



Weil • Winterkamp • Knopp  
Landschaftsarchitektin • Geographen  
Partnerschaft für Umweltplanung

**Prognose des Schattenschlagwurfs  
von vier Windenergieanlagen  
Nordex N163/6.X TCS164  
in Ahaus (Lüntener Mark)  
Anhang 3: Schattenschlagkalender WEA 3**

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	09:24 (WEA 3)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:27	08:18	09:09 (WEA 3)
2	16:31	09:51 (WEA 3)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	09:38 (WEA 3)
3	08:42	09:25 (WEA 3)	08:12	07:17	07:05	06:01	05:18	05:18	05:56	06:46	07:36	07:30	08:21	09:10 (WEA 3)
4	16:33	09:52 (WEA 3)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	09:39 (WEA 3)
5	08:41	09:26 (WEA 3)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	09:11 (WEA 3)
6	16:34	09:53 (WEA 3)	17:25	18:17	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:24	09:40 (WEA 3)
7	08:41	09:26 (WEA 3)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	09:11 (WEA 3)
8	16:36	09:53 (WEA 3)	17:27	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	09:40 (WEA 3)
9	08:40	09:26 (WEA 3)	08:07	07:10	06:59	05:55	05:16	05:20	06:01	06:51	07:41	07:36	08:25	09:12 (WEA 3)
10	16:37	09:54 (WEA 3)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:23	09:41 (WEA 3)
11	08:40	09:26 (WEA 3)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:43	07:37	08:26	09:13 (WEA 3)
12	16:38	09:55 (WEA 3)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	09:41 (WEA 3)
13	08:40	09:26 (WEA 3)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:55	07:44	07:39	08:27	09:13 (WEA 3)
14	16:39	09:55 (WEA 3)	17:32	18:24	20:17	21:08	21:50	21:54	21:13	20:06	18:57	16:54	16:22	09:41 (WEA 3)
15	08:39	09:27 (WEA 3)	08:01	07:03	06:52	05:50	05:14	05:23	06:06	06:56	07:46	07:41	08:28	09:13 (WEA 3)
16	16:41	09:56 (WEA 3)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:22	09:41 (WEA 3)
17	08:39	09:27 (WEA 3)	08:00	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:30	09:15 (WEA 3)
18	16:42	09:56 (WEA 3)	17:36	18:27	20:21	21:12	21:52	21:52	21:09	20:02	18:52	16:50	16:21	09:42 (WEA 3)
19	08:38	09:27 (WEA 3)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:45	08:31	09:15 (WEA 3)
20	16:44	09:56 (WEA 3)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	09:42 (WEA 3)
21	08:38	09:28 (WEA 3)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	09:16 (WEA 3)
22	16:45	09:56 (WEA 3)	17:40	18:31	20:24	21:15	21:53	21:51	21:05	19:57	18:48	16:47	16:21	09:42 (WEA 3)
23	08:37	09:29 (WEA 3)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	09:16 (WEA 3)
24	16:47	09:58 (WEA 3)	17:42	18:33	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	09:42 (WEA 3)
25	08:36	09:29 (WEA 3)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:55	07:50	08:34	09:17 (WEA 3)
26	16:48	09:58 (WEA 3)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	09:43 (WEA 3)
27	08:35	09:30 (WEA 3)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	8	09:16 (WEA 3)
28	16:50	09:58 (WEA 3)	17:45	18:36	20:29	21:20	21:55	21:48	20:59	19:50	18:41	16:43	8	09:24 (WEA 3)
29	08:35	09:30 (WEA 3)	07:48	06:47	06:36	05:39	05:12	05:31	06:17	07:08	07:58	07:53	8	09:13 (WEA 3)
30	16:51	09:58 (WEA 3)	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	14	09:27 (WEA 3)
31	08:34	09:30 (WEA 3)	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	14	09:12 (WEA 3)
32	16:53	09:58 (WEA 3)	17:49	18:40	20:33	21:23	21:56	21:46	20:55	19:45	18:37	16:40	17	09:29 (WEA 3)
33	08:33	09:31 (WEA 3)	07:44	06:43	06:32	05:36	05:12	05:33	06:20	07:11	08:02	07:57	17	09:11 (WEA 3)
34	16:54	09:58 (WEA 3)	17:51	18:41	20:35	21:24	21:56	21:45	20:53	19:43	18:34	16:39	19	09:30 (WEA 3)
35	08:32	09:32 (WEA 3)	07:42	06:40	06:30	05:34	05:12	05:34	06:22	07:12	08:03	07:59	19	09:09 (WEA 3)
36	16:56	09:58 (WEA 3)	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	22	09:31 (WEA 3)
37	08:31	09:33 (WEA 3)	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	22	09:09 (WEA 3)
38	16:58	09:58 (WEA 3)	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	23	09:32 (WEA 3)
39	08:30	09:34 (WEA 3)	07:38	06:36	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	23	09:09 (WEA 3)
40	16:59	09:58 (WEA 3)	17:56	18:46	20:40	21:29	21:57	21:41	20:47	19:36	18:28	16:35	24	09:33 (WEA 3)
41	08:28	09:34 (WEA 3)	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:09	08:04	24	09:09 (WEA 3)
42	17:01	09:57 (WEA 3)	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	25	09:34 (WEA 3)
43	08:27	09:35 (WEA 3)	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	25	09:34 (WEA 3)
44	17:03	09:57 (WEA 3)	18:00	18:50	20:43	21:31	21:58	21:38	20:42	19:31	18:24	16:33	26	09:35 (WEA 3)
45	08:26	09:37 (WEA 3)	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	26	09:09 (WEA 3)
46	17:05	09:56 (WEA 3)	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:32	27	09:36 (WEA 3)
47	08:25	09:38 (WEA 3)	07:30	06:26	06:17	05:26	05:13	05:43	06:32	07:22	07:14	08:09	27	09:08 (WEA 3)
48	17:06	09:55 (WEA 3)	18:04	18:53	20:47	21:34	21:58	21:36	20:38	19:27	17:20	16:31	28	09:36 (WEA 3)
49	08:23	09:40 (WEA 3)	07:28	06:24	06:15	05:25	05:13	05:44	06:33	07:24	07:16	08:10	28	09:08 (WEA 3)
50	17:08	09:54 (WEA 3)	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	17:18	16:30	28	09:36 (WEA 3)
51	08:22	09:43 (WEA 3)	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	07:18	08:12	29	09:09 (WEA 3)
52	17:10	8	09:51 (WEA 3)	18:07	18:57	20:50	21:37	21:58	21:33	20:34	19:22	17:16	28	09:37 (WEA 3)
53	08:21		07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	07:19	08:13	29	09:08 (WEA 3)
54	17:12		18:09	18:59	20:52	21:38	21:58	21:31	20:31	19:20	17:14	16:28	29	09:37 (WEA 3)
55	08:19		07:17	06:09	05:22	05:15	05:48	06:38	07:29	07:21	08:15	08:09	29	09:09 (WEA 3)
56	17:14			20:00	20:53	21:39	21:57	21:30	20:29	19:17	17:12	16:27	29	09:38 (WEA 3)
57	08:18			07:15	06:07	05:21	05:16	05:50	06:40	07:31	07:23	08:16	29	09:10 (WEA 3)
58	17:15			20:02	20:55	21:41	21:57	21:28	20:27	19:15	17:10	16:26	29	09:39 (WEA 3)
59	08:16			07:12		05:20		05:51	06:41		07:25			08:42
60	17:17			20:04		21:42		21:26	20:25		17:08			16:30
61	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243	820
62	astr.max.mögl.Beschattung	683										376		

