 (WEA 4)	05:24	05:14	07:26			07:17	08:12	08:41
	17:10	18:07	18:57	20:50	16	19:42 (WEA 4)	21:37	21:57	19:22	30	19:53 (WEA 4)	18:16	16:29	16:26
28	08:20	07:23	06:19	06:11	11	19:29 (WEA 4)	05:23	05:14	07:27			07:19	08:13	08:41
	17:12	18:09	18:58	20:51	11	19:40 (WEA 4)	21:38	21:57	19:19	30	19:53 (WEA 4)	18:14	16:28	16:27
29	08:19	07:17	06:09	06:02			05:22	05:15	07:29			07:21	08:15	08:42
	17:13	18:10	19:00	20:53			21:39	21:57	19:17	29	19:52 (WEA 4)	18:12	16:27	16:28
30	08:18	07:15	06:07	06:00			05:21	05:15	07:31			07:23	08:16	08:42
	17:15	18:12	19:02	20:55			21:40	21:57	19:15	27	19:51 (WEA 4)	18:10	16:26	16:29
31	08:16	07:12	06:04	06:00			05:20	05:15	07:32			07:25	08:16	08:42
	17:17	18:14	19:04	20:56			21:42	21:59	19:15	27	19:51 (WEA 4)	17:08	16:25	16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	75	331	266	243	
astr.max.mögl.Beschattung				512	486	500	503	444						

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

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

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 33 NW - IP 33 NW
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März	April		Mai		Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05		06:05 20:57	13	20:15 (WEA 4) 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07		06:03 20:58	15	20:14 (WEA 4) 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09		06:01 21:00	19	20:13 (WEA 4) 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10		05:59 21:02	20	20:12 (WEA 4) 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12		05:57 21:03	22	20:11 (WEA 4) 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14		05:55 21:05	22	20:11 (WEA 4) 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16		05:54 21:07	23	20:11 (WEA 4) 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17		05:52 21:08	23	20:10 (WEA 4) 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19		05:50 21:10	23	20:10 (WEA 4) 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21		05:48 21:11	23	20:10 (WEA 4) 21:51
11	08:38 16:43	07:57 17:38	06:58 18:29	06:47 20:22		05:47 21:13	23	20:10 (WEA 4) 21:52
12	08:37 16:45	07:56 17:40	06:56 18:31	06:45 20:24		05:45 21:15	22	20:11 (WEA 4) 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26		05:43 21:16	21	20:11 (WEA 4) 21:53
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28		05:42 21:18	20	20:12 (WEA 4) 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	06:38 20:29		05:40 21:19	19	20:12 (WEA 4) 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31		05:39 21:21	17	20:13 (WEA 4) 21:55
17	08:33 16:53	07:46 17:49	06:45 18:39	06:34 20:33		05:37 21:22	15	20:15 (WEA 4) 21:56
18	08:32 16:54	07:44 17:51	06:42 18:41	06:32 20:34		05:36 21:24	13	20:15 (WEA 4) 21:56
19	08:31 16:56	07:42 17:53	06:40 18:43	06:29 20:36		05:34 21:25	10	20:17 (WEA 4) 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38		05:33 21:27	4	20:20 (WEA 4) 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40		05:31 21:28		20:24 (WEA 4) 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41		05:30 21:30		21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43		05:29 21:31		21:57
24	08:26 17:05	07:32 18:02	06:28 18:51	06:19 20:45		05:28 21:33		21:57
25	08:24 17:06	07:29 18:04	06:26 18:53	06:17 20:46		05:26 21:34		21:57
26	08:23 17:08	07:27 18:05	06:24 18:55	06:15 20:48		05:25 21:35		21:57
27	08:22 17:10	07:25 18:07	06:21 18:57	06:13 20:50		05:24 21:37		21:57
28	08:20 17:12	07:23 18:09	06:19 18:58	06:11 20:51		05:23 21:38		21:57
29	08:19 17:13		07:17 20:00	06:09 20:53		05:22 21:39		21:57
30	08:18 17:15		07:15 20:02	06:07 20:55	8	20:18 (WEA 4) 20:26 (WEA 4)		05:21 21:40
31	08:16 17:17		07:12 20:04					05:20 21:41
Sonnenscheinstunden	258	277	367	416		486		500
astr.max.mögl.Beschattung				8		367		

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 33 NW - IP 33 NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	20:21 (WEA 4)	06:43 20:22	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	20:21 (WEA 4)	06:45 20:20	07:34 19:10	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	20:21 (WEA 4)	06:46 20:18	07:36 19:08	07:30 17:02	08:20 16:24
4	05:18 21:56	05:57 21:20	20:20 (WEA 4)	06:48 20:15	07:37 19:05	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	20:21 (WEA 4)	06:49 20:13	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	20:20 (WEA 4)	06:51 20:11	07:41 19:01	07:35 16:57	08:24 16:22
7	05:21 21:54	06:02 21:14	20:21 (WEA 4)	06:53 20:09	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	20:21 (WEA 4)	06:54 20:06	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:10	20:22 (WEA 4)	06:56 20:04	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	20:22 (WEA 4)	06:58 20:02	07:47 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	20:24 (WEA 4)	06:59 19:59	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	20:25 (WEA 4)	07:01 19:57	07:51 18:47	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	20:27 (WEA 4)	07:03 19:55	07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:48	06:13 21:01	20:34 (WEA 4)	07:04 19:52	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:47	06:15 20:59		07:06 19:50	07:56 18:41	07:51 16:43	08:34 16:21
16	05:30 21:46	06:17 20:57		07:07 19:48	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55		07:09 19:45	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53		07:11 19:43	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51		07:12 19:40	08:03 18:32	07:58 16:37	08:37 16:22
20	05:36 21:42	06:23 20:48		07:14 19:38	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46		07:16 19:36	08:07 18:28	08:02 16:35	08:39 16:22
22	05:38 21:39	06:27 20:44		07:17 19:33	08:08 18:26	08:03 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42		07:19 19:31	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	20:29 (WEA 4) 20:36 (WEA 4)	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	20:27 (WEA 4) 20:38 (WEA 4)	06:31 20:38	07:22 19:26	07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	20:25 (WEA 4) 20:39 (WEA 4)	06:33 20:36	07:24 19:24	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:32	20:24 (WEA 4) 20:41 (WEA 4)	06:35 20:33	07:26 19:22	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	20:23 (WEA 4) 20:41 (WEA 4)	06:36 20:31	07:27 19:19	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	20:22 (WEA 4) 20:41 (WEA 4)	06:38 20:29	07:29 19:17	07:21 17:12	08:15 16:27	08:41 16:28
30	05:50 21:28	20:22 (WEA 4) 20:43 (WEA 4)	06:40 20:27	07:31 19:15	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	20:21 (WEA 4) 20:43 (WEA 4)	06:41 20:24		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454		381	331	266	243
astr.max.mögl.Beschattung	129	129	249				

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

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

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 34 NW - IP 34 NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:42	08:15	07:21	07:10	06:05	20:19 (WEA 4)	05:19	05:16	05:53	20:23 (WEA 4)	06:43	07:32	07:26	08:18		
	16:31	17:19	18:11	20:05	20:57	20:28 (WEA 4)	21:43	21:57	21:25	22	20:45 (WEA 4)	20:22	19:12	17:06	16:25	
2	08:42	08:13	07:19	07:08	06:03	20:17 (WEA 4)	05:18	05:17	05:54	20:22 (WEA 4)	06:45	07:34	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	12	20:29 (WEA 4)	21:44	21:56	21:23	23	20:45 (WEA 4)	20:20	19:10	17:04	16:25
3	08:41	08:11	07:16	07:05	06:01	20:16 (WEA 4)	05:18	05:17	05:56	20:22 (WEA 4)	06:46	07:36	07:30	08:20		
	16:33	17:23	18:15	20:09	21:00	16	20:32 (WEA 4)	21:45	21:56	21:21	23	20:45 (WEA 4)	20:18	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	20:15 (WEA 4)	05:17	05:18	05:57	20:22 (WEA 4)	06:48	07:37	07:32	08:22		
	16:34	17:25	18:16	20:10	21:02	18	20:33 (WEA 4)	21:46	21:56	21:20	23	20:45 (WEA 4)	20:15	19:05	17:00	16:23
5	08:41	08:08	07:12	07:01	05:57	20:13 (WEA 4)	05:16	05:19	05:59	20:23 (WEA 4)	06:49	07:39	07:34	08:23		
	16:35	17:26	18:18	20:12	21:03	21	20:34 (WEA 4)	21:47	21:55	21:18	22	20:45 (WEA 4)	20:13	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	20:13 (WEA 4)	05:15	05:20	06:01	20:22 (WEA 4)	06:51	07:41	07:35	08:24		
	16:37	17:28	18:20	20:14	21:05	21	20:34 (WEA 4)	21:48	21:55	21:16	22	20:44 (WEA 4)	20:11	19:01	16:57	16:22
7	08:40	08:05	07:08	06:56	05:54	20:13 (WEA 4)	05:15	05:21	06:02	20:23 (WEA 4)	06:53	07:42	07:37	08:26		
	16:38	17:30	18:22	20:16	21:07	22	20:35 (WEA 4)	21:49	21:54	21:14	21	20:44 (WEA 4)	20:09	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	05:52	20:12 (WEA 4)	05:14	05:22	06:04	20:23 (WEA 4)	06:54	07:44	07:39	08:27		
	16:39	17:32	18:24	20:17	21:08	23	20:35 (WEA 4)	21:50	21:53	21:12	20	20:43 (WEA 4)	20:06	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	05:50	20:12 (WEA 4)	05:14	05:23	06:05	20:24 (WEA 4)	06:56	07:46	07:41	08:28		
	16:41	17:34	18:25	20:19	21:10	22	20:34 (WEA 4)	21:51	21:53	21:10	18	20:42 (WEA 4)	20:04	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	05:48	20:12 (WEA 4)	05:13	05:24	06:07	20:25 (WEA 4)	06:58	07:47	07:43	08:29		
	16:42	17:36	18:27	20:21	21:11	23	20:35 (WEA 4)	21:51	21:52	21:09	15	20:40 (WEA 4)	20:02	18:52	16:50	16:21
11	08:38	07:57	06:58	06:47	05:47	20:12 (WEA 4)	05:13	05:25	06:09	20:27 (WEA 4)	06:59	07:49	07:44	08:30		
	16:43	17:38	18:29	20:22	21:13	22	20:34 (WEA 4)	21:52	21:51	21:07	11	20:38 (WEA 4)	19:59	18:50	16:49	16:21
12	08:37	07:56	06:56	06:45	05:45	20:12 (WEA 4)	05:13	05:26	06:10	20:28 (WEA 4)	07:01	07:51	07:46	08:31		
	16:45	17:40	18:31	20:24	21:15	23	20:35 (WEA 4)	21:53	21:50	21:05	8	20:36 (WEA 4)	19:57	18:47	16:47	16:21
13	08:37	07:54	06:54	06:43	05:43	20:12 (WEA 4)	05:12	05:27	06:12	20:29	07:03	07:53	07:48	08:32		
	16:46	17:41	18:32	20:26	21:16	22	20:34 (WEA 4)	21:53	21:49	21:03	19	20:42 (WEA 4)	19:55	18:45	16:46	16:21
14	08:36	07:52	06:52	06:40	05:42	20:13 (WEA 4)	05:12	05:28	06:13	20:24	07:04	07:54	07:50	08:33		
	16:48	17:43	18:34	20:28	21:18	21	20:34 (WEA 4)	21:54	21:48	21:01	19	20:42 (WEA 4)	19:52	18:43	16:44	16:21
15	08:35	07:50	06:49	06:38	05:40	20:13 (WEA 4)	05:12	05:29	06:15	20:25	07:06	07:56	07:51	08:34		
	16:49	17:45	18:36	20:29	21:19	20	20:33 (WEA 4)	21:55	21:47	20:59	19	20:41 (WEA 4)	19:50	18:41	16:43	16:21
16	08:34	07:48	06:47	06:36	05:39	20:14 (WEA 4)	05:12	05:30	06:17	20:26	07:07	07:58	07:53	08:35		
	16:51	17:47	18:38	20:31	21:21	19	20:33 (WEA 4)	21:55	21:46	20:57	19	20:42 (WEA 4)	19:48	18:39	16:41	16:21
17	08:33	07:46	06:45	06:34	05:37	20:15 (WEA 4)	05:12	05:32	06:18	20:27	07:09	08:00	07:55	08:36		
	16:53	17:49	18:39	20:33	21:22	17	20:32 (WEA 4)	21:56	21:45	20:55	19	20:42 (WEA 4)	19:45	18:36	16:40	16:21
18	08:32	07:44	06:42	06:32	05:36	20:15 (WEA 4)	05:12	05:33	06:20	20:28	07:11	08:01	07:57	08:37		
	16:54	17:51	18:41	20:34	21:24	16	20:31 (WEA 4)	21:56	21:44	20:53	19	20:42 (WEA 4)	19:43	18:34	16:39	16:21
19	08:31	07:42	06:40	06:29	05:34	20:17 (WEA 4)	05:12	05:34	06:22	20:29	07:12	08:03	07:58	08:37		
	16:56	17:53	18:43	20:36	21:25	13	20:30 (WEA 4)	21:56	21:43	20:51	19	20:42 (WEA 4)	19:40	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33	20:19 (WEA 4)	05:12	05:36	06:23	20:24	07:14	08:05	08:00	08:38		
	16:58	17:54	18:45	20:38	21:27	10	20:29 (WEA 4)	21:57	21:42	20:48	19	20:42 (WEA 4)	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	20:22 (WEA 4)	05:12	05:37	06:25	20:25	07:16	08:07	08:02	08:39		
	16:59	17:56	18:46	20:40	21:28	4	20:26 (WEA 4)	21:57	21:41	20:46	19	20:42 (WEA 4)	19:36	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30	20:17 (WEA 4)	05:12	05:38	06:27	20:26	07:17	08:08	08:03	08:39		
	17:01	17:58	18:48	20:41	21:30	21	20:31 (WEA 4)	21:57	21:39	20:44	19	20:42 (WEA 4)	19:33	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29	20:18 (WEA 4)	05:12	05:40	06:28	20:27	07:19	08:10	08:05	08:40		
	17:03	18:00	18:50	20:43	21:31	21	20:31 (WEA 4)	21:57	21:38	7	20:37 (WEA 4)	20:42	19:31	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	05:28	20:18 (WEA 4)	05:13	05:41	06:30	20:28	07:21	08:12	08:07	08:40		
	17:05	18:02	18:51	20:45	21:33	21	20:31 (WEA 4)	21:57	21:37	12	20:40 (WEA 4)	20:40	19:29	18:22	16:31	16:24
25	08:24	07:29	06:26	06:17	05:26	20:18 (WEA 4)	05:13	05:42	06:31	20:29	07:22	08:13	08:08	08:41		
	17:06	18:04	18:53	20:46	21:34	21	20:31 (WEA 4)	21:57	21:35	14	20:41 (WEA 4)	20:38	19:26	18:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25	20:18 (WEA 4)	05:13	05:44	06:33	20:30	07:24	08:15	08:10	08:41		
	17:08	18:05	18:55	20:48	21:35	17	20:32 (WEA 4)	21:57	21:34	17	20:42 (WEA 4)	20:36	19:24	18:18	16:29	16:25
27	08:22	07:25	06:21	06:13	05:24	20:19 (WEA 4)	05:14	05:45	06:35	20:25	07:26	08:17	08:12	08:41		
	17:10	18:07	18:57	20:50	21:37	21	20:32 (WEA 4)	21:57	21:32	18	20:43 (WEA 4)	20:33	19:22	18:16	16:29	16:26
28	08:20	07:23	06:19	06:11	05:23	20:19 (WEA 4)	05:14	05:47	06:36	20:26	07:27	08:18	08:13	08:41		
	17:12	18:09	18:58	20:51	21:38	21	20:32 (WEA 4)	21:57	21:31	19	20:43 (WEA 4)	20:31	19:19	18:14	16:28	16:27
29	08:19	07:17	06:09	05:22	05:15	20:19 (WEA 4)	05:15	05:48	06:38	20:27	07:29	08:20	08:15	08:41		
	17:13	18:10	19:00	20:53	21:39	21	20:32 (WEA 4)	21:57	21:29	20	20:43 (WEA 4)	20:29	19:17	18:12	16:27	16:28
30	08:18	07:15	06:07	05:21	05:15	20:19 (WEA 4)	05:15	05:50	06:40	20:28	07:31	08:22	08:16	08:42		
	17:15	18:12	19:02	20:55	21:40	21	20:32 (WEA 4)	21:57	21:28	22	20:45 (WEA 4)	20:27	19:15	18:10	16:26	16:29
31	08:16	07:12	06:05	05:20	05:15	20:19 (WEA 4)	05:15	05:51	06:41	20:29	07:32	08:23	08:16	08:42		
	17:17	18:14	19:04	21:41	21:41	21	20:32 (WEA 4)	21:57	21:26	22	20:44 (WEA 4)	20:24	19:12	18:08	16:30	16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	228	381	331	266	243			
astr.max.mögl.Beschattung					374	151										