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 3 Schattenrezeptor: IP 01-SO - IP 01-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	09:23 (WEA 3)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:27	08:18	09:08 (WEA 3)
2	16:31	09:49 (WEA 3)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	09:37 (WEA 3)
3	08:42	09:23 (WEA 3)	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34	07:28	08:19	09:09 (WEA 3)
4	16:32	09:50 (WEA 3)	17:21	18:13	20:07	20:58	21:44	21:57	21:23	20:20	19:10	17:04	16:25	09:38 (WEA 3)
5	08:42	09:24 (WEA 3)	08:12	07:17	07:05	06:01	05:18	05:18	05:56	06:46	07:36	07:30	08:21	09:09 (WEA 3)
6	16:33	09:51 (WEA 3)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	09:37 (WEA 3)
7	08:41	09:25 (WEA 3)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	09:10 (WEA 3)
8	16:34	09:52 (WEA 3)	17:25	18:17	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:24	09:38 (WEA 3)
9	08:41	09:24 (WEA 3)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	09:10 (WEA 3)
10	16:36	09:52 (WEA 3)	17:27	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	09:38 (WEA 3)
11	08:41	09:25 (WEA 3)	08:07	07:10	06:59	05:55	05:16	05:20	06:01	06:51	07:41	07:36	08:25	09:11 (WEA 3)
12	16:37	09:53 (WEA 3)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:23	09:39 (WEA 3)
13	08:40	09:25 (WEA 3)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:43	07:37	08:26	09:11 (WEA 3)
14	16:38	09:53 (WEA 3)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	09:39 (WEA 3)
15	08:40	09:25 (WEA 3)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:55	07:44	07:39	08:27	09:12 (WEA 3)
16	16:39	09:53 (WEA 3)	17:32	18:24	20:17	21:08	21:50	21:54	21:13	20:06	18:57	16:54	16:22	09:39 (WEA 3)
17	08:39	09:26 (WEA 3)	08:01	07:03	06:52	05:50	05:14	05:23	06:06	06:56	07:46	07:41	08:28	09:12 (WEA 3)
18	16:41	09:54 (WEA 3)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:22	09:39 (WEA 3)
19	08:39	09:26 (WEA 3)	08:00	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:30	09:13 (WEA 3)
20	16:42	09:55 (WEA 3)	17:36	18:27	20:21	21:12	21:52	21:52	21:09	20:02	18:52	16:50	16:21	09:40 (WEA 3)
21	08:38	09:26 (WEA 3)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:45	08:31	09:14 (WEA 3)
22	16:44	09:55 (WEA 3)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	09:40 (WEA 3)
23	08:38	09:26 (WEA 3)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	09:14 (WEA 3)
24	16:45	09:55 (WEA 3)	17:40	18:31	20:24	21:15	21:53	21:51	21:05	19:57	18:48	16:47	16:21	09:40 (WEA 3)
25	08:37	09:27 (WEA 3)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	09:15 (WEA 3)
26	16:47	09:56 (WEA 3)	17:42	18:33	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	09:40 (WEA 3)
27	08:36	09:28 (WEA 3)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:55	07:50	8	09:14 (WEA 3)
28	16:48	09:57 (WEA 3)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	09:41 (WEA 3)
29	08:35	09:28 (WEA 3)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	9	09:11 (WEA 3)
30	16:50	09:57 (WEA 3)	17:45	18:36	20:29	21:20	21:55	21:48	20:59	19:50	18:41	16:43	14	09:25 (WEA 3)
31	08:35	09:28 (WEA 3)	07:48	06:47	06:36	05:39	05:12	05:31	06:17	07:08	07:58	07:53	15	09:10 (WEA 3)
32	16:51	09:57 (WEA 3)	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	17	09:27 (WEA 3)
33	08:34	09:28 (WEA 3)	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	18	09:09 (WEA 3)
34	16:53	09:57 (WEA 3)	17:49	18:40	20:33	21:23	21:56	21:46	20:55	19:45	18:37	16:40	19	09:29 (WEA 3)
35	08:33	09:29 (WEA 3)	07:44	06:43	06:32	05:36	05:12	05:33	06:20	07:11	08:02	07:57	20	09:28 (WEA 3)
36	16:54	09:57 (WEA 3)	17:51	18:41	20:35	21:24	21:56	21:45	20:53	19:43	18:34	16:39	21	09:30 (WEA 3)
37	08:32	09:29 (WEA 3)	07:42	06:40	06:30	05:34	05:12	05:34	06:22	07:12	08:03	07:59	22	09:07 (WEA 3)
38	16:56	09:57 (WEA 3)	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	23	09:30 (WEA 3)
39	08:31	09:30 (WEA 3)	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	24	09:07 (WEA 3)
40	16:58	09:57 (WEA 3)	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	25	09:31 (WEA 3)
41	08:30	09:31 (WEA 3)	07:38	06:36	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	26	09:06 (WEA 3)
42	16:59	09:57 (WEA 3)	17:56	18:46	20:40	21:29	21:57	21:41	20:47	19:36	18:28	16:35	27	09:32 (WEA 3)
43	08:28	09:32 (WEA 3)	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:09	08:04	28	09:06 (WEA 3)
44	17:01	09:56 (WEA 3)	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	29	09:33 (WEA 3)
45	08:27	09:33 (WEA 3)	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	30	09:07 (WEA 3)
46	17:03	09:56 (WEA 3)	18:00	18:50	20:43	21:31	21:58	21:38	20:42	19:31	18:24	16:33	31	09:34 (WEA 3)
47	08:26	09:34 (WEA 3)	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	32	09:07 (WEA 3)
48	17:05	09:56 (WEA 3)	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:32	33	09:35 (WEA 3)
49	08:25	09:35 (WEA 3)	07:30	06:26	06:17	05:26	05:13	05:43	06:32	07:22	08:14	08:09	34	09:06 (WEA 3)
50	17:06	09:55 (WEA 3)	18:04	18:53	20:47	21:34	21:58	21:36	20:38	19:27	18:20	16:31	35	09:35 (WEA 3)
51	08:23	09:37 (WEA 3)	07:28	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	36	09:06 (WEA 3)
52	17:08	09:54 (WEA 3)	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:16	16:30	37	09:35 (WEA 3)
53	08:22	09:39 (WEA 3)	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:18	08:12	38	09:07 (WEA 3)
54	17:10	09:52 (WEA 3)	18:07	18:57	20:50	21:37	21:58	21:33	20:34	19:22	18:16	16:29	39	09:36 (WEA 3)
55	08:21	09:42 (WEA 3)	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	40	09:07 (WEA 3)
56	17:12	09:50 (WEA 3)	18:09	18:59	20:52	21:38	21:58	21:31	20:31	19:20	18:14	16:28	41	09:36 (WEA 3)
57	08:19			07:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	08:15	42	09:07 (WEA 3)
58	17:14			20:00	20:53	21:39	21:57	21:30	20:29	19:17	18:12	16:27	43	09:37 (WEA 3)
59	08:18			07:15	06:07	05:21	05:16	05:50	06:40	07:31	08:23	08:16	44	09:08 (WEA 3)
60	17:15			20:02	20:55	21:41	21:57	21:28	20:27	19:15	18:10	16:26	45	09:37 (WEA 3)
61	08:16			07:12		05:20		05:51	06:41		07:25		46	09:08 (WEA 3)
62	17:17			20:04		21:42		21:26	20:25		17:08		47	09:37 (WEA 3)
63	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	411	243
64	astr.max.mögl.Beschattung	715											794	

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	---------------------------	----------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 16:31	09:56 (WEA 3) 17:19	08:15 18:11	07:21 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	08:18 16:25	
2	08:42 16:32	09:57 (WEA 3) 17:21	08:13 18:13	07:19 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	08:19 16:25	
3	08:42 16:33	09:58 (WEA 3) 17:23	08:12 18:15	07:17 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	08:21 16:24	
4	08:41 16:34	09:59 (WEA 3) 17:25	08:10 18:16	07:14 20:11	06:03 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	08:22 16:24	
5	08:41 16:36	09:59 (WEA 3) 17:27	08:08 18:18	07:12 20:12	06:04 21:03	05:16 21:47	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03	07:34 16:59	08:23 16:23	
6	08:41 16:37	10:01 (WEA 3) 17:28	08:07 18:20	07:10 20:14	06:59 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	08:25 16:23	
7	08:40 16:38	10:02 (WEA 3) 17:30	08:05 18:22	07:08 20:16	06:56 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	08:26 16:22	
8	08:40 16:39	10:02 (WEA 3) 17:32	08:03 18:24	07:05 20:17	06:54 21:08	05:14 21:50	05:22 21:54	06:04 21:13	06:54 20:06	07:44 18:57	07:39 16:54	08:27 16:22	
9	08:39 16:41	10:04 (WEA 3) 17:34	08:01 18:25	07:03 20:19	06:52 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	08:28 16:22	
10	08:39 16:42	10:06 (WEA 3) 17:36	08:00 18:27	07:01 20:21	06:49 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	08:30 16:21	
11	08:38 16:44	10:08 (WEA 3) 17:38	07:58 18:29	06:59 20:23	06:47 21:13	05:13 21:52	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:45 16:49	08:31 16:21	
12	08:38 16:45	10:10 (WEA 3) 17:40	07:56 18:30	06:56 20:24	06:45 21:15	05:13 21:53	05:26 21:51	06:10 21:05	07:01 19:57	07:51 18:48	07:46 16:47	08:32 16:21	
13	08:37 16:46	10:11 (WEA 3) 17:42	07:54 18:33	06:54 20:26	06:43 21:16	05:12 21:54	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	08:33 16:21	
14	08:36 16:48	10:12 (WEA 3) 17:43	07:52 18:34	06:52 20:28	06:40 21:18	05:12 21:54	05:28 21:49	06:14 21:01	07:04 19:52	07:55 18:43	07:50 16:44	08:34 16:21	
15	08:35 16:50	10:13 (WEA 3) 17:45	07:50 18:36	06:49 20:29	06:38 21:20	05:11 21:55	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	08:35 16:21	
16	08:35 16:51	10:14 (WEA 3) 17:47	07:48 18:38	06:47 20:31	06:36 21:21	05:11 21:55	05:31 21:47	06:17 20:57	07:08 19:48	07:58 18:39	07:53 16:41	08:35 16:21	
17	08:34 16:53	10:15 (WEA 3) 17:49	07:46 18:40	06:45 20:33	06:34 21:23	05:11 21:56	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:37	07:55 16:40	08:36 16:21	
18	08:33 16:54	10:16 (WEA 3) 17:51	07:44 18:41	06:43 20:35	06:32 21:24	05:11 21:56	05:33 21:45	06:20 20:53	07:11 19:43	08:02 18:34	07:57 16:39	08:37 16:22	
19	08:32 16:56	10:17 (WEA 3) 17:53	07:42 18:43	06:40 20:36	06:30 21:26	05:11 21:57	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	08:38 16:22	
20	08:31 16:58	10:18 (WEA 3) 17:55	07:40 18:45	06:38 20:38	06:27 21:27	05:11 21:57	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	08:30 16:59	10:19 (WEA 3) 17:56	07:38 18:46	06:36 20:40	06:25 21:29	05:11 21:57	05:37 21:41	06:25 20:47	07:16 19:36	08:07 18:28	08:02 16:35	08:39 16:23	
22	08:28 17:01	10:20 (WEA 3) 17:57	07:36 18:48	06:33 20:41	06:23 21:30	05:11 21:57	05:38 21:40	06:27 20:44	07:17 19:34	08:09 18:26	08:04 16:34	08:39 16:23	
23	08:27 17:03	10:21 (WEA 3) 17:58	07:34 18:50	06:31 20:43	06:21 21:31	05:11 21:58	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	08:40 16:24	
24	08:26 17:05	10:22 (WEA 3) 18:00	07:32 18:50	06:29 20:44	06:19 21:31	05:11 21:58	05:41 21:38	06:30 20:42	07:21 19:29	08:12 18:22	08:07 16:32	08:40 16:24	
25	08:25 17:06	10:23 (WEA 3) 18:01	07:30 18:52	06:26 20:45	06:17 21:33	05:11 21:58	05:43 21:37	06:32 20:40	07:22 19:29	08:14 18:22	08:09 16:32	08:41 16:24	
26	08:23 17:08	10:24 (WEA 3) 18:02	07:28 18:53	06:24 20:47	06:15 21:34	05:11 21:58	05:44 21:36	06:33 20:38	07:24 19:27	08:16 18:20	08:10 16:31	08:41 16:25	
27	08:22 17:10	10:25 (WEA 3) 18:03	07:25 18:55	06:22 20:48	06:13 21:35	05:11 21:58	05:45 21:34	06:35 20:36	07:26 19:24	08:18 18:18	08:12 16:30	08:42 16:25	
28	08:21 17:12	10:26 (WEA 3) 18:04	07:23 18:57	06:21 20:50	06:11 21:37	05:11 21:58	05:47 21:33	06:36 20:34	07:27 19:22	08:19 18:16	08:13 16:29	08:42 16:26	
29	08:19 17:14	10:27 (WEA 3) 18:05	07:21 18:59	06:19 20:52	06:09 21:38	05:11 21:58	05:48 21:31	06:38 20:31	07:29 19:20	08:21 18:14	08:15 16:28	08:42 16:27	
30	08:18 17:15	10:28 (WEA 3) 18:06	07:19 19:00	06:17 20:53	06:07 21:39	05:11 21:57	05:50 21:30	06:40 20:29	07:31 19:17	08:23 18:12	08:16 16:27	08:42 16:28	
31	08:16 17:17	10:29 (WEA 3) 18:07	07:17 19:02	06:15 20:55	06:07 21:41	05:11 21:57	05:51 21:28	06:41 20:27	07:32 19:15	08:24 18:10	08:16 16:26	08:42 16:29	
	Sonnenscheinstunden astr.max.mögl.Beschattung	258 191	277 200	367 204	416 212	486 214	500 216	503 205	454 202	381 178	331 170	266 163	243 160