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

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



SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 35-NW - IP 35-NW
Annahmen für Schattenwurfberechnung

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

	Januar	Februar	März	April		Mai		Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05		06:05 20:57	10	20:18 (WEA 4) 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07		06:03 20:58	13	20:16 (WEA 4) 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09		06:01 21:00	16	20:16 (WEA 4) 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10		05:59 21:02	19	20:14 (WEA 4) 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12		05:57 21:03	21	20:13 (WEA 4) 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14		05:55 21:05	22	20:12 (WEA 4) 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16		05:54 21:07	22	20:13 (WEA 4) 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17		05:52 21:08	22	20:12 (WEA 4) 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19		05:50 21:10	22	20:12 (WEA 4) 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21		05:48 21:11	23	20:12 (WEA 4) 21:51
11	08:38 16:43	07:57 17:38	06:58 18:29	06:47 20:22		05:47 21:13	22	20:12 (WEA 4) 21:52
12	08:37 16:45	07:56 17:40	06:56 18:31	06:45 20:24		05:45 21:15	21	20:13 (WEA 4) 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26		05:43 21:16	20	20:13 (WEA 4) 21:53
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28		05:42 21:18	19	20:14 (WEA 4) 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	06:38 20:29		05:40 21:19	18	20:14 (WEA 4) 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31		05:39 21:21	17	20:15 (WEA 4) 21:55
17	08:33 16:53	07:46 17:49	06:45 18:39	06:34 20:33		05:37 21:22	15	20:16 (WEA 4) 21:56
18	08:32 16:54	07:44 17:51	06:42 18:41	06:32 20:34		05:36 21:24	12	20:17 (WEA 4) 21:56
19	08:31 16:56	07:42 17:53	06:40 18:43	06:29 20:36		05:34 21:25	9	20:19 (WEA 4) 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38		05:33 21:27	3	20:22 (WEA 4) 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40		05:31 21:28		05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41		05:30 21:30		05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43		05:29 21:31		05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:51	06:19 20:45		05:28 21:33		05:13 21:57
25	08:24 17:06	07:29 18:04	06:26 18:53	06:17 20:46		05:26 21:34		05:13 21:57
26	08:23 17:08	07:27 18:05	06:24 18:55	06:15 20:48		05:25 21:35		05:13 21:57
27	08:22 17:10	07:25 18:07	06:21 18:57	06:13 20:50		05:24 21:37		05:14 21:57
28	08:20 17:12	07:23 18:09	06:19 18:58	06:11 20:51		05:23 21:38		05:14 21:57
29	08:19 17:13		07:17 20:00	06:09 20:53		05:22 21:39		05:15 21:57
30	08:18 17:15		07:14 20:02	06:07 20:55	5	20:21 (WEA 4) 20:26 (WEA 4)		05:15 21:57
31	08:16 17:17		07:12 20:04			05:20 21:41		
Sonnenscheinstunden	258	277	367	416		486		500
astr.max.mögl.Beschattung				5		346		

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 35-NW - IP 35-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	20:23 (WEA 4)	06:43 20:22	07:32 19:12	07:26 17:06	08:18 16:25
2	05:17 21:56	05:54 21:23	20:22 (WEA 4)	06:45 20:20	07:34 19:10	07:28 17:04	08:19 16:25
3	05:17 21:56	05:56 21:21	20:23 (WEA 4)	06:46 20:18	07:36 19:08	07:30 17:02	08:20 16:24
4	05:18 21:56	05:57 21:20	20:22 (WEA 4)	06:48 20:15	07:37 19:05	07:32 17:00	08:22 16:23
5	05:19 21:55	05:59 21:18	20:23 (WEA 4)	06:49 20:13	07:39 19:03	07:34 16:59	08:23 16:23
6	05:20 21:55	06:01 21:16	20:22 (WEA 4)	06:51 20:11	07:41 19:01	07:35 16:57	08:24 16:22
7	05:21 21:54	06:02 21:14	20:23 (WEA 4)	06:53 20:09	07:42 18:59	07:37 16:55	08:26 16:22
8	05:22 21:53	06:04 21:12	20:23 (WEA 4)	06:54 20:06	07:44 18:56	07:39 16:54	08:27 16:22
9	05:23 21:53	06:05 21:10	20:24 (WEA 4)	06:56 20:04	07:46 18:54	07:41 16:52	08:28 16:21
10	05:24 21:52	06:07 21:09	20:24 (WEA 4)	06:58 20:02	07:47 18:52	07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	20:26 (WEA 4)	06:59 19:59	07:49 18:50	07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	20:27 (WEA 4)	07:01 19:57	07:51 18:47	07:46 16:47	08:31 16:21
13	05:27 21:49	06:12 21:03	20:32 (WEA 4)	07:03 19:55	07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:48	06:13 21:01	20:34 (WEA 4)	07:04 19:52	07:54 18:43	07:50 16:44	08:33 16:21
15	05:29 21:47	06:15 20:59	07:06	07:56 19:50	07:56 18:41	07:51 16:43	08:34 16:21
16	05:30 21:46	06:17 20:57	07:07	07:58 19:48	07:58 18:39	07:53 16:41	08:35 16:21
17	05:32 21:45	06:18 20:55	07:09	08:00 19:45	08:00 18:36	07:55 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11	08:01 19:43	08:01 18:34	07:57 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12	08:03 19:40	08:03 18:32	07:58 16:37	08:37 16:22
20	05:36 21:42	06:23 20:48	07:14	08:05 19:38	08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16	08:07 19:36	08:07 18:28	08:02 16:35	08:39 16:22
22	05:38 21:39	06:27 20:44	07:17	08:08 19:33	08:08 18:26	08:03 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19	08:10 19:31	08:10 18:24	08:05 16:33	08:40 16:23
24	05:41 21:37	20:31 (WEA 4) 20:37 (WEA 4)	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	20:28 (WEA 4) 20:39 (WEA 4)	06:31 20:38	07:22 19:26	07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	20:27 (WEA 4) 20:40 (WEA 4)	06:33 20:36	07:24 19:24	07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:32	20:26 (WEA 4) 20:42 (WEA 4)	06:35 20:33	07:26 19:22	07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	20:25 (WEA 4) 20:42 (WEA 4)	06:36 20:31	07:27 19:19	07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	20:24 (WEA 4) 20:43 (WEA 4)	06:38 20:29	07:29 19:17	07:21 17:12	08:15 16:27	08:41 16:28
30	05:50 21:28	20:24 (WEA 4) 20:23 (WEA 4)	06:40 06:41	07:31 19:15	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	20:23 (WEA 4) 20:44 (WEA 4)	06:41 20:24	07:31	07:25 17:08	08:16 16:25	08:42 16:30
Sonnenscheinstunden	503	454	381	331	266	243	
astr.max.mögl.Beschattung	123	230					

Tabellen-Layout: Die Daten für jeden Tag 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:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 36-NW - IP 36-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai		Juni	Juli		August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21	07:10	06:05		05:19	05:16		05:53	20:27 (WEA 4)	06:43	07:32	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57		21:43	21:57		21:25	23 20:50 (WEA 4)	20:22	19:12	17:06	16:25	
2	08:42	08:13	07:19	07:08	06:03		05:18	05:17		05:54	20:26 (WEA 4)	06:45	07:34	07:28	08:19	
	16:32	17:21	18:13	20:07	20:58		21:44	21:56		21:23	23 20:49 (WEA 4)	20:20	19:10	17:04	16:25	
3	08:41	08:11	07:16	07:05	06:01		05:18	05:17		05:56	20:27 (WEA 4)	06:46	07:36	07:30	08:20	
	16:33	17:23	18:15	20:09	21:00		21:45	21:56		21:21	22 20:49 (WEA 4)	20:18	19:08	17:02	16:24	
4	08:41	08:10	07:14	07:03	05:59		20:23 (WEA 4)	05:17		05:57	20:27 (WEA 4)	06:48	07:37	07:32	08:22	
	16:34	17:25	18:16	20:10	21:02	10	20:33 (WEA 4)	21:46		21:20	21 20:48 (WEA 4)	20:15	19:06	17:00	16:23	
5	08:41	08:08	07:12	07:01	05:57		20:21 (WEA 4)	05:16		05:59	20:28 (WEA 4)	06:49	07:39	07:34	08:23	
	16:35	17:26	18:18	20:12	21:03	13	20:34 (WEA 4)	21:47		21:18	20 20:48 (WEA 4)	20:13	19:03	16:59	16:23	
6	08:41	08:06	07:10	06:58	05:55		20:19 (WEA 4)	05:15		06:01	20:28 (WEA 4)	06:51	07:41	07:35	08:24	
	16:37	17:28	18:20	20:14	21:05	16	20:35 (WEA 4)	21:48		21:16	18 20:46 (WEA 4)	20:11	19:01	16:57	16:22	
7	08:40	08:05	07:08	06:56	05:54		20:19 (WEA 4)	05:15		06:02	20:30 (WEA 4)	06:53	07:42	07:37	08:26	
	16:38	17:30	18:22	20:16	21:07	19	20:38 (WEA 4)	21:49		21:14	15 20:45 (WEA 4)	20:09	18:59	16:55	16:22	
8	08:40	08:03	07:05	06:54	05:52		20:17 (WEA 4)	05:14		06:04	20:31 (WEA 4)	06:54	07:44	07:39	08:27	
	16:39	17:32	18:24	20:17	21:08	21	20:38 (WEA 4)	21:50		21:12	12 20:43 (WEA 4)	20:06	18:56	16:54	16:22	
9	08:39	08:01	07:03	06:52	05:50		20:16 (WEA 4)	05:14		06:05	20:33 (WEA 4)	06:56	07:46	07:41	08:28	
	16:41	17:34	18:25	20:19	21:10	22	20:38 (WEA 4)	21:51		21:10	9 20:42 (WEA 4)	20:04	18:54	16:52	16:21	
10	08:39	07:59	07:01	06:49	05:48		20:17 (WEA 4)	05:13		06:07		06:58	07:47	07:43	08:29	
	16:42	17:36	18:27	20:21	21:11	22	20:39 (WEA 4)	21:51		21:09		20:02	18:52	16:50	16:21	
11	08:38	07:57	06:58	06:47	05:47		20:16 (WEA 4)	05:13		06:09		06:59	07:49	07:44	08:30	
	16:43	17:38	18:29	20:22	21:13	23	20:39 (WEA 4)	21:52		21:07		21:07	18:50	16:49	16:21	
12	08:37	07:56	06:56	06:45	05:45		20:16 (WEA 4)	05:13		06:10		07:01	07:51	07:46	08:31	
	16:45	17:40	18:31	20:24	21:15	24	20:40 (WEA 4)	21:53		21:05		21:05	18:47	16:47	16:21	
13	08:37	07:54	06:54	06:43	05:43		20:15 (WEA 4)	05:12		06:12		07:03	07:53	07:48	08:32	
	16:46	17:41	18:32	20:26	21:16	24	20:39 (WEA 4)	21:53		21:03		21:03	18:45	16:46	16:21	
14	08:36	07:52	06:52	06:40	05:42		20:16 (WEA 4)	05:12		06:13		07:04	07:54	07:50	08:33	
	16:48	17:43	18:34	20:28	21:18	24	20:40 (WEA 4)	21:54		21:01		21:01	18:43	16:44	16:21	
15	08:35	07:50	06:49	06:38	05:40		20:15 (WEA 4)	05:12		06:15		07:06	07:56	07:51	08:34	
	16:49	17:45	18:36	20:29	21:19	24	20:39 (WEA 4)	21:55		21:07		20:59	18:41	16:43	16:21	
16	08:34	07:48	06:47	06:36	05:39		20:16 (WEA 4)	05:12		06:17		07:07	07:58	07:53	08:35	
	16:51	17:47	18:38	20:31	21:21	23	20:39 (WEA 4)	21:55		20:57		19:48	18:39	16:41	16:21	
17	08:33	07:46	06:45	06:34	05:37		20:17 (WEA 4)	05:12		06:18		07:09	08:00	07:55	08:36	
	16:53	17:49	18:39	20:33	21:22	22	20:39 (WEA 4)	21:56		21:45	5 20:40 (WEA 4)	20:55	19:45	18:36	16:40	16:21
18	08:32	07:44	06:42	06:32	05:36		20:16 (WEA 4)	05:12		06:20		07:11	08:01	07:57	08:37	
	16:54	17:51	18:41	20:34	21:24	22	20:38 (WEA 4)	21:56		21:44	9 20:42 (WEA 4)	20:53	19:43	18:34	16:39	16:21
19	08:31	07:42	06:40	06:29	05:34		20:17 (WEA 4)	05:12		06:22		07:12	08:03	07:58	08:37	
	16:56	17:53	18:43	20:36	21:25	21	20:38 (WEA 4)	21:56		21:43	13 20:44 (WEA 4)	20:51	19:41	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33		20:18 (WEA 4)	05:12		06:23		07:14	08:05	08:00	08:38	
	16:58	17:54	18:45	20:38	21:27	20	20:38 (WEA 4)	21:57		21:42	15 20:46 (WEA 4)	20:48	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31		20:19 (WEA 4)	05:12		06:25		07:16	08:07	08:02	08:39	
	16:59	17:56	18:46	20:40	21:28	19	20:38 (WEA 4)	21:57		21:41	16 20:46 (WEA 4)	20:46	19:36	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30		20:19 (WEA 4)	05:12		06:28		07:17	08:08	08:03	08:39	
	17:01	17:58	18:48	20:41	21:30	17	20:36 (WEA 4)	21:57		21:39	18 20:47 (WEA 4)	20:44	19:33	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29		20:20 (WEA 4)	05:12		06:28		07:19	08:10	08:05	08:40	
	17:03	18:00	18:50	20:43	21:31	15	20:35 (WEA 4)	21:57		21:38	19 20:47 (WEA 4)	20:42	19:31	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	05:28		20:21 (WEA 4)	05:13		06:29		07:21	08:12	08:07	08:40	
	17:05	18:02	18:52	20:45	21:33	14	20:35 (WEA 4)	21:57		21:37	21 20:49 (WEA 4)	20:40	19:29	18:22	16:31	16:24
25	08:24	07:29	06:26	06:17	05:26		20:23 (WEA 4)	05:13		06:29		07:22	07:14	08:08	08:41	
	17:06	18:04	18:53	20:46	21:34	11	20:34 (WEA 4)	21:57		21:35	22 20:49 (WEA 4)	20:38	19:26	17:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25		20:24 (WEA 4)	05:13		06:29		07:24	07:16	08:10	08:41	
	17:08	18:05	18:55	20:48	21:35	8	20:32 (WEA 4)	21:57		21:34	22 20:49 (WEA 4)	20:36	19:24	17:18	16:29	16:25
27	08:22	07:25	06:21	06:13	05:24			05:14		06:35		07:26	07:17	08:12	08:41	
	17:10	18:07	18:57	20:50	21:37			21:57		21:32	23 20:50 (WEA 4)	20:33	19:22	17:16	16:29	16:26
28	08:20	07:23	06:19	06:11	05:23			05:14		06:36		07:27	07:19	08:13	08:41	
	17:12	18:09	18:58	20:51	21:38			21:57		21:31	24 20:50 (WEA 4)	20:31	19:19	17:14	16:28	16:27
29	08:19	07:17	06:09	05:22				05:15		06:38		07:29	07:21	08:15	08:41	
	17:13		20:00	20:53	21:39			21:57		21:29	23 20:49 (WEA 4)	20:29	19:17	17:12	16:27	16:28
30	08:18	07:15	06:07	05:21				05:15		06:40		07:31	07:23	08:16	08:42	
	17:15		20:02	20:55	21:40			21:57		21:28	24 20:50 (WEA 4)	20:27	19:15	17:10	16:26	16:29
31	08:16	07:12		05:20				05:51		06:41		07:25		08:12	08:42	
	17:17		20:04		21:41			21:26		20:24	23 20:49 (WEA 4)	20:24		17:08		16:30
Sonnenscheinstunden	258	277	367	416	486		500	503		454	163	381	331	266	243	
astr.max.mögl.Beschattung					434			277								

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

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

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 37-NW - IP 37-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	20:27 (WEA 4)	06:43	07:32	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	23 20:50 (WEA 4)	20:22	19:12	17:06	16:25	
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	20:27 (WEA 4)	06:45	07:34	07:28	08:19	
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	22 20:49 (WEA 4)	20:20	19:10	17:04	16:25	
3	08:41	08:11	07:16	07:05	06:01	20:28 (WEA 4)	05:18	05:17	05:56	20:27 (WEA 4)	06:46	07:36	08:20	
	16:33	17:23	18:15	20:09	21:00	2 20:30 (WEA 4)	21:45	21:56	21:21	22 20:49 (WEA 4)	20:18	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	20:23 (WEA 4)	05:17	05:18	05:57	20:27 (WEA 4)	06:48	07:37	08:22	
	16:34	17:25	18:16	20:10	21:02	10 20:33 (WEA 4)	21:46	21:56	21:20	21 20:48 (WEA 4)	20:15	19:06	17:00	16:23
5	08:41	08:08	07:12	07:01	05:57	20:21 (WEA 4)	05:16	05:19	05:59	20:28 (WEA 4)	06:49	07:39	08:23	
	16:35	17:26	18:18	20:12	21:03	13 20:34 (WEA 4)	21:47	21:55	21:18	20 20:48 (WEA 4)	20:13	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	20:19 (WEA 4)	05:15	05:20	06:01	20:29 (WEA 4)	06:51	07:41	08:25	
	16:37	17:28	18:20	20:14	21:05	16 20:35 (WEA 4)	21:48	21:55	21:16	17 20:46 (WEA 4)	20:11	19:01	16:57	16:22
7	08:40	08:05	07:08	06:56	05:54	20:19 (WEA 4)	05:15	05:21	06:02	20:30 (WEA 4)	06:53	07:42	08:26	
	16:38	17:30	18:22	20:16	21:07	19 20:38 (WEA 4)	21:49	21:54	21:14	15 20:45 (WEA 4)	20:09	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	05:52	20:18 (WEA 4)	05:14	05:22	06:04	20:31 (WEA 4)	06:54	07:44	08:27	
	16:39	17:32	18:24	20:17	21:08	20 20:38 (WEA 4)	21:50	21:53	21:12	12 20:43 (WEA 4)	20:06	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	05:50	20:17 (WEA 4)	05:14	05:23	06:05	20:34 (WEA 4)	06:56	07:46	08:28	
	16:41	17:34	18:25	20:19	21:10	21 20:38 (WEA 4)	21:51	21:53	21:10	8 20:42 (WEA 4)	20:04	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	05:48	20:17 (WEA 4)	05:13	05:24	06:07	06:58	07:47	08:31	08:29	
	16:42	17:36	18:27	20:21	21:11	22 20:39 (WEA 4)	21:51	21:52	21:09	21:09	20:02	18:52	16:50	16:21
11	08:38	07:57	06:58	06:47	05:47	20:16 (WEA 4)	05:13	05:25	06:09	06:59	07:49	08:34	08:30	
	16:43	17:38	18:29	20:22	21:13	23 20:39 (WEA 4)	21:52	21:51	21:07	21:07	20:01	18:50	16:49	16:21
12	08:37	07:56	06:56	06:45	05:45	20:16 (WEA 4)	05:13	05:26	06:10	07:01	07:51	08:36	08:31	
	16:45	17:40	18:31	20:24	21:15	24 20:40 (WEA 4)	21:53	21:50	21:05	21:05	19:57	18:47	16:47	16:21
13	08:37	07:54	06:54	06:43	05:43	20:16 (WEA 4)	05:12	05:27	06:12	07:03	07:53	08:38	08:32	
	16:46	17:41	18:32	20:26	21:16	23 20:39 (WEA 4)	21:53	21:49	21:03	21:03	19:55	18:45	16:46	16:21
14	08:36	07:52	06:52	06:40	05:42	20:16 (WEA 4)	05:12	05:28	06:13	07:04	07:54	08:39	08:33	
	16:48	17:43	18:34	20:28	21:18	24 20:40 (WEA 4)	21:54	21:48	21:01	19:52	18:43	16:44	16:21	
15	08:35	07:50	06:49	06:38	05:40	20:16 (WEA 4)	05:12	05:29	06:15	07:06	07:56	08:41	08:34	
	16:49	17:45	18:36	20:29	21:19	23 20:39 (WEA 4)	21:55	21:47	20:59	19:50	18:41	16:43	16:21	
16	08:34	07:48	06:47	06:36	05:39	20:17 (WEA 4)	05:12	05:30	06:17	07:07	07:58	08:43	08:35	
	16:51	17:47	18:38	20:31	21:21	22 20:39 (WEA 4)	21:55	21:46	20:57	19:48	18:39	16:41	16:21	
17	08:33	07:46	06:45	06:34	05:37	20:17 (WEA 4)	05:12	05:32	06:18	07:09	08:00	07:55	08:36	
	16:53	17:49	18:39	20:33	21:22	22 20:39 (WEA 4)	21:56	21:45	20:55	19:45	18:36	16:40	16:21	
18	08:32	07:44	06:42	06:32	05:36	20:17 (WEA 4)	05:12	05:33	06:20	07:11	08:01	07:57	08:37	
	16:54	17:51	18:41	20:34	21:24	21 20:38 (WEA 4)	21:56	21:44	7 20:41 (WEA 4)	20:53	19:43	18:34	16:39	16:21
19	08:31	07:42	06:40	06:29	05:34	20:18 (WEA 4)	05:12	05:34	06:22	07:12	08:03	07:58	08:37	
	16:56	17:53	18:43	20:36	21:25	20 20:38 (WEA 4)	21:56	21:43	11 20:43 (WEA 4)	20:51	19:41	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33	20:19 (WEA 4)	05:12	05:36	06:23	07:14	08:05	08:00	08:38	
	16:58	17:54	18:45	20:38	21:27	19 20:38 (WEA 4)	21:57	21:42	13 20:45 (WEA 4)	20:48	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	20:20 (WEA 4)	05:12	05:37	06:25	07:16	08:07	08:02	08:39	
	16:59	17:56	18:46	20:40	21:28	17 20:37 (WEA 4)	21:57	21:41	15 20:46 (WEA 4)	20:46	19:36	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30	20:20 (WEA 4)	05:12	05:38	06:27	07:17	08:08	08:03	08:39	
	17:01	17:58	18:48	20:41	21:30	16 20:36 (WEA 4)	21:57	21:39	17 20:47 (WEA 4)	20:44	19:33	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29	20:21 (WEA 4)	05:12	05:40	06:28	07:19	08:10	08:05	08:40	
	17:03	18:00	18:50	20:43	21:31	14 20:35 (WEA 4)	21:57	21:38	18 20:47 (WEA 4)	20:42	19:31	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	05:28	20:22 (WEA 4)	05:13	05:41	06:30	07:21	08:12	08:07	08:40	
	17:05	18:02	18:52	20:45	21:33	12 20:34 (WEA 4)	21:57	21:37	19 20:48 (WEA 4)	20:40	19:29	18:22	16:31	16:24
25	08:24	07:29	06:26	06:17	05:26	20:24 (WEA 4)	05:13	05:42	06:31	07:22	08:13	08:08	08:41	
	17:06	18:04	18:53	20:46	21:34	9 20:33 (WEA 4)	21:57	21:35	21 20:49 (WEA 4)	20:38	19:26	18:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25	20:26 (WEA 4)	05:13	05:44	20:27 (WEA 4)	06:33	07:24	07:16	08:10	08:41
	17:08	18:05	18:55	20:48	21:35	4 20:30 (WEA 4)	21:57	21:34	22 20:49 (WEA 4)	20:36	19:24	17:18	16:29	16:25
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	06:35	06:26	07:17	08:08	08:03	08:41	
	17:10	18:07	18:57	20:50	21:37	21:57	21:32	23 20:50 (WEA 4)	20:33	19:22	17:16	16:29	16:26	
28	08:20	07:23	06:19	06:11	05:23	05:14	05:47	06:36	06:27	07:19	08:13	08:08	08:41	
	17:12	18:09	18:58	20:51	21:38	21:57	21:31	23 20:50 (WEA 4)	20:31	19:19	17:14	16:28	16:27	
29	08:19	07:17	06:09	05:22	05:15	05:15	05:48	06:38	06:28	07:20	08:15	08:10	08:41	
	17:13	08:00	20:53	21:39	21:57	21:29	23 20:49 (WEA 4)	20:29	06:38	19:17	17:12	16:27	16:28	
30	08:18	07:15	06:07	05:21	05:15	05:15	05:50	06:40	06:38	07:31	08:23	08:16	08:42	
	17:15	08:02	20:55	21:40	21:57	21:28	23 20:50 (WEA 4)	20:27	06:40	19:15	17:10	16:26	16:29	
31	08:16	07:12	06:05	05:20	05:15	05:15	05:51	06:41	06:41	07:31	08:23	08:16	08:42	
	17:17	08:04	21:41	21:41	21:57	21:26	24 20:50 (WEA 4)	20:24	06:41	19:15	17:08	16:26	16:30	
Sonnenscheinstunden	258	277	367	416	486	500	503	454	160	381	331	266	243	
astr.max.mögl.Beschattung					416		259							