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 3 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	09:56 (WEA 3)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:27	08:18	09:49 (WEA 3)	
2	16:31	10:21 (WEA 3)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	12	10:01 (WEA 3)
3	08:42	09:57 (WEA 3)	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34	07:28	08:19	09:49 (WEA 3)	
4	16:32	10:21 (WEA 3)	17:21	18:13	20:07	20:58	21:44	21:57	21:23	20:20	19:10	17:04	16:25	14	10:03 (WEA 3)
5	08:42	09:58 (WEA 3)	08:12	07:17	07:05	06:01	05:18	05:18	05:56	06:46	07:36	07:30	08:21	09:48 (WEA 3)	
6	16:33	10:22 (WEA 3)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	16	10:04 (WEA 3)
7	08:41	10:00 (WEA 3)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	09:48 (WEA 3)	
8	16:34	10:22 (WEA 3)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:24	18	10:06 (WEA 3)
9	08:41	10:00 (WEA 3)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	09:47 (WEA 3)	
10	16:36	10:22 (WEA 3)	17:27	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:21	19	10:06 (WEA 3)
11	08:41	10:01 (WEA 3)	08:07	07:10	06:59	05:55	05:16	05:20	06:01	06:51	07:41	07:36	08:25	09:47 (WEA 3)	
12	16:37	10:21 (WEA 3)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:23	21	10:08 (WEA 3)
13	08:40	10:02 (WEA 3)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:43	07:37	08:26	09:47 (WEA 3)	
14	16:38	10:21 (WEA 3)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	22	10:09 (WEA 3)
15	08:40	10:03 (WEA 3)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27	09:47 (WEA 3)	
16	16:39	10:21 (WEA 3)	17:32	18:24	20:17	21:08	21:50	21:54	21:13	20:06	18:57	16:54	16:22	22	10:09 (WEA 3)
17	08:39	10:04 (WEA 3)	08:01	07:03	06:52	05:50	05:14	05:23	06:06	06:56	07:46	07:41	08:28	09:47 (WEA 3)	
18	16:41	10:21 (WEA 3)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:22	23	10:10 (WEA 3)
19	08:39	10:06 (WEA 3)	08:00	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:30	09:47 (WEA 3)	
20	16:42	10:20 (WEA 3)	17:36	18:27	20:21	21:12	21:52	21:52	21:09	20:02	18:52	16:50	16:21	24	10:11 (WEA 3)
21	08:38	10:07 (WEA 3)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:45	08:31	09:48 (WEA 3)	
22	16:44	10:19 (WEA 3)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	24	10:12 (WEA 3)
23	08:38	10:09 (WEA 3)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	09:48 (WEA 3)	
24	16:45	10:17 (WEA 3)	17:40	18:31	20:24	21:15	21:53	21:51	21:05	19:57	18:48	16:47	16:21	24	10:12 (WEA 3)
25	08:37	07:54	06:54	06:43	05:43	05:12	05:27	05:27	06:12	07:03	07:53	07:48	08:33	09:48 (WEA 3)	
26	16:46	17:42	18:33	20:26	21:16	21:54	21:50	21:50	21:03	19:55	18:45	16:46	16:21	25	10:13 (WEA 3)
27	08:36	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:55	07:50	07:50	08:34	09:48 (WEA 3)	
28	16:48	17:43	18:34	20:28	21:18	21:54	21:49	21:49	21:01	19:52	18:43	16:44	16:21	26	10:14 (WEA 3)
29	08:35	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	07:52	08:35	09:49 (WEA 3)	
30	16:50	17:45	18:36	20:29	21:20	21:55	21:48	20:59	19:50	18:41	16:43	16:43	16:21	25	10:14 (WEA 3)
31	08:35	07:48	06:47	06:36	05:39	05:12	05:31	06:17	07:08	07:58	07:53	07:53	08:35	09:48 (WEA 3)	
32	16:51	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:41	16:21	26	10:14 (WEA 3)
33	08:34	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	07:55	08:36	09:49 (WEA 3)	
34	16:53	17:49	18:40	20:33	21:23	21:56	21:46	20:55	19:45	18:37	16:40	16:40	16:21	26	10:15 (WEA 3)
35	08:33	07:44	06:43	06:32	05:36	05:12	05:33	06:20	07:11	08:02	07:57	07:57	08:37	09:49 (WEA 3)	
36	16:54	17:51	18:41	20:35	21:24	21:56	21:45	20:53	19:43	18:34	16:39	16:39	16:22	27	10:16 (WEA 3)
37	08:32	07:42	06:40	06:30	05:34	05:12	05:34	06:22	07:12	08:03	07:59	07:59	08:38	09:50 (WEA 3)	
38	16:56	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	16:37	16:22	27	10:17 (WEA 3)
39	08:31	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	08:00	08:38	09:50 (WEA 3)	
40	16:58	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	16:36	16:22	26	10:16 (WEA 3)
41	08:30	07:38	06:36	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	08:02	08:39	09:51 (WEA 3)	
42	16:59	17:56	18:46	20:40	21:29	21:57	21:41	20:47	19:36	18:28	16:35	16:35	16:23	26	10:17 (WEA 3)
43	08:28	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:09	08:04	08:04	08:39	09:51 (WEA 3)	
44	17:01	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	16:34	16:23	26	10:17 (WEA 3)
45	08:27	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	08:05	08:40	09:52 (WEA 3)	
46	17:03	18:00	18:50	20:43	21:31	21:58	21:38	20:42	19:31	18:24	16:33	16:33	16:24	26	10:18 (WEA 3)
47	08:26	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	08:07	08:40	09:52 (WEA 3)	
48	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:32	16:32	16:24	27	10:19 (WEA 3)
49	08:25	07:30	06:26	06:17	05:26	05:13	05:43	06:32	07:22	08:14	08:09	08:09	08:41	09:52 (WEA 3)	
50	17:06	18:04	18:53	20:47	21:34	21:58	21:36	20:38	19:27	18:20	16:31	16:31	16:25	27	10:19 (WEA 3)
51	08:23	07:28	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	08:10	08:41	09:54 (WEA 3)	
52	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:16	16:30	16:30	16:25	26	10:20 (WEA 3)
53	08:22	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:18	08:12	08:12	08:41	09:54 (WEA 3)	
54	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:34	19:22	18:14	16:29	16:29	16:26	26	10:20 (WEA 3)
55	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	08:13	08:42	09:54 (WEA 3)	
56	17:12	18:09	18:59	20:52	21:38	21:58	21:31	20:31	19:20	18:14	16:28	16:28	16:27	26	10:20 (WEA 3)
57	08:19	07:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	09:13	08:15	08:15	08:42	09:55 (WEA 3)	
58	17:14	18:11	19:01	20:53	21:39	21:57	21:30	20:29	19:17	18:12	16:27	16:27	16:28	26	10:21 (WEA 3)
59	08:18	07:15	06:07	05:21	05:16	05:50	06:40	07:31	08:23	09:16	08:16	08:16	08:42	09:56 (WEA 3)	
60	17:15	18:12	19:02	20:55	21:41	21:57	21:28	20:27	19:15	18:10	16:26	16:26	16:29	25	10:21 (WEA 3)
61	08:16	07:12	06:04	05:20	05:20	05:51	06:41	07:32	08:24	09:17	08:17	08:17	08:42	09:56 (WEA 3)	
62	17:17	18:14	19:04	20:04	21:42	21:57	21:26	20:25	19:13	18:08	16:24	16:24	16:30	25	10:21 (WEA 3)
63	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243	733	
64	astr.max.mögl.Beschattung	226										7			