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

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

Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 38-NW - IP 38-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	20:28 (WEA 4)	06:43	07:32	07:26	08:18			
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	22	20:50 (WEA 4)	20:22	19:12	17:06	16:25		
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	20:27 (WEA 4)	06:45	07:34	07:28	08:19			
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	23	20:50 (WEA 4)	20:20	19:10	17:04	16:25		
3	08:41	08:11	07:16	07:05	06:01	05:18	05:17	05:56	20:28 (WEA 4)	06:46	07:36	07:30	08:20			
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	22	20:50 (WEA 4)	20:18	19:08	17:02	16:24		
4	08:41	08:10	07:14	07:03	05:59	20:24 (WEA 4)	05:17	05:57	20:28 (WEA 4)	06:48	07:37	07:32	08:22			
	16:34	17:25	18:16	20:10	21:02	9	20:33 (WEA 4)	21:46	21:20	21	20:49 (WEA 4)	20:15	19:06	17:00	16:23	
5	08:41	08:08	07:12	07:01	05:57	20:22 (WEA 4)	05:16	05:19	20:29 (WEA 4)	06:49	07:39	07:34	08:23			
	16:35	17:26	18:18	20:12	21:03	12	20:34 (WEA 4)	21:47	21:18	20	20:49 (WEA 4)	20:13	19:03	16:59	16:23	
6	08:41	08:06	07:10	06:58	05:55	20:20 (WEA 4)	05:15	05:20	06:01	20:29 (WEA 4)	06:51	07:41	07:35	08:24		
	16:37	17:28	18:20	20:14	21:05	15	20:35 (WEA 4)	21:48	21:16	17	20:46 (WEA 4)	20:11	19:01	16:57	16:22	
7	08:40	08:05	07:08	06:56	05:54	20:20 (WEA 4)	05:15	05:21	06:02	20:31 (WEA 4)	06:53	07:42	07:37	08:26		
	16:38	17:30	18:22	20:16	21:07	18	20:38 (WEA 4)	21:49	21:14	14	20:45 (WEA 4)	20:09	18:59	16:55	16:22	
8	08:40	08:03	07:05	06:54	05:52	20:18 (WEA 4)	05:14	05:22	06:04	20:32 (WEA 4)	06:54	07:44	07:39	08:27		
	16:39	17:32	18:24	20:17	21:08	20	20:38 (WEA 4)	21:50	21:12	11	20:43 (WEA 4)	20:06	18:56	16:54	16:22	
9	08:39	08:01	07:03	06:52	05:50	20:17 (WEA 4)	05:14	05:23	06:05	20:34 (WEA 4)	06:56	07:46	07:41	08:28		
	16:41	17:34	18:25	20:19	21:10	22	20:39 (WEA 4)	21:51	21:10	8	20:42 (WEA 4)	20:04	18:54	16:52	16:21	
10	08:39	07:59	07:01	06:49	05:48	20:18 (WEA 4)	05:13	05:24	06:07	06:58	07:47	07:43	08:29			
	16:42	17:36	18:27	20:21	21:11	22	20:40 (WEA 4)	21:51	21:09	21:09	20:02	18:52	16:50	16:21		
11	08:38	07:57	06:58	06:47	05:47	20:17 (WEA 4)	05:13	05:25	06:09	06:59	07:49	07:44	08:30			
	16:43	17:38	18:29	20:22	21:13	22	20:39 (WEA 4)	21:52	21:07	21:07	20:01	18:50	16:49	16:21		
12	08:37	07:56	06:56	06:45	05:45	20:17 (WEA 4)	05:13	05:26	06:10	07:01	07:51	07:46	08:31			
	16:45	17:40	18:31	20:24	21:15	23	20:40 (WEA 4)	21:53	21:05	21:05	19:57	18:47	16:47	16:21		
13	08:37	07:54	06:54	06:43	05:43	20:17 (WEA 4)	05:12	05:27	06:12	07:03	07:53	07:48	08:32			
	16:46	17:41	18:32	20:26	21:16	23	20:40 (WEA 4)	21:53	21:03	19:55	18:45	16:46	16:21			
14	08:36	07:52	06:52	06:40	05:42	20:17 (WEA 4)	05:12	05:28	06:13	07:04	07:54	07:50	08:33			
	16:48	17:43	18:34	20:28	21:18	23	20:40 (WEA 4)	21:54	21:01	19:52	18:43	16:44	16:21			
15	08:35	07:50	06:49	06:38	05:40	20:17 (WEA 4)	05:12	05:29	06:15	07:06	07:56	07:51	08:34			
	16:49	17:45	18:36	20:29	21:19	22	20:39 (WEA 4)	21:55	21:07	20:59	19:50	18:41	16:43	16:21		
16	08:34	07:48	06:47	06:36	05:39	20:17 (WEA 4)	05:12	05:30	06:17	07:07	07:58	07:53	08:35			
	16:51	17:47	18:38	20:31	21:21	22	20:39 (WEA 4)	21:55	21:07	20:57	19:48	18:39	16:41	16:21		
17	08:33	07:46	06:45	06:34	05:37	20:18 (WEA 4)	05:12	05:32	06:18	07:09	08:00	07:55	08:36			
	16:53	17:49	18:39	20:33	21:22	22	20:40 (WEA 4)	21:56	21:05	20:55	19:45	18:36	16:40	16:21		
18	08:32	07:44	06:42	06:32	05:36	20:18 (WEA 4)	05:12	05:33	06:20	07:11	08:01	07:57	08:37			
	16:54	17:51	18:41	20:34	21:24	20	20:38 (WEA 4)	21:56	21:04	5	20:41 (WEA 4)	20:53	19:43	18:34	16:39	16:21
19	08:31	07:42	06:40	06:29	05:34	20:19 (WEA 4)	05:12	05:34	06:22	07:12	08:03	07:58	08:37			
	16:56	17:53	18:43	20:36	21:25	19	20:38 (WEA 4)	21:56	21:03	10	20:43 (WEA 4)	20:51	19:40	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33	20:19 (WEA 4)	05:12	05:36	06:23	07:14	08:05	08:00	08:38			
	16:58	17:54	18:45	20:38	21:27	19	20:38 (WEA 4)	21:57	21:02	12	20:45 (WEA 4)	20:48	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	20:20 (WEA 4)	05:12	05:37	06:25	07:16	08:07	08:02	08:39			
	16:59	17:56	18:46	20:40	21:28	18	20:38 (WEA 4)	21:57	21:01	14	20:46 (WEA 4)	20:46	19:36	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30	20:20 (WEA 4)	05:12	05:38	06:27	07:17	08:08	08:03	08:39			
	17:01	17:58	18:48	20:41	21:30	16	20:36 (WEA 4)	21:57	21:09	17	20:47 (WEA 4)	20:44	19:33	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29	20:22 (WEA 4)	05:12	05:40	06:28	07:19	08:10	08:05	08:40			
	17:03	18:00	18:50	20:43	21:31	13	20:35 (WEA 4)	21:57	21:08	18	20:47 (WEA 4)	20:42	19:31	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	05:28	20:23 (WEA 4)	05:13	05:41	06:30	07:21	08:12	08:07	08:40			
	17:05	18:02	18:51	20:45	21:33	11	20:34 (WEA 4)	21:57	21:07	19	20:49 (WEA 4)	20:40	19:29	18:22	16:31	16:24
25	08:24	07:29	06:26	06:17	05:26	20:25 (WEA 4)	05:13	05:42	06:31	07:22	08:13	08:08	08:41			
	17:06	18:04	18:53	20:46	21:34	8	20:33 (WEA 4)	21:57	21:05	20	20:49 (WEA 4)	20:38	19:26	18:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	05:44	06:33	07:24	08:15	08:10	08:41			
	17:08	18:05	18:55	20:48	21:35	21:57	21:34	21:04	21	20:49 (WEA 4)	20:36	19:24	18:18	16:29	16:25	
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	05:45	06:35	07:26	08:17	08:12	08:41			
	17:10	18:07	18:57	20:50	21:37	21:57	21:32	21:02	22	20:50 (WEA 4)	20:33	19:22	18:16	16:29	16:26	
28	08:20	07:23	06:19	06:11	05:23	05:14	05:47	05:47	06:36	07:27	08:19	08:13	08:41			
	17:12	18:09	18:58	20:51	21:38	21:57	21:31	21:01	22	20:50 (WEA 4)	20:31	19:19	18:14	16:28	16:27	
29	08:19	07:17	06:09	05:22	05:15	05:15	05:48	05:48	06:38	07:29	08:21	08:15	08:41			
	17:13	18:10	19:00	20:53	21:39	21:57	21:29	21:00	23	20:50 (WEA 4)	20:29	19:17	18:12	16:27	16:28	
30	08:18	07:15	06:07	05:21	05:15	05:15	05:50	05:50	06:40	07:31	08:23	08:16	08:42			
	17:15	18:12	19:02	20:55	21:40	21:57	21:28	21:00	23	20:50 (WEA 4)	20:27	19:15	18:10	16:26	16:29	
31	08:16	07:12	06:05	05:20	05:15	05:15	05:51	05:51	06:41	07:32	08:24	08:16	08:42			
	17:17	18:14	19:04	21:41	21:26	21:26	21:26	21:00	23	20:50 (WEA 4)	20:24	17:08	16:30			
Sonnenscheinstunden	258	277	367	416	486	500	503	454	158	381	331	266	243			
astr.max.mögl.Beschattung					399		249									

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

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



Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 39-NW - IP 39-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai		Juni	Juli		August		September	Oktober	November	Dezember	
1	08:42	08:15	07:21	07:10	06:05		05:19	05:16		05:53	20:27 (WEA 4)	06:43	07:32	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57		21:43	21:57		21:25	23 20:50 (WEA 4)	20:22	19:12	17:06	16:25	
2	08:42	08:13	07:19	07:08	06:03		05:18	05:17		05:54	20:27 (WEA 4)	06:45	07:34	07:28	08:19	
	16:32	17:21	18:13	20:07	20:58		21:44	21:56		21:23	22 20:49 (WEA 4)	20:20	19:10	17:04	16:25	
3	08:41	08:11	07:16	07:05	06:01		20:25 (WEA 4)	05:18	05:17	05:56	20:28 (WEA 4)	06:46	07:36	07:30	08:20	
	16:33	17:23	18:15	20:09	21:00	7	20:32 (WEA 4)	21:45	21:56	21:21	21 20:49 (WEA 4)	20:18	19:08	17:02	16:24	
4	08:41	08:10	07:14	07:03	05:59		20:22 (WEA 4)	05:17	05:18	05:57	20:27 (WEA 4)	06:48	07:37	07:32	08:22	
	16:34	17:25	18:16	20:10	21:02	11	20:33 (WEA 4)	21:46	21:56	21:20	21 20:48 (WEA 4)	20:15	19:05	17:00	16:23	
5	08:41	08:08	07:12	07:01	05:57		20:20 (WEA 4)	05:16	05:19	05:59	20:28 (WEA 4)	06:49	07:39	07:34	08:23	
	16:35	17:26	18:18	20:12	21:03	14	20:34 (WEA 4)	21:47	21:55	21:18	20 20:48 (WEA 4)	20:13	19:03	16:59	16:23	
6	08:41	08:06	07:10	06:58	05:55		20:19 (WEA 4)	05:15	05:20	06:01	20:28 (WEA 4)	06:51	07:41	07:35	08:24	
	16:37	17:28	18:20	20:14	21:05	16	20:35 (WEA 4)	21:48	21:55	21:16	18 20:46 (WEA 4)	20:11	19:01	16:57	16:22	
7	08:40	08:05	07:08	06:56	05:54		20:19 (WEA 4)	05:15	05:21	06:02	20:30 (WEA 4)	06:53	07:42	07:37	08:26	
	16:38	17:30	18:22	20:16	21:07	19	20:38 (WEA 4)	21:49	21:54	21:14	15 20:45 (WEA 4)	20:09	18:59	16:55	16:22	
8	08:40	08:03	07:05	06:54	05:52		20:18 (WEA 4)	05:14	05:22	06:04	20:30 (WEA 4)	06:54	07:44	07:39	08:27	
	16:39	17:32	18:24	20:17	21:08	20	20:38 (WEA 4)	21:50	21:53	21:12	13 20:43 (WEA 4)	20:06	18:56	16:54	16:22	
9	08:39	08:01	07:03	06:52	05:50		20:17 (WEA 4)	05:14	05:23	06:05	20:33 (WEA 4)	06:56	07:46	07:41	08:28	
	16:41	17:34	18:25	20:19	21:10	21	20:38 (WEA 4)	21:51	21:53	21:10	9 20:42 (WEA 4)	20:04	18:54	16:52	16:21	
10	08:39	07:59	07:01	06:49	05:48		20:17 (WEA 4)	05:13	05:24	06:07	20:35 (WEA 4)	06:58	07:47	07:43	08:29	
	16:42	17:36	18:27	20:21	21:11	22	20:39 (WEA 4)	21:51	21:52	21:09	4 20:39 (WEA 4)	20:02	18:52	16:50	16:21	
11	08:38	07:57	06:58	06:47	05:47		20:16 (WEA 4)	05:13	05:25	06:09		06:59	07:49	07:44	08:30	
	16:43	17:38	18:29	20:22	21:13	23	20:39 (WEA 4)	21:52	21:51	21:07		21:07	18:50	16:49	16:21	
12	08:37	07:56	06:56	06:45	05:45		20:17 (WEA 4)	05:13	05:26	06:10		07:01	07:51	07:46	08:31	
	16:45	17:40	18:31	20:24	21:15	22	20:39 (WEA 4)	21:53	21:50	21:05		21:05	18:47	16:47	16:21	
13	08:37	07:54	06:54	06:43	05:43		20:16 (WEA 4)	05:12	05:27	06:12		07:03	07:53	07:48	08:32	
	16:46	17:41	18:32	20:26	21:16	23	20:39 (WEA 4)	21:53	21:49	21:03		21:03	18:45	16:46	16:21	
14	08:36	07:52	06:52	06:40	05:42		20:17 (WEA 4)	05:12	05:28	06:13		07:04	07:54	07:50	08:33	
	16:48	17:43	18:34	20:28	21:18	22	20:39 (WEA 4)	21:54	21:48	21:01		21:01	18:43	16:44	16:21	
15	08:35	07:50	06:49	06:38	05:40		20:16 (WEA 4)	05:12	05:29	06:15		07:06	07:56	07:51	08:34	
	16:49	17:45	18:36	20:29	21:19	22	20:38 (WEA 4)	21:55	21:47	20:59		20:59	18:41	16:43	16:21	
16	08:34	07:48	06:47	06:36	05:39		20:17 (WEA 4)	05:12	05:30	06:17		07:07	07:58	07:53	08:35	
	16:51	17:47	18:38	20:31	21:21	22	20:39 (WEA 4)	21:55	21:46	20:57		21:08	18:39	16:41	16:21	
17	08:33	07:46	06:45	06:34	05:37		20:18 (WEA 4)	05:12	05:32	06:18		07:09	08:00	07:55	08:36	
	16:53	17:49	18:39	20:33	21:22	20	20:38 (WEA 4)	21:56	21:45	20:55		21:05	18:36	16:40	16:21	
18	08:32	07:44	06:42	06:32	05:36		20:18 (WEA 4)	05:12	05:33	06:20		07:11	08:01	07:57	08:37	
	16:54	17:51	18:41	20:34	21:24	19	20:37 (WEA 4)	21:56	21:44	20:53		21:03	18:34	16:39	16:21	
19	08:31	07:42	06:40	06:29	05:34		20:19 (WEA 4)	05:12	05:34			06:22	07:12	08:03	07:58	08:37
	16:56	17:53	18:43	20:36	21:25	18	20:37 (WEA 4)	21:56	21:43	3 20:39 (WEA 4)		20:51	19:40	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33		20:20 (WEA 4)	05:12	05:36			06:23	07:14	08:05	08:00	08:38
	16:58	17:54	18:45	20:38	21:27	17	20:37 (WEA 4)	21:57	21:42	9 20:42 (WEA 4)		20:48	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31		20:21 (WEA 4)	05:12	05:37			06:25	07:16	08:07	08:02	08:39
	16:59	17:56	18:46	20:40	21:28	15	20:36 (WEA 4)	21:57	21:41	12 20:44 (WEA 4)		20:46	19:36	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30		20:21 (WEA 4)	05:12	05:38			06:27	07:17	08:08	08:03	08:39
	17:01	17:58	18:48	20:41	21:30	13	20:34 (WEA 4)	21:57	21:39	14 20:45 (WEA 4)		20:44	19:33	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29		20:23 (WEA 4)	05:12	05:40			06:28	07:19	08:10	08:05	08:40
	17:03	18:00	18:50	20:43	21:31	10	20:33 (WEA 4)	21:57	21:38	16 20:46 (WEA 4)		20:42	19:31	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	05:28		20:25 (WEA 4)	05:13	05:41			06:30	07:21	08:12	08:07	08:40
	17:05	18:02	18:51	20:45	21:33	7 20:32 (WEA 4)		21:57	21:37	17 20:47 (WEA 4)		20:40	19:29	18:22	16:31	16:24
25	08:24	07:29	06:26	06:17	05:26		05:13	05:42	05:44			06:31	07:22	07:14	08:08	08:41
	17:06	18:04	18:53	20:46	21:34		21:57	21:35	19 20:48 (WEA 4)		20:38		19:26	17:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25		05:13	05:44	05:44			06:33	07:24	07:16	08:10	08:41
	17:08	18:05	18:55	20:48	21:35		21:57	21:34	20 20:48 (WEA 4)		20:36		19:24	17:18	16:29	16:25
27	08:22	07:25	06:21	06:13	05:24		05:14	05:45	05:45			06:35	07:26	07:17	08:12	08:41
	17:10	18:07	18:57	20:50	21:37		21:57	21:32	21 20:49 (WEA 4)		20:33		19:22	17:16	16:29	16:26
28	08:20	07:23	06:19	06:11	05:23		05:14	05:47	05:47			06:36	07:27	07:19	08:13	08:41
	17:12	18:09	18:58	20:51	21:38		21:57	21:31	22 20:49 (WEA 4)		20:31		19:19	17:14	16:28	16:27
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	17:13		20:00	20:53	21:39		21:57	21:29	22 20:49 (WEA 4)		20:29		19:17	17:12	16:27	16:28
30	08:18	07:14	06:07	05:21			05:15	05:50	05:50			06:40	07:31	07:23	08:16	08:42
	17:15		20:02	20:55	21:40		21:57	21:28	23 20:50 (WEA 4)		20:27		19:15	17:10	16:26	16:29
31	08:16	07:12		05:20				05:51	05:51			06:41	07:25		08:42	
	17:17	20:04		21:41				21:26	22 20:49 (WEA 4)		20:24		17:08		16:30	
Sonnenscheinstunden	258	277	367	416	486		500	503		454	166	381	331	266	243	
astr.max.mögl.Beschattung					383			220								

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

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



Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 40-NW - IP 40-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21	07:10	06:05	05:19	05:16	05:53	20:28 (WEA 4)	06:43	07:32	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	22 20:50 (WEA 4)	20:22	19:12	17:06	16:25	
2	08:42	08:13	07:19	07:08	06:03	05:18	05:17	05:54	20:28 (WEA 4)	06:45	07:34	07:28	08:19	
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	22 20:50 (WEA 4)	20:20	19:10	17:04	16:25	
3	08:41	08:11	07:16	07:05	06:01	20:27 (WEA 4)	05:18	05:17	05:56	20:28 (WEA 4)	06:46	07:36	08:20	
	16:33	17:23	18:15	20:09	21:00	5 20:32 (WEA 4)	21:45	21:56	21:21	22 20:50 (WEA 4)	20:18	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	20:24 (WEA 4)	05:17	05:18	05:57	20:28 (WEA 4)	06:48	07:37	08:22	
	16:34	17:25	18:16	20:10	21:02	9 20:33 (WEA 4)	21:46	21:56	21:20	21 20:49 (WEA 4)	20:15	19:05	17:00	16:23
5	08:41	08:08	07:12	07:01	05:57	20:21 (WEA 4)	05:16	05:19	05:59	20:29 (WEA 4)	06:49	07:39	08:23	
	16:35	17:26	18:18	20:12	21:03	13 20:34 (WEA 4)	21:47	21:55	21:18	20 20:49 (WEA 4)	20:13	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	20:20 (WEA 4)	05:15	05:20	06:01	20:29 (WEA 4)	06:51	07:41	08:25	
	16:37	17:28	18:20	20:14	21:05	15 20:35 (WEA 4)	21:48	21:55	21:16	17 20:46 (WEA 4)	20:11	19:01	16:57	16:22
7	08:40	08:05	07:08	06:56	05:54	20:20 (WEA 4)	05:15	05:21	06:02	20:31 (WEA 4)	06:53	07:42	08:26	
	16:38	17:30	18:22	20:16	21:07	18 20:38 (WEA 4)	21:49	21:54	21:14	14 20:45 (WEA 4)	20:09	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	05:52	20:19 (WEA 4)	05:14	05:22	06:04	20:31 (WEA 4)	06:54	07:44	08:27	
	16:39	17:32	18:24	20:17	21:08	20 20:39 (WEA 4)	21:50	21:53	21:12	12 20:43 (WEA 4)	20:06	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	05:50	20:18 (WEA 4)	05:14	05:23	06:05	20:34 (WEA 4)	06:56	07:46	08:28	
	16:41	17:34	18:25	20:19	21:10	21 20:39 (WEA 4)	21:51	21:53	21:10	8 20:42 (WEA 4)	20:04	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	05:48	20:18 (WEA 4)	05:13	05:24	06:07	06:58	07:47	08:31	08:29	
	16:42	17:36	18:27	20:21	21:11	21 20:39 (WEA 4)	21:51	21:52	21:09	21:09	20:02	18:52	16:50	16:21
11	08:38	07:57	06:58	06:47	05:47	20:17 (WEA 4)	05:13	05:25	06:09	06:59	07:49	08:34	08:30	
	16:43	17:38	18:29	20:22	21:13	22 20:39 (WEA 4)	21:52	21:51	21:07	21:07	20:02	18:50	16:49	16:21
12	08:37	07:56	06:56	06:45	05:45	20:18 (WEA 4)	05:13	05:26	06:10	07:01	07:51	08:36	08:31	
	16:45	17:40	18:31	20:24	21:15	22 20:40 (WEA 4)	21:53	21:50	21:05	21:05	19:57	18:47	16:47	16:21
13	08:37	07:54	06:54	06:43	05:43	20:17 (WEA 4)	05:12	05:27	06:12	07:03	07:53	08:38	08:32	
	16:46	17:41	18:32	20:26	21:16	22 20:39 (WEA 4)	21:53	21:49	21:03	19:55	18:45	16:46	16:21	
14	08:36	07:52	06:52	06:40	05:42	20:18 (WEA 4)	05:12	05:28	06:13	07:04	07:54	08:39	08:33	
	16:48	17:43	18:34	20:28	21:18	22 20:40 (WEA 4)	21:54	21:48	21:01	19:52	18:43	16:44	16:21	
15	08:35	07:50	06:49	06:38	05:40	20:17 (WEA 4)	05:12	05:29	06:15	07:06	07:56	08:41	08:34	
	16:49	17:45	18:36	20:29	21:19	22 20:39 (WEA 4)	21:55	21:47	20:59	19:50	18:41	16:43	16:21	
16	08:34	07:48	06:47	06:36	05:39	20:18 (WEA 4)	05:12	05:30	06:17	07:07	07:58	08:43	08:35	
	16:51	17:47	18:38	20:31	21:21	21 20:39 (WEA 4)	21:55	21:46	20:57	19:48	18:39	16:41	16:21	
17	08:33	07:46	06:45	06:34	05:37	20:19 (WEA 4)	05:12	05:32	06:18	07:09	08:00	07:55	08:36	
	16:53	17:49	18:39	20:33	21:22	20 20:39 (WEA 4)	21:56	21:45	20:55	19:45	18:36	16:40	16:21	
18	08:32	07:44	06:42	06:32	05:36	20:18 (WEA 4)	05:12	05:33	06:20	07:11	08:01	07:57	08:37	
	16:54	17:51	18:41	20:34	21:24	20 20:38 (WEA 4)	21:56	21:44	20:53	19:43	18:34	16:39	16:21	
19	08:31	07:42	06:40	06:29	05:34	20:19 (WEA 4)	05:12	05:34	06:22	07:12	08:03	07:58	08:37	
	16:56	17:53	18:43	20:36	21:25	19 20:38 (WEA 4)	21:56	21:43	3 20:40 (WEA 4)	20:51	19:40	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33	20:20 (WEA 4)	05:12	05:36	06:23	07:14	08:05	08:00	08:38	
	16:58	17:54	18:45	20:38	21:27	17 20:37 (WEA 4)	21:57	21:42	9 20:43 (WEA 4)	20:48	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	20:21 (WEA 4)	05:12	05:37	06:25	07:16	08:07	08:02	08:39	
	16:59	17:56	18:46	20:40	21:28	16 20:37 (WEA 4)	21:57	21:41	12 20:45 (WEA 4)	20:46	19:36	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30	20:22 (WEA 4)	05:12	05:38	06:27	07:17	08:08	08:03	08:39	
	17:01	17:58	18:48	20:41	21:30	13 20:35 (WEA 4)	21:57	21:39	14 20:46 (WEA 4)	20:44	19:33	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29	20:23 (WEA 4)	05:12	05:40	06:28	07:19	08:10	08:05	08:40	
	17:03	18:00	18:50	20:43	21:31	11 20:34 (WEA 4)	21:57	21:38	17 20:47 (WEA 4)	20:42	19:31	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	05:28	20:25 (WEA 4)	05:13	05:41	06:30	07:21	08:12	08:07	08:40	
	17:05	18:02	18:51	20:45	21:33	7 20:32 (WEA 4)	21:57	21:37	18 20:48 (WEA 4)	20:40	19:29	18:22	16:31	16:24
25	08:24	07:29	06:26	06:17	05:26	05:13	05:42	05:44	06:31	07:22	08:13	08:08	08:41	
	17:06	18:04	18:53	20:46	21:34	21:57	21:35	19 20:48 (WEA 4)	20:38	19:26	18:19	16:30	16:25	
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	05:44	06:33	07:24	08:15	08:10	08:41	
	17:08	18:05	18:55	20:48	21:35	21:57	21:34	20 20:49 (WEA 4)	20:36	19:24	18:17	16:29	16:25	
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	05:45	06:35	07:26	08:17	08:12	08:41	
	17:10	18:07	18:57	20:50	21:37	21:57	21:32	21 20:50 (WEA 4)	20:33	19:22	18:16	16:29	16:26	
28	08:20	07:23	06:19	06:11	05:23	05:14	05:47	05:47	06:36	07:27	08:19	08:13	08:41	
	17:12	18:09	18:58	20:51	21:38	21:57	21:31	22 20:50 (WEA 4)	20:31	19:19	18:14	16:28	16:27	
29	08:19	07:17	06:09	05:22	05:15	05:15	05:48	05:48	06:38	07:29	08:21	08:15	08:41	
	17:13	08:00	20:53	21:39	21:57	21:29	22 20:49 (WEA 4)	20:29	20:29	19:17	18:12	16:27	16:28	
30	08:18	07:14	06:07	05:21	05:15	05:15	05:50	05:50	06:40	08:01	08:23	08:16	08:42	
	17:15	08:02	20:55	21:40	21:57	21:28	22 20:50 (WEA 4)	20:27	20:27	19:15	18:10	16:26	16:29	
31	08:16	07:12	06:05	05:20	05:14	05:14	05:51	05:51	06:41	08:02	08:24	08:16	08:42	
	17:17	08:04	21:41	21:41	21:57	21:26	23 20:50 (WEA 4)	20:24	20:24	18:08	17:08	16:26	16:30	
Sonnenscheinstunden	258	277	367	416	486	500	503	454	158	381	331	266	243	
astr.max.mögl.Beschattung					376		222							