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 Schattenrezeptor: IP 04-S - IP 04-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	Juli	August	September	Oktober	November	Dezember		
1	08:42	14:26 (WEA 3)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:26	08:18	14:18 (WEA 3)
2	16:31	31 14:57 (WEA 3)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	21 14:39 (WEA 3)
3	08:42	14:27 (WEA 3)	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34	07:28	08:19	14:18 (WEA 3)
4	16:32	30 14:57 (WEA 3)	17:21	18:13	20:07	20:58	21:44	21:57	21:23	20:20	19:10	17:04	16:25	22 14:40 (WEA 3)
5	08:42	14:28 (WEA 3)	08:11	07:17	07:05	06:01	05:18	05:17	05:56	06:46	07:36	07:30	08:21	14:17 (WEA 3)
6	16:33	30 14:58 (WEA 3)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	24 14:41 (WEA 3)
7	08:41	14:28 (WEA 3)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	14:17 (WEA 3)
8	16:34	29 14:57 (WEA 3)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:23	25 14:42 (WEA 3)
9	08:41	14:30 (WEA 3)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	14:17 (WEA 3)
10	16:35	28 14:58 (WEA 3)	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	26 14:43 (WEA 3)
11	08:41	14:30 (WEA 3)	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41	07:36	08:25	14:16 (WEA 3)
12	16:37	27 14:57 (WEA 3)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:22	28 14:44 (WEA 3)
13	08:40	14:32 (WEA 3)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42	07:37	08:26	14:17 (WEA 3)
14	16:38	26 14:58 (WEA 3)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	28 14:45 (WEA 3)
15	08:40	14:32 (WEA 3)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27	14:17 (WEA 3)
16	16:39	25 14:57 (WEA 3)	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	18:56	16:54	16:22	29 14:46 (WEA 3)
17	08:39	14:34 (WEA 3)	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46	07:41	08:28	14:16 (WEA 3)
18	16:41	24 14:58 (WEA 3)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:21	30 14:46 (WEA 3)
19	08:39	14:35 (WEA 3)	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:29	14:16 (WEA 3)
20	16:42	22 14:57 (WEA 3)	17:36	18:27	20:21	21:12	21:51	21:52	21:09	20:02	18:52	16:50	16:29	31 14:47 (WEA 3)
21	08:38	14:36 (WEA 3)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:45	08:31	14:17 (WEA 3)
22	16:43	21 14:57 (WEA 3)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	31 14:48 (WEA 3)
23	08:38	14:37 (WEA 3)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	14:18 (WEA 3)
24	16:45	19 14:56 (WEA 3)	17:40	18:31	20:24	21:15	21:53	21:50	21:05	19:57	18:47	16:47	16:21	31 14:49 (WEA 3)
25	08:37	14:39 (WEA 3)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	14:18 (WEA 3)
26	16:46	16 14:55 (WEA 3)	17:41	18:32	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	31 14:49 (WEA 3)
27	08:36	14:41 (WEA 3)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:54	07:50	08:34	14:18 (WEA 3)
28	16:48	12 14:53 (WEA 3)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	32 14:50 (WEA 3)
29	08:35	14:46 (WEA 3)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	08:34	14:19 (WEA 3)
30	16:50	5 14:51 (WEA 3)	17:45	18:36	20:29	21:19	21:55	21:48	20:59	19:50	18:41	16:43	16:21	32 14:51 (WEA 3)
31	08:34	14:39 (WEA 3)	07:48	06:47	06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53	08:35	14:18 (WEA 3)
32	16:51	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:21	32 14:50 (WEA 3)	
33	08:34	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	07:55	08:36	14:19 (WEA 3)
34	16:53	17:49	18:39	20:33	21:23	21:56	21:46	20:55	19:45	18:36	16:40	16:21	32 14:51 (WEA 3)	
35	08:33	07:44	06:42	06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57	07:57	08:37	14:19 (WEA 3)
36	16:54	17:51	18:41	20:35	21:24	21:56	21:44	20:53	19:43	18:34	16:39	16:21	33 14:52 (WEA 3)	
37	08:32	07:42	06:40	06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:59	07:59	08:38	14:20 (WEA 3)
38	16:56	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	16:22	33 14:53 (WEA 3)	
39	08:31	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	08:00	08:38	14:20 (WEA 3)
40	16:58	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	16:22	33 14:53 (WEA 3)	
41	08:29	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	08:02	08:39	14:21 (WEA 3)
42	16:59	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36	18:28	16:35	16:22	33 14:54 (WEA 3)	
43	08:28	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:08	08:04	08:04	08:39	14:21 (WEA 3)
44	17:01	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	16:23	32 14:53 (WEA 3)	
45	08:27	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	08:05	08:40	14:22 (WEA 3)
46	17:03	18:00	18:50	20:43	21:31	21:58	21:38	20:42	19:31	18:24	16:33	16:23	33 14:55 (WEA 3)	
47	08:26	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	08:07	08:40	14:22 (WEA 3)
48	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:31	16:24	33 14:55 (WEA 3)	
49	08:25	07:30	06:26	06:17	05:26	05:13	05:42	06:31	07:22	08:14	08:09	08:09	08:41	14:22 (WEA 3)
50	17:06	18:04	18:53	20:46	21:34	21:58	21:36	20:38	19:27	18:20	16:30	16:25	33 14:55 (WEA 3)	
51	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	08:10	08:41	14:22 (WEA 3)
52	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:16	16:29	16:25	33 14:55 (WEA 3)	
53	08:22	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:17	08:12	08:12	08:41	14:24 (WEA 3)
54	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:34	19:22	18:16	16:29	16:26	32 14:56 (WEA 3)	
55	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	08:13	08:41	14:24 (WEA 3)
56	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:14	16:28	16:27	32 14:56 (WEA 3)	
57	08:19	07:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	09:15	10:08	10:02	08:42	14:25 (WEA 3)
58	17:14	18:11	19:00	20:53	21:39	21:57	21:30	20:29	19:17	18:12	17:06	16:27	32 14:57 (WEA 3)	
59	08:18	07:15	06:07	05:21	05:15	05:50	06:40	07:31	08:23	09:16	10:09	10:03	08:42	14:26 (WEA 3)
60	17:15	18:12	19:01	20:54	21:40	21:57	21:28	20:27	19:15	18:10	17:04	16:27	31 14:57 (WEA 3)	
61	08:16	07:12	06:04	05:20	05:14	05:49	06:41	07:32	08:24	09:17	10:10	10:04	08:42	14:26 (WEA 3)
62	17:17	18:14	19:03	20:56	21:42	21:59	21:26	20:25	19:13	18:08	17:02	16:28	31 14:57 (WEA 3)	
63	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243	939
64	astr.max.mögl.Beschattung	345												

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 Schattenrezeptor: IP 04-W - IP 04-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	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42	14:25 (WEA 3)	08:15	07:21	07:10	06:05	05:19	05:16	05:53	06:43	07:32	07:26	08:18	14:17 (WEA 3)
2	16:31	30 14:55 (WEA 3)	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:13	17:06	16:25	19 14:36 (WEA 3)
3	08:42	14:26 (WEA 3)	08:13	07:19	07:08	06:03	05:18	05:17	05:54	06:45	07:34	07:28	08:19	14:17 (WEA 3)
4	16:32	29 14:55 (WEA 3)	17:21	18:13	20:07	20:58	21:44	21:57	21:23	20:20	19:10	17:04	16:25	21 14:38 (WEA 3)
5	08:42	14:27 (WEA 3)	08:11	07:17	07:05	06:01	05:18	05:17	05:56	06:46	07:36	07:30	08:21	14:16 (WEA 3)
6	16:33	29 14:56 (WEA 3)	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24	22 14:38 (WEA 3)
7	08:41	14:27 (WEA 3)	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22	14:16 (WEA 3)
8	16:34	28 14:55 (WEA 3)	17:25	18:16	20:11	21:02	21:46	21:56	21:20	20:16	19:06	17:01	16:23	24 14:40 (WEA 3)
9	08:41	14:29 (WEA 3)	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:50	07:39	07:34	08:23	14:16 (WEA 3)
10	16:35	27 14:56 (WEA 3)	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	16:59	16:23	25 14:41 (WEA 3)
11	08:41	14:29 (WEA 3)	08:06	07:10	06:58	05:55	05:15	05:20	06:01	06:51	07:41	07:36	08:25	14:15 (WEA 3)
12	16:37	26 14:55 (WEA 3)	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	16:57	16:22	26 14:41 (WEA 3)
13	08:40	14:31 (WEA 3)	08:05	07:08	06:56	05:54	05:15	05:21	06:02	06:53	07:42	07:37	08:26	14:16 (WEA 3)
14	16:38	25 14:56 (WEA 3)	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	16:55	16:22	27 14:43 (WEA 3)
15	08:40	14:31 (WEA 3)	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27	14:15 (WEA 3)
16	16:39	24 14:55 (WEA 3)	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	18:56	16:54	16:22	28 14:43 (WEA 3)
17	08:39	14:33 (WEA 3)	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46	07:41	08:28	14:15 (WEA 3)
18	16:41	22 14:55 (WEA 3)	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	18:54	16:52	16:21	29 14:44 (WEA 3)
19	08:39	14:34 (WEA 3)	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	07:43	08:29	14:15 (WEA 3)
20	16:42	21 14:53 (WEA 3)	17:36	18:27	20:21	21:12	21:51	21:52	21:09	20:02	18:52	16:50	16:21	29 14:44 (WEA 3)
21	08:38	14:35 (WEA 3)	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:45	08:31	14:16 (WEA 3)
22	16:43	19 14:54 (WEA 3)	17:38	18:29	20:23	21:13	21:52	21:51	21:07	19:59	18:50	16:49	16:21	30 14:46 (WEA 3)
23	08:38	14:37 (WEA 3)	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:32	14:16 (WEA 3)
24	16:45	16 14:53 (WEA 3)	17:40	18:31	20:24	21:15	21:53	21:50	21:05	19:57	18:47	16:47	16:21	31 14:47 (WEA 3)
25	08:37	14:39 (WEA 3)	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:33	14:17 (WEA 3)
26	16:46	12 14:51 (WEA 3)	17:41	18:32	20:26	21:16	21:54	21:50	21:03	19:55	18:45	16:46	16:21	30 14:47 (WEA 3)
27	08:36	14:42 (WEA 3)	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:54	07:50	08:34	14:17 (WEA 3)
28	16:48	7 14:49 (WEA 3)	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	18:43	16:44	16:21	31 14:48 (WEA 3)
29	08:35	14:35 (WEA 3)	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	08:34	14:17 (WEA 3)
30	16:50	17:45	18:36	20:29	21:19	21:55	21:48	20:59	19:50	18:41	16:43	16:43	16:21	31 14:48 (WEA 3)
31	08:34	07:48	06:47	06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53	07:48	08:35	14:17 (WEA 3)
32	16:51	17:47	18:38	20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41	16:41	16:21	31 14:48 (WEA 3)
33	08:34	07:46	06:45	06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55	07:48	08:36	14:17 (WEA 3)
34	16:53	17:49	18:39	20:33	21:23	21:56	21:46	20:55	19:45	18:36	16:40	16:40	16:21	32 14:49 (WEA 3)
35	08:33	07:44	06:42	06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57	07:48	08:37	14:18 (WEA 3)
36	16:54	17:51	18:41	20:35	21:24	21:56	21:44	20:53	19:43	18:34	16:39	16:39	16:21	32 14:50 (WEA 3)
37	08:32	07:42	06:40	06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:59	07:48	08:38	14:19 (WEA 3)
38	16:56	17:53	18:43	20:36	21:26	21:57	21:43	20:51	19:41	18:32	16:37	16:37	16:22	32 14:51 (WEA 3)
39	08:31	07:40	06:38	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	07:48	08:38	14:18 (WEA 3)
40	16:58	17:55	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	16:36	16:36	16:22	32 14:50 (WEA 3)
41	08:29	07:38	06:35	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	07:48	08:39	14:19 (WEA 3)
42	16:59	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36	18:28	16:35	16:35	16:22	32 14:51 (WEA 3)
43	08:28	07:36	06:33	06:23	05:30	05:12	05:38	06:27	07:17	08:08	08:04	07:48	08:39	14:19 (WEA 3)
44	17:01	17:58	18:48	20:41	21:30	21:57	21:40	20:44	19:34	18:26	16:34	16:34	16:23	32 14:51 (WEA 3)
45	08:27	07:34	06:31	06:21	05:29	05:12	05:40	06:28	07:19	08:10	08:05	07:48	08:40	14:20 (WEA 3)
46	17:03	18:00	18:50	20:43	21:31	21:58	21:38	20:42	19:31	18:24	16:33	16:33	16:23	32 14:52 (WEA 3)
47	08:26	07:32	06:29	06:19	05:28	05:13	05:41	06:30	07:21	08:12	08:07	07:48	08:40	14:21 (WEA 3)
48	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:31	16:31	16:24	32 14:53 (WEA 3)
49	08:25	07:30	06:26	06:17	05:26	05:13	05:42	06:31	07:22	08:14	08:09	07:48	08:41	14:21 (WEA 3)
50	17:06	18:04	18:53	20:46	21:34	21:58	21:36	20:38	19:27	18:20	16:30	16:30	16:25	32 14:53 (WEA 3)
51	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	07:48	08:41	14:21 (WEA 3)
52	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:18	16:29	16:29	16:25	32 14:53 (WEA 3)
53	08:22	07:25	06:22	06:13	05:24	05:14	05:45	06:35	07:26	08:17	08:12	07:48	08:41	14:23 (WEA 3)
54	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:34	19:22	18:16	16:29	16:29	16:26	31 14:54 (WEA 3)
55	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	14:22 (WEA 3)	08:41	14:23 (WEA 3)
56	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:14	16:28	16:28	16:27	31 14:54 (WEA 3)
57	08:19	07:17	06:09	05:22	05:15	05:48	06:38	07:29	08:21	09:15	14:20 (WEA 3)	14:20 (WEA 3)	08:42	14:24 (WEA 3)
58	17:14	18:11	19:00	20:53	21:39	21:57	21:30	20:29	19:17	18:12	16:27	16:27	16:28	31 14:55 (WEA 3)
59	08:18	07:15	06:07	05:21	05:15	05:50	06:40	07:31	08:23	09:16	14:19 (WEA 3)	14:19 (WEA 3)	08:42	14:24 (WEA 3)
60	17:15	18:12	19:01	20:52	21:40	21:57	21:28	20:27	19:15	18:10	16:26	16:26	16:29	31 14:55 (WEA 3)
61	08:16	07:12	06:04	05:20	05:20	05:51	06:41	07:32	08:24	09:17	14:18 (WEA 3)	14:18 (WEA 3)	08:42	14:25 (WEA 3)
62	17:17	18:14	19:03	20:54	21:42	21:59	21:26	20:25	19:13	18:08	16:25	16:25	16:30	30 14:55 (WEA 3)
63	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243	908
64	astr.max.mögl.Beschattung	315												

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	---------------------------	----------------------------