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 41-NW - IP 41-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinfallrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai		Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 18:05	06:05 20:57		05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	07:08 20:07	06:03 20:58		14 20:30 (WEA 4) 20:44 (WEA 4) 05:18 20:31 (WEA 4)
3	08:41 16:33	08:11 17:23	07:16 18:15	07:05 20:09	06:01 21:00		12 20:43 (WEA 4) 05:18 20:33 (WEA 4) 21:45 10 20:43 (WEA 4)
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10	05:59 21:02		05:17 21:46 8 20:34 (WEA 4) 20:42 (WEA 4)
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12	05:57 21:03		05:16 21:47 5 20:35 (WEA 4) 20:40 (WEA 4)
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14	05:55 21:05		05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16	05:54 21:07		05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17	05:52 21:08	3 20:34 (WEA 4) 20:37 (WEA 4)	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19	05:50 21:10	10 20:40 (WEA 4)	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21	05:48 21:11	13 20:29 (WEA 4) 20:42 (WEA 4)	05:13 21:51
11	08:38 16:43	07:57 17:38	06:58 18:29	06:47 20:22	05:47 21:13	16 20:27 (WEA 4) 20:43 (WEA 4)	05:13 21:52
12	08:37 16:45	07:56 17:40	06:56 18:31	06:45 20:24	05:45 21:15	18 20:27 (WEA 4) 20:45 (WEA 4)	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	06:43 20:26	05:43 21:16	20 20:25 (WEA 4) 20:45 (WEA 4)	05:12 21:53
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	05:42 21:18	21 20:25 (WEA 4) 20:46 (WEA 4)	05:12 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	06:38 20:29	05:40 21:19	22 20:24 (WEA 4) 20:46 (WEA 4)	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	05:39 21:21	23 20:24 (WEA 4) 20:47 (WEA 4)	05:12 21:55
17	08:33 16:53	07:46 17:49	06:45 18:39	06:34 20:33	05:37 21:22	24 20:24 (WEA 4) 20:48 (WEA 4)	05:12 21:56
18	08:32 16:54	07:44 17:51	06:42 18:41	06:32 20:34	05:36 21:24	23 20:24 (WEA 4) 20:47 (WEA 4)	05:12 21:56
19	08:31 16:56	07:42 17:53	06:40 18:43	06:29 20:36	05:34 21:25	23 20:24 (WEA 4) 20:47 (WEA 4)	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	05:33 21:27	24 20:24 (WEA 4) 20:48 (WEA 4)	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	05:31 21:28	23 20:25 (WEA 4) 20:48 (WEA 4)	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	05:30 21:30	23 20:24 (WEA 4) 20:47 (WEA 4)	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	05:29 21:31	23 20:24 (WEA 4) 20:47 (WEA 4)	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	05:28 21:33	22 20:25 (WEA 4) 20:47 (WEA 4)	05:13 21:57
25	08:24 17:06	07:29 18:04	06:26 18:53	06:17 20:46	05:26 21:34	22 20:25 (WEA 4) 20:47 (WEA 4)	05:13 21:57
26	08:23 17:08	07:27 18:05	06:24 18:55	06:15 20:48	05:25 21:35	21 20:26 (WEA 4) 20:47 (WEA 4)	05:13 21:57
27	08:22 17:10	07:25 18:07	06:21 18:57	06:13 20:50	05:24 21:37	20 20:26 (WEA 4) 20:46 (WEA 4)	05:14 21:57
28	08:20 17:12	07:23 18:09	06:19 18:58	06:11 20:51	05:23 21:38	19 20:27 (WEA 4) 20:46 (WEA 4)	05:14 21:57
29	08:19 17:13		07:17 20:00	06:09 20:53	05:22 21:39	18 20:27 (WEA 4) 20:45 (WEA 4)	05:15 21:57
30	08:18 17:15		07:15 20:02	06:07 20:55	05:21 21:40	17 20:28 (WEA 4) 20:45 (WEA 4)	05:15 21:57
31	08:16 17:17		07:12 20:04		05:20 21:41	16 20:29 (WEA 4) 20:45 (WEA 4)	
Sonnenscheinstunden	258	277	367	416	486		500
astr.max.mögl.Beschattung					464		49

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

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

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 41-NW - IP 41-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Juli		August		September		Oktober		November		Dezember	
1	05:16		05:53		20:37 (WEA 4)	06:43	07:32		07:26		08:18	
	21:57		21:25	18	20:55 (WEA 4)	20:22	19:12		17:06		16:25	
2	05:17		05:54		20:38 (WEA 4)	06:45	07:34		07:28		08:19	
	21:56		21:23	15	20:53 (WEA 4)	20:20	19:10		17:04		16:25	
3	05:17		05:56		20:40 (WEA 4)	06:46	07:36		07:30		08:20	
	21:56		21:21	12	20:52 (WEA 4)	20:18	19:08		17:02		16:24	
4	05:18		05:57		20:41 (WEA 4)	06:48	07:37		07:32		08:22	
	21:56		21:20	9	20:50 (WEA 4)	20:15	19:06		17:00		16:23	
5	05:19		05:59			06:49	07:39		07:34		08:23	
	21:55		21:18			20:13	19:03		16:59		16:23	
6	05:20		06:01			06:51	07:41		07:35		08:24	
	21:55		21:16			20:11	19:01		16:57		16:22	
7	05:21		20:44 (WEA 4)	06:02		06:53	07:42		07:37		08:26	
	21:54	2	20:46 (WEA 4)	21:14		20:09	18:59		16:55		16:22	
8	05:22		20:41 (WEA 4)	06:04		06:54	07:44		07:39		08:27	
	21:53	6	20:47 (WEA 4)	21:12		20:06	18:56		16:54		16:22	
9	05:23		20:39 (WEA 4)	06:05		06:56	07:46		07:41		08:28	
	21:53	10	20:49 (WEA 4)	21:10		20:04	18:54		16:52		16:21	
10	05:24		20:39 (WEA 4)	06:07		06:58	07:47		07:43		08:29	
	21:52	11	20:50 (WEA 4)	21:09		20:02	18:52		16:50		16:21	
11	05:25		20:38 (WEA 4)	06:09		06:59	07:49		07:44		08:30	
	21:51	13	20:51 (WEA 4)	21:07		19:59	18:50		16:49		16:21	
12	05:26		20:37 (WEA 4)	06:10		07:01	07:51		07:46		08:31	
	21:50	15	20:52 (WEA 4)	21:05		19:57	18:47		16:47		16:21	
13	05:27		20:37 (WEA 4)	06:12		07:03	07:53		07:48		08:32	
	21:49	16	20:53 (WEA 4)	21:03		19:55	18:45		16:46		16:21	
14	05:28		20:36 (WEA 4)	06:13		07:04	07:54		07:50		08:33	
	21:48	18	20:54 (WEA 4)	21:01		19:52	18:43		16:44		16:21	
15	05:29		20:36 (WEA 4)	06:15		07:06	07:56		07:51		08:34	
	21:47	19	20:55 (WEA 4)	20:59		19:50	18:41		16:43		16:21	
16	05:30		20:36 (WEA 4)	06:17		07:07	07:58		07:53		08:35	
	21:46	20	20:56 (WEA 4)	20:57		19:48	18:39		16:41		16:21	
17	05:32		20:35 (WEA 4)	06:18		07:09	08:00		07:55		08:36	
	21:45	21	20:56 (WEA 4)	20:55		19:45	18:36		16:40		16:21	
18	05:33		20:35 (WEA 4)	06:20		07:11	08:01		07:57		08:37	
	21:44	21	20:56 (WEA 4)	20:53		19:43	18:34		16:39		16:21	
19	05:34		20:34 (WEA 4)	06:22		07:12	08:03		07:58		08:37	
	21:43	22	20:56 (WEA 4)	20:51		19:41	18:32		16:37		16:22	
20	05:36		20:35 (WEA 4)	06:23		07:14	08:05		08:00		08:38	
	21:42	23	20:58 (WEA 4)	20:48		19:38	18:30		16:36		16:22	
21	05:37		20:35 (WEA 4)	06:25		07:16	08:07		08:02		08:39	
	21:41	23	20:58 (WEA 4)	20:46		19:36	18:28		16:35		16:22	
22	05:38		20:34 (WEA 4)	06:27		07:17	08:08		08:03		08:39	
	21:39	24	20:58 (WEA 4)	20:44		19:33	18:26		16:34		16:23	
23	05:40		20:34 (WEA 4)	06:28		07:19	08:10		08:05		08:40	
	21:38	23	20:57 (WEA 4)	20:42		19:31	18:24		16:33		16:23	
24	05:41		20:35 (WEA 4)	06:30		07:21	08:12		08:07		08:40	
	21:37	23	20:58 (WEA 4)	20:40		19:29	18:22		16:31		16:24	
25	05:42		20:34 (WEA 4)	06:31		07:22	07:14		08:08		08:41	
	21:35	24	20:58 (WEA 4)	20:38		19:26	17:20		16:30		16:25	
26	05:44		20:34 (WEA 4)	06:33		07:24	07:16		08:10		08:41	
	21:34	23	20:57 (WEA 4)	20:36		19:24	17:18		16:29		16:25	
27	05:45		20:35 (WEA 4)	06:35		07:26	07:17		08:12		08:41	
	21:32	23	20:58 (WEA 4)	20:33		19:22	17:16		16:29		16:26	
28	05:47		20:35 (WEA 4)	06:36		07:27	07:19		08:13		08:41	
	21:31	22	20:57 (WEA 4)	20:31		19:19	17:14		16:28		16:27	
29	05:48		20:35 (WEA 4)	06:38		07:29	07:21		08:15		08:41	
	21:29	21	20:56 (WEA 4)	20:29		19:17	17:12		16:27		16:28	
30	05:50		20:36 (WEA 4)	06:40		07:31	07:23		08:16		08:42	
	21:28	21	20:57 (WEA 4)	20:27		19:15	17:10		16:26		16:29	
31	05:51		20:36 (WEA 4)	06:41			07:25				08:42	
	21:26	19	20:55 (WEA 4)	20:24			17:08				16:30	
Sonnenscheinstunden	503		454			381	331		266		243	
astr.max.mögl.Beschattung		463		54								

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

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

Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 48-NW - IP 48-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	June	July	August	September	Oktober	November	Dezember						
1	08:42	08:15	07:21	07:10	06:05	05:19	20:44 (WEA 4)	05:16	20:50 (WEA 4)	05:53	06:43	07:32	07:26	08:18				
	16:31	17:19	18:11	20:05	20:57	21:43	22	21:06 (WEA 4)	21:57	22	21:12 (WEA 4)	21:25	20:22	19:12	17:06	16:25		
2	08:42	08:13	07:19	07:08	06:03	05:18	20:44 (WEA 4)	05:17	20:51 (WEA 4)	05:54	06:45	07:34	07:28	08:19				
	16:32	17:21	18:13	20:07	20:58	21:44	22	21:06 (WEA 4)	21:56	22	21:13 (WEA 4)	21:23	20:20	19:10	17:04	16:25		
3	08:41	08:11	07:16	07:05	06:01	05:18	20:44 (WEA 4)	05:18	20:50 (WEA 4)	05:56	06:46	07:36	07:30	08:20				
	16:33	17:23	18:15	20:09	21:00	21:45	23	21:07 (WEA 4)	21:56	22	21:12 (WEA 4)	21:21	20:18	19:08	17:02	16:24		
4	08:41	08:10	07:14	07:03	05:59	05:17	20:44 (WEA 4)	05:18	20:50 (WEA 4)	05:57	06:48	07:37	07:32	08:22				
	16:34	17:25	18:16	20:10	21:02	21:46	23	21:07 (WEA 4)	21:56	23	21:13 (WEA 4)	21:20	20:15	19:06	17:00	16:23		
5	08:41	08:08	07:12	07:01	05:57	05:16	20:44 (WEA 4)	05:19	20:51 (WEA 4)	05:59	06:49	07:39	07:34	08:23				
	16:35	17:26	18:18	20:12	21:03	21:47	23	21:07 (WEA 4)	21:55	22	21:13 (WEA 4)	21:18	20:13	19:03	16:59	16:23		
6	08:41	08:06	07:10	06:58	05:55	05:15	20:45 (WEA 4)	05:20	20:51 (WEA 4)	06:01	06:51	07:41	07:35	08:24				
	16:37	17:28	18:20	20:14	21:05	21:48	22	21:07 (WEA 4)	21:55	23	21:14 (WEA 4)	21:16	20:11	19:01	16:57	16:22		
7	08:40	08:05	07:08	06:56	05:54	05:15	20:44 (WEA 4)	05:21	20:51 (WEA 4)	06:02	06:53	07:42	07:37	08:26				
	16:38	17:30	18:22	20:16	21:07	21:49	23	21:07 (WEA 4)	21:54	23	21:14 (WEA 4)	21:14	20:09	18:59	16:55	16:22		
8	08:40	08:03	07:05	06:54	05:52	05:14	20:45 (WEA 4)	05:22	20:51 (WEA 4)	06:04	06:54	07:44	07:39	08:27				
	16:39	17:32	18:24	20:17	21:08	21:50	23	21:08 (WEA 4)	21:53	22	21:13 (WEA 4)	21:12	20:06	18:56	16:54	16:22		
9	08:39	08:01	07:03	06:52	05:50	05:14	20:46 (WEA 4)	05:23	20:51 (WEA 4)	06:05	06:56	07:46	07:41	08:28				
	16:41	17:34	18:25	20:19	21:10	21:51	22	21:08 (WEA 4)	21:53	23	21:14 (WEA 4)	21:10	20:04	18:54	16:52	16:21		
10	08:39	07:59	07:01	06:49	05:48	05:13	20:45 (WEA 4)	05:24	20:51 (WEA 4)	06:07	06:58	07:47	07:43	08:29				
	16:42	17:36	18:27	20:21	21:11	21:51	23	21:08 (WEA 4)	21:52	23	21:14 (WEA 4)	21:09	20:02	18:52	16:50	16:21		
11	08:38	07:57	06:58	06:47	05:47	05:13	20:46 (WEA 4)	05:25	20:51 (WEA 4)	06:09	06:59	07:49	07:44	08:30				
	16:43	17:38	18:29	20:22	21:13	21:52	22	21:08 (WEA 4)	21:51	23	21:14 (WEA 4)	21:07	19:59	18:50	16:49	16:21		
12	08:37	07:56	06:56	06:45	05:45	05:13	20:46 (WEA 4)	05:26	20:52 (WEA 4)	06:10	07:01	07:51	07:46	08:31				
	16:45	17:40	18:31	20:24	21:15	21:53	22	21:08 (WEA 4)	21:50	22	21:14 (WEA 4)	21:05	19:57	18:47	16:47	16:21		
13	08:37	07:54	06:54	06:43	05:43	05:12	20:46 (WEA 4)	05:27	20:52 (WEA 4)	06:12	07:03	07:53	07:48	08:32				
	16:46	17:41	18:32	20:26	21:16	21:53	22	21:08 (WEA 4)	21:49	22	21:14 (WEA 4)	21:03	19:55	18:45	16:46	16:21		
14	08:36	07:52	06:52	06:40	05:42	05:12	20:46 (WEA 4)	05:28	20:52 (WEA 4)	06:13	07:04	07:54	07:50	08:33				
	16:48	17:43	18:34	20:28	21:18	21:54	22	21:08 (WEA 4)	21:48	22	21:14 (WEA 4)	21:01	19:52	18:43	16:44	16:21		
15	08:35	07:50	06:49	06:38	05:40	05:12	20:47 (WEA 4)	05:29	20:53 (WEA 4)	06:15	07:06	07:56	07:51	08:34				
	16:49	17:45	18:36	20:29	21:19	21:55	21	21:08 (WEA 4)	21:47	21	21:14 (WEA 4)	20:59	19:50	18:41	16:43	16:21		
16	08:34	07:48	06:47	06:36	05:39	05:12	20:47 (WEA 4)	05:30	20:54 (WEA 4)	06:17	07:07	07:58	07:53	08:35				
	16:51	17:47	18:38	20:31	21:21	21:55	21	21:08 (WEA 4)	21:46	20	21:14 (WEA 4)	20:57	19:48	18:39	16:41	16:21		
17	08:33	07:46	06:45	06:34	05:37	05:12	20:47 (WEA 4)	05:32	20:54 (WEA 4)	06:18	07:09	08:00	07:55	08:36				
	16:53	17:49	18:39	20:33	21:22	21:56	22	21:09 (WEA 4)	21:45	19	21:13 (WEA 4)	20:55	19:45	18:36	16:40	16:21		
18	08:32	07:44	06:42	06:32	05:36	05:12	20:47 (WEA 4)	05:33	20:54 (WEA 4)	06:20	07:11	08:01	07:57	08:37				
	16:54	17:51	18:41	20:34	21:24	21:56	22	21:09 (WEA 4)	21:44	18	21:12 (WEA 4)	20:53	19:43	18:34	16:39	16:21		
19	08:31	07:42	06:40	06:29	05:34	05:12	20:48 (WEA 4)	05:34	20:55 (WEA 4)	06:22	07:12	08:03	07:58	08:37				
	16:56	17:53	18:43	20:36	21:25	21:56	21	21:09 (WEA 4)	21:43	16	21:11 (WEA 4)	20:51	19:41	18:32	16:37	16:22		
20	08:30	07:40	06:38	06:27	05:33	05:12	20:48 (WEA 4)	05:36	20:56 (WEA 4)	06:23	07:14	08:05	08:00	08:38				
	16:58	17:54	18:45	20:38	21:27	5	20:56 (WEA 4)	21:57	21	21:09 (WEA 4)	21:42	15	21:11 (WEA 4)	20:48	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	05:12	20:49 (WEA 4)	05:37	20:57 (WEA 4)	06:25	07:16	08:07	08:02	08:39				
	16:59	17:56	18:46	20:40	21:28	9	20:58 (WEA 4)	21:57	21	21:10 (WEA 4)	21:41	12	21:09 (WEA 4)	20:46	19:36	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30	05:12	20:49 (WEA 4)	05:38	20:58 (WEA 4)	06:27	07:17	08:08	08:03	08:39				
	17:01	17:58	18:48	20:41	21:30	11	20:58 (WEA 4)	21:57	21	21:10 (WEA 4)	21:39	10	21:08 (WEA 4)	20:44	19:33	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29	05:12	20:46 (WEA 4)	05:40	20:59 (WEA 4)	06:28	07:19	08:10	08:05	08:40				
	17:03	18:00	18:50	20:43	21:31	14	21:00 (WEA 4)	21:57	21	21:10 (WEA 4)	21:38	7	21:06 (WEA 4)	20:42	19:31	18:24	16:33	16:23
24	08:26	07:32	06:28	06:19	05:28	05:13	20:45 (WEA 4)	05:41	20:58 (WEA 4)	06:30	07:21	08:12	08:07	08:40				
	17:05	18:02	18:52	20:45	21:33	16	21:01 (WEA 4)	21:57	22	21:10 (WEA 4)	21:37	3	21:06 (WEA 4)	20:40	19:29	18:22	16:31	16:24
25	08:24	07:29	06:26	06:17	05:26	05:13	20:45 (WEA 4)	05:42	20:59 (WEA 4)	06:31	07:22	08:14	08:08	08:41				
	17:06	18:04	18:53	20:46	21:34	17	21:02 (WEA 4)	21:57	22	21:11 (WEA 4)	21:35	20:38	19:26	17:20	16:30	16:25		
26	08:23	07:27	06:24	06:15	05:25	05:13	20:45 (WEA 4)	05:44	20:59 (WEA 4)	06:33	07:24	08:16	08:10	08:41				
	17:08	18:05	18:55	20:48	21:35	18	21:03 (WEA 4)	21:57	22	21:11 (WEA 4)	21:34	20:36	19:24	17:18	16:29	16:25		
27	08:22	07:25	06:21	06:13	05:24	05:14	20:44 (WEA 4)	05:45	20:50 (WEA 4)	06:35	07:26	08:17	08:12	08:41				
	17:10	18:07	18:57	20:50	21:37	20	21:04 (WEA 4)	21:57	21	21:11 (WEA 4)	21:32	20:33	19:22	17:16	16:29	16:26		
28	08:20	07:23	06:19	06:11	05:23	05:14	20:44 (WEA 4)	05:47	20:49 (WEA 4)	06:36	07:27	08:19	08:13	08:41				
	17:12	18:09	18:58	20:51	21:38	21	21:05 (WEA 4)	21:57	22	21:11 (WEA 4)	21:31	20:31	19:19	17:14	16:28	16:27		
29	08:19	07:17	06:09	05:22	05:15	05:15	20:44 (WEA 4)	05:48	20:50 (WEA 4)	06:38	07:29	08:21	08:15	08:41				
	17:13	18:10	19:00	20:53	21:39	21	21:05 (WEA 4)	21:57	22	21:12 (WEA 4)	21:29	20:29	19:17	17:12	16:27	16:28		
30	08:18	07:15	06:07	05:21	05:15	05:15	20:43 (WEA 4)	05:50	20:50 (WEA 4)	06:40	07:31	08:23	08:16	08:42				
	17:15	18:12	19:02	20:55	21:40	22	21:05 (WEA 4)	21:57	22	21:12 (WEA 4)	21:28	20:27	19:15	17:10	16:26	16:29		
31	08:16	07:12	06:04	05:20	05:14	05:14	20:44 (WEA 4)	05:51	20:51 (WEA 4)	06:41	07:32	08:24	08:17	08:42				
	17:17	18:14	19:04	21:41	22	21:06 (WEA 4)	21:57	22	21:12 (WEA 4)	21:26	20:24	17:08	16:30	16:30				
Sonnenscheinstunden	258	277	367	416	486	500	658	503	455	454	381	331	266	243				
astr.max.mögl.Beschattung					196													

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) Schatteneende (WEA mit letztem Schatten)
	Sonnenuntergang (SS:MM)			

Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 49-NW - IP 49-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

- Die Sonne scheint täglich von Sonnenauf- bis -untergang
- Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung
- Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember				
1	08:42	08:15	07:21	07:10	06:05	05:19	20:47 (WEA 4)	05:16	20:53 (WEA 4)	05:53	06:43	07:32	07:26	08:18		
	16:31	17:19	18:11	20:05	20:57	21:43	22	21:09 (WEA 4)	21:57	22	21:15 (WEA 4)	21:25	20:22	19:12	17:06	16:25
2	08:42	08:13	07:19	07:08	06:03	05:18	20:47 (WEA 4)	05:17	20:53 (WEA 4)	05:54	06:45	07:34	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	21:44	22	21:09 (WEA 4)	21:56	23	21:16 (WEA 4)	21:23	20:20	19:10	17:04	16:25
3	08:41	08:11	07:16	07:05	06:01	05:18	20:48 (WEA 4)	05:18	20:53 (WEA 4)	05:56	06:46	07:36	07:30	08:20		
	16:33	17:23	18:15	20:09	21:00	21:45	22	21:10 (WEA 4)	21:56	22	21:15 (WEA 4)	21:21	20:18	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	05:17	20:47 (WEA 4)	05:18	20:53 (WEA 4)	05:57	06:48	07:37	07:32	08:22		
	16:34	17:25	18:16	20:10	21:02	21:46	23	21:10 (WEA 4)	21:56	23	21:16 (WEA 4)	21:20	20:15	19:06	17:00	16:23
5	08:41	08:08	07:12	07:01	05:57	05:16	20:47 (WEA 4)	05:19	20:53 (WEA 4)	05:59	06:49	07:39	07:34	08:23		
	16:35	17:26	18:18	20:12	21:03	21:47	23	21:10 (WEA 4)	21:55	23	21:16 (WEA 4)	21:18	20:13	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	05:15	20:48 (WEA 4)	05:20	20:54 (WEA 4)	06:01	06:51	07:41	07:35	08:24		
	16:37	17:28	18:20	20:14	21:05	21:48	22	21:17 (WEA 4)	21:55	23	21:17 (WEA 4)	21:16	20:11	19:01	16:57	16:22
7	08:40	08:05	07:08	06:56	05:54	05:15	20:47 (WEA 4)	05:21	20:54 (WEA 4)	06:02	06:53	07:42	07:37	08:26		
	16:38	17:30	18:22	20:16	21:07	21:49	23	21:17 (WEA 4)	21:54	23	21:17 (WEA 4)	21:14	20:09	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	05:52	05:14	20:48 (WEA 4)	05:22	20:54 (WEA 4)	06:04	06:54	07:44	07:39	08:27		
	16:39	17:32	18:24	20:17	21:08	21:50	23	21:11 (WEA 4)	21:53	22	21:16 (WEA 4)	21:12	20:06	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	05:50	05:14	20:48 (WEA 4)	05:23	20:54 (WEA 4)	06:05	06:56	07:46	07:41	08:28		
	16:41	17:34	18:25	20:19	21:10	21:51	23	21:11 (WEA 4)	21:53	22	21:16 (WEA 4)	21:10	20:04	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	05:48	05:13	20:48 (WEA 4)	05:24	20:54 (WEA 4)	06:07	06:58	07:47	07:43	08:29		
	16:42	17:36	18:27	20:21	21:11	21:51	23	21:11 (WEA 4)	21:52	22	21:16 (WEA 4)	21:09	20:02	18:52	16:50	16:21
11	08:38	07:57	06:58	06:47	05:47	05:13	20:48 (WEA 4)	05:25	20:55 (WEA 4)	06:09	06:59	07:49	07:44	08:30		
	16:43	17:38	18:29	20:22	21:13	21:52	23	21:11 (WEA 4)	21:51	21	21:16 (WEA 4)	21:07	19:59	18:50	16:49	16:21
12	08:37	07:56	06:56	06:45	05:45	05:13	20:49 (WEA 4)	05:26	20:55 (WEA 4)	06:10	07:01	07:51	07:46	08:31		
	16:45	17:40	18:31	20:24	21:15	21:53	23	21:12 (WEA 4)	21:50	21	21:16 (WEA 4)	21:05	19:57	18:47	16:47	16:21
13	08:37	07:54	06:54	06:43	05:43	05:12	20:48 (WEA 4)	05:27	20:55 (WEA 4)	06:12	07:03	07:53	07:48	08:32		
	16:46	17:41	18:32	20:26	21:16	21:53	23	21:11 (WEA 4)	21:49	21	21:16 (WEA 4)	21:03	19:55	18:45	16:46	16:21
14	08:36	07:52	06:52	06:40	05:42	05:12	20:49 (WEA 4)	05:28	20:56 (WEA 4)	06:13	07:04	07:54	07:50	08:33		
	16:48	17:43	18:34	20:28	21:18	21:54	22	21:11 (WEA 4)	21:48	20	21:16 (WEA 4)	21:01	19:52	18:43	16:44	16:21
15	08:35	07:50	06:49	06:38	05:40	05:12	20:49 (WEA 4)	05:29	20:57 (WEA 4)	06:15	07:06	07:56	07:51	08:34		
	16:50	17:45	18:36	20:29	21:19	21:55	23	21:12 (WEA 4)	21:47	19	21:16 (WEA 4)	20:59	19:50	18:41	16:43	16:21
16	08:34	07:48	06:47	06:36	05:39	05:12	20:49 (WEA 4)	05:30	20:58 (WEA 4)	06:17	07:07	07:58	07:53	08:35		
	16:51	17:47	18:38	20:31	21:21	21:55	23	21:12 (WEA 4)	21:46	17	21:15 (WEA 4)	20:57	19:48	18:39	16:41	16:21
17	08:33	07:46	06:45	06:34	05:37	05:12	20:50 (WEA 4)	05:32	20:58 (WEA 4)	06:18	07:09	08:00	07:55	08:36		
	16:53	17:49	18:39	20:33	21:22	21:56	22	21:12 (WEA 4)	21:45	15	21:13 (WEA 4)	20:55	19:45	18:36	16:40	16:21
18	08:32	07:44	06:42	06:32	05:36	05:12	20:50 (WEA 4)	05:33	20:59 (WEA 4)	06:20	07:11	08:01	07:57	08:37		
	16:54	17:51	18:41	20:34	21:24	21:56	22	21:12 (WEA 4)	21:44	13	21:12 (WEA 4)	20:53	19:43	18:34	16:39	16:21
19	08:31	07:42	06:40	06:29	05:34	05:12	20:50 (WEA 4)	05:34	21:00 (WEA 4)	06:22	07:12	08:03	07:58	08:37		
	16:56	17:53	18:43	20:36	21:25	21:56	22	21:12 (WEA 4)	21:43	11	21:11 (WEA 4)	20:51	19:41	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33	05:12	20:50 (WEA 4)	05:36	21:02 (WEA 4)	06:23	07:14	08:05	08:00	08:38		
	16:58	17:54	18:45	20:38	21:27	21:57	22	21:12 (WEA 4)	21:42	9	21:11 (WEA 4)	20:48	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	05:12	20:51 (WEA 4)	05:37	21:03 (WEA 4)	06:25	07:16	08:07	08:02	08:39		
	16:59	17:56	18:46	20:40	21:28	21:57	22	21:13 (WEA 4)	21:41	6	21:09 (WEA 4)	20:46	19:36	18:28	16:35	16:22
22	08:28	07:36	06:33	06:23	05:30	05:12	20:51 (WEA 4)	05:38	06:27	07:17	08:08	08:03	08:39			
	17:01	17:58	18:48	20:41	21:30	21:57	22	21:13 (WEA 4)	21:39	20:44	19:33	18:26	16:34	16:23		
23	08:27	07:34	06:31	06:21	05:29	05:12	20:52 (WEA 4)	05:40	06:28	07:19	08:10	08:05	08:40			
	17:03	18:00	18:50	20:43	21:31	21:57	22	21:13 (WEA 4)	21:38	20:42	19:31	18:24	16:33	16:23		
24	08:26	07:32	06:28	06:19	05:28	05:13	20:51 (WEA 4)	05:41	06:30	07:21	08:12	08:07	08:40			
	17:05	18:02	18:52	20:45	21:33	21:57	22	21:13 (WEA 4)	21:37	20:40	19:29	18:22	16:31	16:24		
25	08:24	07:29	06:26	06:17	05:26	05:13	20:50 (WEA 4)	05:42	06:31	07:22	08:14	08:08	08:41			
	17:06	18:04	18:53	20:46	21:34	21:57	22	21:14 (WEA 4)	21:35	20:38	19:26	17:20	16:30	16:25		
26	08:23	07:27	06:24	06:15	05:25	05:13	20:51 (WEA 4)	05:44	06:33	07:24	08:16	08:10	08:41			
	17:08	18:05	18:55	20:48	21:35	21:57	23	21:14 (WEA 4)	21:34	20:36	19:24	17:18	16:29	16:25		
27	08:22	07:25	06:21	06:13	05:24	05:14	20:48 (WEA 4)	05:45	06:35	07:26	08:17	08:12	08:41			
	17:10	18:07	18:57	20:50	21:37	21:57	23	21:15 (WEA 4)	21:32	20:33	19:22	17:16	16:29	16:26		
28	08:20	07:23	06:19	06:11	05:23	05:14	20:48 (WEA 4)	05:47	06:36	07:27	08:19	08:13	08:41			
	17:12	18:09	18:58	20:51	21:38	21:57	22	21:14 (WEA 4)	21:31	20:31	19:19	17:14	16:28	16:27		
29	08:19	07:17	06:09	05:22	05:15	05:15	20:52 (WEA 4)	05:48	06:38	07:29	08:21	08:15	08:41			
	17:13	18:10	19:00	20:53	21:39	21:57	23	21:15 (WEA 4)	21:29	20:29	19:17	17:12	16:27	16:28		
30	08:18	07:15	06:07	05:21	05:15	05:15	20:52 (WEA 4)	05:50	06:40	07:31	08:23	08:16	08:42			
	17:15	18:12	19:02	20:55	21:40	21:57	23	21:15 (WEA 4)	21:28	20:27	19:15	17:10	16:26	16:29		
31	08:16	07:12	06:03	05:20	05:14	05:14	20:48 (WEA 4)	05:51	06:41	07:32	08:24	08:17	08:42			
	17:17	18:14	19:04	21:41	21:26	21:26	21:09 (WEA 4)	05:51	06:41	07:32	08:24	08:17	08:42			
Sonnenscheinstunden	258	277	367	416	486	500	500	503	454	381	331	266	243			
astr.max.mögl.Beschattung					144	675		398								