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinstrahlrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni
1	08:42 16:31	14:44 (WEA 3) 15:24 (WEA 3)	08:15 17:19	15:07 (WEA 3) 18:11	07:10 20:05	06:05 20:57
2	08:42 16:32	14:45 (WEA 3) 15:25 (WEA 3)	08:13 17:21	15:10 (WEA 3) 18:13	07:08 20:07	06:03 20:58
3	08:42 16:33	14:45 (WEA 3) 15:26 (WEA 3)	08:11 17:23	15:20 (WEA 3) 18:15	07:05 20:09	06:01 21:00
4	08:41 16:34	14:45 (WEA 3) 15:26 (WEA 3)	08:10 17:25	15:20 (WEA 3) 18:16	07:03 20:11	05:59 21:02
5	08:41 16:35	14:46 (WEA 3) 15:27 (WEA 3)	08:08 17:26	15:20 (WEA 3) 18:18	07:01 20:12	05:57 21:03
6	08:41 16:37	14:45 (WEA 3) 15:27 (WEA 3)	08:06 17:28	15:20 (WEA 3) 18:20	06:58 20:14	05:55 21:05
7	08:40 16:38	14:46 (WEA 3) 15:28 (WEA 3)	08:05 17:30	15:20 (WEA 3) 18:22	06:56 20:16	05:54 21:07
8	08:40 16:39	14:46 (WEA 3) 15:28 (WEA 3)	08:03 17:32	15:20 (WEA 3) 18:24	06:54 20:17	05:52 21:08
9	08:39 16:41	14:47 (WEA 3) 15:29 (WEA 3)	08:01 17:34	15:20 (WEA 3) 18:25	06:52 20:19	05:50 21:10
10	08:39 16:42	14:47 (WEA 3) 15:29 (WEA 3)	07:59 17:36	15:20 (WEA 3) 18:27	06:49 20:21	05:48 21:12
11	08:38 16:43	14:47 (WEA 3) 15:29 (WEA 3)	07:58 17:38	15:20 (WEA 3) 18:29	06:47 20:23	05:47 21:13
12	08:38 16:45	14:48 (WEA 3) 15:30 (WEA 3)	07:56 17:40	15:20 (WEA 3) 18:31	06:45 20:24	05:45 21:15
13	08:37 16:46	14:48 (WEA 3) 15:30 (WEA 3)	07:54 17:41	15:20 (WEA 3) 18:32	06:43 20:26	05:43 21:16
14	08:36 16:48	14:48 (WEA 3) 15:30 (WEA 3)	07:52 17:43	15:20 (WEA 3) 18:34	06:40 20:28	05:42 21:18
15	08:35 16:50	14:49 (WEA 3) 15:31 (WEA 3)	07:50 17:45	15:20 (WEA 3) 18:36	06:38 20:29	05:40 21:19
16	08:34 16:51	14:49 (WEA 3) 15:31 (WEA 3)	07:48 17:47	15:20 (WEA 3) 18:38	06:36 20:31	05:39 21:21
17	08:34 16:53	14:50 (WEA 3) 15:31 (WEA 3)	07:46 17:49	15:20 (WEA 3) 18:39	06:34 20:33	05:37 21:23
18	08:33 16:54	14:50 (WEA 3) 15:31 (WEA 3)	07:44 17:51	15:20 (WEA 3) 18:41	06:32 20:35	05:36 21:24
19	08:32 16:56	14:51 (WEA 3) 15:32 (WEA 3)	07:42 17:53	15:20 (WEA 3) 18:43	06:29 20:36	05:34 21:26
20	08:31 16:58	14:52 (WEA 3) 15:32 (WEA 3)	07:40 17:55	15:20 (WEA 3) 18:45	06:27 20:38	05:33 21:27
21	08:29 16:59	14:53 (WEA 3) 15:32 (WEA 3)	07:38 17:56	15:20 (WEA 3) 18:46	06:25 20:40	05:31 21:28
22	08:28 17:01	14:53 (WEA 3) 15:32 (WEA 3)	07:36 17:58	15:20 (WEA 3) 18:48	06:23 20:41	05:30 21:30
23	08:27 17:03	14:54 (WEA 3) 15:32 (WEA 3)	07:34 18:00	15:20 (WEA 3) 18:50	06:21 20:43	05:29 21:31
24	08:26 17:05	14:54 (WEA 3) 15:31 (WEA 3)	07:32 18:02	15:20 (WEA 3) 18:52	06:19 20:45	05:28 21:33
25	08:25 17:06	14:56 (WEA 3) 15:31 (WEA 3)	07:30 18:04	15:20 (WEA 3) 18:53	06:17 20:46	05:26 21:34
26	08:23 17:08	14:57 (WEA 3) 15:31 (WEA 3)	07:27 18:06	15:20 (WEA 3) 18:55	06:15 20:48	05:25 21:35
27	08:22 17:10	14:58 (WEA 3) 15:30 (WEA 3)	07:25 18:07	15:20 (WEA 3) 18:57	06:13 20:50	05:24 21:37
28	08:21 17:12	14:59 (WEA 3) 15:30 (WEA 3)	07:23 18:09	15:20 (WEA 3) 18:58	06:11 20:52	05:23 21:38
29	08:19 17:14	15:01 (WEA 3) 15:28 (WEA 3)		15:20 (WEA 3) 18:59	06:09 20:53	05:22 21:39
30	08:18 17:15	15:02 (WEA 3) 15:27 (WEA 3)		15:20 (WEA 3) 19:00	06:07 20:55	05:21 21:40
31	08:16 17:17	15:04 (WEA 3) 15:26 (WEA 3)		15:20 (WEA 3) 20:04	06:05 20:57	05:20 21:42
Sonnenscheinstunden	258					
astr.max.mögl.Beschattung	1187	277	27	367	416	500

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

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



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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 42 14:30 (WEA 3) 15:12 (WEA 3)
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 42 14:30 (WEA 3) 15:12 (WEA 3)
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 42 14:30 (WEA 3) 15:12 (WEA 3)
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 42 14:31 (WEA 3) 15:13 (WEA 3)
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 42 14:31 (WEA 3) 15:13 (WEA 3)
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 41 14:32 (WEA 3) 15:13 (WEA 3)
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 41 14:33 (WEA 3) 15:14 (WEA 3)
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 41 14:33 (WEA 3) 15:14 (WEA 3)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52	10	14:41 (WEA 3) 14:51 (WEA 3) 16:21 41 15:14 (WEA 3)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	18	14:37 (WEA 3) 14:55 (WEA 3) 16:21 40 14:34 (WEA 3) 15:14 (WEA 3)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	22	14:35 (WEA 3) 14:57 (WEA 3) 16:21 40 14:35 (WEA 3) 15:15 (WEA 3)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	25	14:34 (WEA 3) 14:59 (WEA 3) 16:21 40 14:35 (WEA 3) 15:15 (WEA 3)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	28	14:32 (WEA 3) 15:00 (WEA 3) 16:21 40 14:36 (WEA 3) 15:16 (WEA 3)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	31	14:31 (WEA 3) 15:02 (WEA 3) 16:21 39 14:37 (WEA 3) 15:16 (WEA 3)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	32	14:31 (WEA 3) 15:03 (WEA 3) 16:21 40 14:37 (WEA 3) 15:17 (WEA 3)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	34	14:30 (WEA 3) 15:04 (WEA 3) 16:21 39 14:37 (WEA 3) 15:16 (WEA 3)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	35	14:30 (WEA 3) 15:05 (WEA 3) 16:21 39 14:38 (WEA 3) 15:17 (WEA 3)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	37	14:28 (WEA 3) 15:05 (WEA 3) 16:21 39 14:38 (WEA 3) 15:17 (WEA 3)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	38	14:28 (WEA 3) 15:06 (WEA 3) 16:22 39 14:39 (WEA 3) 15:18 (WEA 3)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	39	14:28 (WEA 3) 15:07 (WEA 3) 16:22 39 14:39 (WEA 3) 15:18 (WEA 3)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	39	14:28 (WEA 3) 15:07 (WEA 3) 16:22 39 14:40 (WEA 3) 15:19 (WEA 3)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	40	14:28 (WEA 3) 15:08 (WEA 3) 16:23 39 14:40 (WEA 3) 15:19 (WEA 3)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	41	14:28 (WEA 3) 15:09 (WEA 3) 16:23 39 14:41 (WEA 3) 15:20 (WEA 3)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	42	14:27 (WEA 3) 15:09 (WEA 3) 16:24 39 14:41 (WEA 3) 15:20 (WEA 3)
25	05:42 21:35	06:31 20:38	07:22 19:27	08:14 17:20	08:09 16:30	41	14:28 (WEA 3) 15:09 (WEA 3) 16:25 39 14:41 (WEA 3) 15:20 (WEA 3)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18	08:10 16:29	42	14:28 (WEA 3) 15:10 (WEA 3) 16:25 39 14:42 (WEA 3) 15:21 (WEA 3)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16	08:12 16:29	42	14:29 (WEA 3) 15:11 (WEA 3) 16:26 39 14:43 (WEA 3) 15:22 (WEA 3)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14	08:13 16:28	42	14:28 (WEA 3) 15:10 (WEA 3) 16:27 39 14:43 (WEA 3) 15:22 (WEA 3)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12	08:15 16:27	42	14:29 (WEA 3) 15:11 (WEA 3) 16:28 40 14:43 (WEA 3) 15:23 (WEA 3)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	08:16 16:26	42	14:30 (WEA 3) 15:12 (WEA 3) 16:29 40 14:44 (WEA 3) 15:24 (WEA 3)
31	05:51 21:26	06:41 20:25		08:25 17:08			08:42 16:30 40 14:44 (WEA 3) 15:24 (WEA 3)
Sonnenscheinstunden	503	454	381	331	266		243
astr.max.mögl.Beschattung					762		1240