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) Schatteneende (WEA mit letztem Schatten)
	Sonnenuntergang (SS:MM)			



Projekt:

WP Luentener Mark

Lizenzierter Anwender:

WWK Partnerschaft für Umweltplanung

Molkenstraße 5

DE-48231 Warendorf

02581 93 660

Reiner Winterkamp / r.winterkamp@wwk-umweltplanung.de

Berechnet:

07.12.2023 10:04/4.0.424

SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 4 Schattenrezeptor: IP 50-NW - IP 50-NW
Annahmen für Schattenwurfberechnung

Die dargestellten Zeiten sind die astronomisch maximal mögliche Beschattungsdauer, berechnet unter folgenden Annahmen:

Die Sonne scheint täglich von Sonnenauf- bis -untergang

Die Rotorfläche steht immer senkrecht zur Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	08:15	07:21	07:10	06:05	05:19	20:56 (WEA 4)	05:16	20:59 (WEA 4)	05:53	06:43	07:32	07:26	08:18
	16:31	17:19	18:11	20:05	20:57	21:43	14 21:10 (WEA 4)	21:57	22 21:21 (WEA 4)	21:25	20:22	19:12	17:06	16:25
2	08:42	08:13	07:19	07:08	06:03	05:18	20:56 (WEA 4)	05:17	21:00 (WEA 4)	05:54	06:45	07:34	07:28	08:19
	16:32	17:21	18:13	20:07	20:58	21:44	15 21:11 (WEA 4)	21:56	22 21:22 (WEA 4)	21:23	20:20	19:10	17:04	16:25
3	08:41	08:11	07:16	07:05	06:01	05:18	20:56 (WEA 4)	05:18	21:00 (WEA 4)	05:56	06:46	07:36	07:30	08:20
	16:33	17:23	18:15	20:09	21:00	21:45	17 21:13 (WEA 4)	21:56	21 21:21 (WEA 4)	21:21	20:18	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	05:17	20:55 (WEA 4)	05:18	21:00 (WEA 4)	05:57	06:48	07:37	07:32	08:22
	16:34	17:25	18:16	20:10	21:02	21:46	18 21:13 (WEA 4)	21:56	21 21:21 (WEA 4)	21:20	20:15	19:06	17:00	16:23
5	08:41	08:08	07:12	07:01	05:57	05:16	20:55 (WEA 4)	05:19	21:01 (WEA 4)	05:59	06:49	07:39	07:34	08:23
	16:35	17:26	18:18	20:12	21:03	21:47	19 21:14 (WEA 4)	21:55	21 21:22 (WEA 4)	21:18	20:13	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	05:15	20:55 (WEA 4)	05:20	21:01 (WEA 4)	06:01	06:51	07:41	07:35	08:24
	16:37	17:28	18:20	20:14	21:05	21:48	20 21:15 (WEA 4)	21:55	21 21:22 (WEA 4)	21:16	20:11	19:01	16:57	16:22
7	08:40	08:05	07:08	06:56	05:54	05:15	20:55 (WEA 4)	05:21	21:02 (WEA 4)	06:02	06:53	07:42	07:37	08:26
	16:38	17:30	18:22	20:16	21:07	21:49	20 21:15 (WEA 4)	05:21	19 21:21 (WEA 4)	21:14	20:09	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	05:52	05:14	20:55 (WEA 4)	05:22	21:02 (WEA 4)	06:04	06:54	07:44	07:39	08:27
	16:39	17:32	18:24	20:17	21:08	21:50	21 21:16 (WEA 4)	21:53	18 21:20 (WEA 4)	21:12	20:06	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	05:50	05:14	20:56 (WEA 4)	05:23	21:02 (WEA 4)	06:05	06:56	07:46	07:41	08:28
	16:41	17:34	18:25	20:19	21:10	21:51	21 21:17 (WEA 4)	21:53	17 21:19 (WEA 4)	21:10	20:04	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	05:48	05:13	20:55 (WEA 4)	05:24	21:03 (WEA 4)	06:07	06:58	07:47	07:43	08:29
	16:42	17:36	18:27	20:21	21:11	21:51	22 21:17 (WEA 4)	21:52	16 21:19 (WEA 4)	21:09	20:02	18:52	16:50	16:21
11	08:38	07:57	06:58	06:47	05:47	05:13	20:55 (WEA 4)	05:25	21:04 (WEA 4)	06:09	06:59	07:49	07:44	08:30
	16:43	17:38	18:29	20:22	21:13	21:52	22 21:17 (WEA 4)	21:51	14 21:18 (WEA 4)	21:07	19:59	18:50	16:49	16:21
12	08:37	07:56	06:56	06:45	05:45	05:13	20:56 (WEA 4)	05:26	21:04 (WEA 4)	06:10	07:01	07:51	07:46	08:31
	16:45	17:40	18:31	20:24	21:15	21:53	22 21:18 (WEA 4)	21:50	13 21:17 (WEA 4)	21:05	19:57	18:47	16:47	16:21
13	08:37	07:54	06:54	06:43	05:43	05:12	20:55 (WEA 4)	05:27	21:05 (WEA 4)	06:12	07:03	07:53	07:48	08:32
	16:46	17:41	18:32	20:26	21:16	21:53	22 21:17 (WEA 4)	21:49	11 21:16 (WEA 4)	21:03	19:55	18:45	16:46	16:21
14	08:36	07:52	06:52	06:40	05:42	05:12	20:55 (WEA 4)	05:28	21:06 (WEA 4)	06:13	07:04	07:54	07:50	08:33
	16:48	17:43	18:34	20:28	21:18	21:54	23 21:18 (WEA 4)	21:48	10 21:16 (WEA 4)	21:01	19:52	18:43	16:44	16:21
15	08:35	07:50	06:49	06:38	05:40	05:12	20:55 (WEA 4)	05:29	21:08 (WEA 4)	06:15	07:06	07:56	07:51	08:34
	16:50	17:45	18:36	20:29	21:19	21:55	23 21:18 (WEA 4)	21:47	8 21:16 (WEA 4)	20:59	19:50	18:41	16:43	16:21
16	08:34	07:48	06:47	06:36	05:39	05:12	20:56 (WEA 4)	05:30	21:10 (WEA 4)	06:17	07:07	07:58	07:53	08:35
	16:51	17:47	18:38	20:31	21:21	21:55	22 21:18 (WEA 4)	21:46	5 21:15 (WEA 4)	20:57	19:48	18:39	16:41	16:21
17	08:33	07:46	06:45	06:34	05:37	05:12	20:56 (WEA 4)	05:32	06:18	07:09	08:00	07:55	08:36	
	16:53	17:49	18:39	20:33	21:22	21:56	23 21:19 (WEA 4)	21:45	20:55	19:45	18:36	16:40	16:21	
18	08:32	07:44	06:42	06:32	05:36	05:12	20:56 (WEA 4)	05:33	06:20	07:11	08:01	07:57	08:37	
	16:54	17:51	18:41	20:34	21:24	21:56	23 21:19 (WEA 4)	21:44	20:53	19:43	18:34	16:39	16:21	
19	08:31	07:42	06:40	06:29	05:34	05:12	20:56 (WEA 4)	05:34	06:22	07:12	08:03	07:58	08:37	
	16:56	17:53	18:43	20:36	21:25	21:56	23 21:19 (WEA 4)	21:43	20:51	19:41	18:32	16:37	16:22	
20	08:30	07:40	06:38	06:27	05:33	05:12	20:56 (WEA 4)	05:36	06:23	07:14	08:05	08:00	08:38	
	16:58	17:54	18:45	20:38	21:27	21:57	23 21:19 (WEA 4)	21:42	20:48	19:38	18:30	16:36	16:22	
21	08:29	07:38	06:35	06:25	05:31	05:12	20:57 (WEA 4)	05:37	06:25	07:16	08:07	08:02	08:39	
	16:59	17:56	18:46	20:40	21:28	21:57	23 21:20 (WEA 4)	21:41	20:46	19:36	18:28	16:35	16:23	
22	08:28	07:36	06:33	06:23	05:30	05:12	20:57 (WEA 4)	05:38	06:27	07:17	08:08	08:03	08:39	
	17:01	17:58	18:48	20:41	21:30	21:57	23 21:20 (WEA 4)	21:39	20:44	19:33	18:26	16:34	16:23	
23	08:27	07:34	06:31	06:21	05:29	05:12	20:57 (WEA 4)	05:40	06:28	07:19	08:10	08:05	08:40	
	17:03	18:00	18:50	20:43	21:31	21:57	23 21:20 (WEA 4)	21:38	20:42	19:31	18:24	16:33	16:23	
24	08:26	07:32	06:28	06:19	05:28	05:13	20:58 (WEA 4)	05:41	06:30	07:21	08:12	08:07	08:40	
	17:05	18:02	18:52	20:45	21:33	21:57	23 21:21 (WEA 4)	21:37	20:40	19:29	18:22	16:31	16:24	
25	08:24	07:29	06:26	06:17	05:26	05:13	20:58 (WEA 4)	05:42	06:31	07:22	07:14	08:08	08:41	
	17:06	18:04	18:53	20:46	21:34	21:57	23 21:21 (WEA 4)	21:35	20:38	19:26	17:20	16:30	16:25	
26	08:23	07:27	06:24	06:15	05:25	05:13	20:58 (WEA 4)	05:44	06:33	07:24	07:16	08:10	08:41	
	17:08	18:05	18:55	20:48	21:35	21:57	22 21:20 (WEA 4)	21:34	20:36	19:24	17:18	16:29	16:25	
27	08:22	07:25	06:21	06:13	05:24	05:14	20:59 (WEA 4)	05:45	06:35	07:26	07:17	08:12	08:41	
	17:10	18:07	18:57	20:50	21:37	21:57	22 21:21 (WEA 4)	21:32	20:33	19:22	17:16	16:29	16:26	
28	08:20	07:23	06:19	06:11	05:23	05:14	20:58 (WEA 4)	05:47	06:36	07:27	07:19	08:13	08:41	
	17:12	18:09	18:58	20:51	21:38	6 21:06 (WEA 4)	21:57	21:31	20:31	19:19	17:14	16:28	16:27	
29	08:19	07:17	06:09	05:22	20:58 (WEA 4)	05:15	20:59 (WEA 4)	05:48	06:38	07:29	07:21	08:15	08:41	
	17:13	18:10	19:00	20:53	21:39	9 21:07 (WEA 4)	21:57	21:29	20:29	19:17	17:12	16:27	16:28	
30	08:18	07:15	06:07	05:21	20:57 (WEA 4)	05:15	20:59 (WEA 4)	05:50	06:40	07:31	07:23	08:16	08:42	
	17:15	18:12	19:02	20:55	21:40	11 21:08 (WEA 4)	21:57	21:28	20:27	19:15	17:10	16:26	16:29	
31	08:16	07:12	06:03	05:20	20:57 (WEA 4)	05:15	21:21 (WEA 4)	05:51	06:41	07:32	07:25	08:18	08:42	
	17:17	18:14	19:04	21:41	12 21:09 (WEA 4)	05:16	21:26	05:51	20:24	19:16	17:08	16:30	16:30	
Sonnenscheinstunden	258	277	367	416	486	500	503	503	454	381	331	266	243	
astr.max.mögl.Beschattung					38	639		259						

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

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