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinstrahlrichtung  
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni		
1	08:42 16:31	14:41 (WEA 3) 15:22 (WEA 3)	08:15 17:19	15:06 (WEA 3) 15:19 (WEA 3)	07:21 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	14:41 (WEA 3) 15:23 (WEA 3)	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	14:42 (WEA 3) 15:23 (WEA 3)	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	14:42 (WEA 3) 15:23 (WEA 3)	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	14:43 (WEA 3) 15:24 (WEA 3)	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	14:42 (WEA 3) 15:24 (WEA 3)	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	14:43 (WEA 3) 15:25 (WEA 3)	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	14:43 (WEA 3) 15:25 (WEA 3)	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	14:44 (WEA 3) 15:27 (WEA 3)	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	14:44 (WEA 3) 15:27 (WEA 3)	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	14:45 (WEA 3) 15:27 (WEA 3)	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	14:45 (WEA 3) 15:27 (WEA 3)	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	14:45 (WEA 3) 15:27 (WEA 3)	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	14:45 (WEA 3) 15:28 (WEA 3)	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	14:46 (WEA 3) 15:28 (WEA 3)	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	14:46 (WEA 3) 15:28 (WEA 3)	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	14:47 (WEA 3) 15:28 (WEA 3)	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	14:48 (WEA 3) 15:29 (WEA 3)	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	14:49 (WEA 3) 15:29 (WEA 3)	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	14:49 (WEA 3) 15:29 (WEA 3)	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	14:50 (WEA 3) 15:29 (WEA 3)	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	14:50 (WEA 3) 15:29 (WEA 3)	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	14:52 (WEA 3) 15:29 (WEA 3)	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	14:52 (WEA 3) 15:28 (WEA 3)	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	14:53 (WEA 3) 15:28 (WEA 3)	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	14:55 (WEA 3) 15:28 (WEA 3)	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	14:56 (WEA 3) 15:27 (WEA 3)	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	14:58 (WEA 3) 15:26 (WEA 3)	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	14:59 (WEA 3) 15:25 (WEA 3)	07:21 18:09	06:17 19:00	06:09 20:53	05:22 21:39	05:15 21:57	05:15 21:57
30	08:18 17:15	15:00 (WEA 3) 15:23 (WEA 3)	07:20 18:09	06:15 19:01	06:07 20:55	05:21 21:40	05:15 21:57	05:15 21:57
31	08:16 17:17	15:03 (WEA 3) 15:22 (WEA 3)	07:19 18:09	06:14 19:02	06:06 20:56	05:20 21:41	05:15 21:57	05:15 21:57
Sonnenscheinstunden	258	277	367	416	486	500		
astr.max.mögl.Beschattung	1179	13						

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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 42 14:27 (WEA 3) 15:09 (WEA 3)
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 43 14:27 (WEA 3) 15:10 (WEA 3)
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 43 14:27 (WEA 3) 15:10 (WEA 3)
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 42 14:28 (WEA 3) 15:10 (WEA 3)
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 42 14:28 (WEA 3) 15:10 (WEA 3)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	07:36 16:57		08:25 16:22 42 14:28 (WEA 3) 15:10 (WEA 3)
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 41 14:30 (WEA 3) 15:11 (WEA 3)
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 41 14:30 (WEA 3) 15:11 (WEA 3)
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 41 14:30 (WEA 3) 15:11 (WEA 3)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	13 14:37 (WEA 3)	08:29 14:50 (WEA 3) 16:21 42 14:30 (WEA 3) 15:12 (WEA 3)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	19 14:34 (WEA 3)	08:31 14:53 (WEA 3) 16:21 41 14:32 (WEA 3) 15:13 (WEA 3)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	23 14:32 (WEA 3)	08:32 14:55 (WEA 3) 16:21 41 14:32 (WEA 3) 15:13 (WEA 3)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	26 14:31 (WEA 3)	08:33 14:57 (WEA 3) 16:21 40 14:33 (WEA 3) 15:13 (WEA 3)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	29 14:29 (WEA 3)	08:34 14:58 (WEA 3) 16:21 41 14:33 (WEA 3) 15:14 (WEA 3)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	31 14:29 (WEA 3)	08:34 15:00 (WEA 3) 16:21 40 14:34 (WEA 3) 15:14 (WEA 3)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	33 14:28 (WEA 3)	08:35 15:01 (WEA 3) 16:21 40 14:34 (WEA 3) 15:14 (WEA 3)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	35 14:27 (WEA 3)	08:36 15:02 (WEA 3) 16:21 40 14:34 (WEA 3) 15:14 (WEA 3)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	36 14:26 (WEA 3)	08:37 15:02 (WEA 3) 16:21 40 14:35 (WEA 3) 15:15 (WEA 3)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	37 14:26 (WEA 3)	08:38 15:03 (WEA 3) 16:22 40 14:36 (WEA 3) 15:16 (WEA 3)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	39 14:25 (WEA 3)	08:38 15:04 (WEA 3) 16:22 40 14:36 (WEA 3) 15:16 (WEA 3)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	39 14:25 (WEA 3)	08:39 15:04 (WEA 3) 16:22 40 14:37 (WEA 3) 15:17 (WEA 3)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	40 14:25 (WEA 3)	08:39 15:05 (WEA 3) 16:23 40 14:37 (WEA 3) 15:17 (WEA 3)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	40 14:26 (WEA 3)	08:40 15:06 (WEA 3) 16:23 40 14:38 (WEA 3) 15:18 (WEA 3)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	41 14:25 (WEA 3)	08:40 15:06 (WEA 3) 16:24 40 14:38 (WEA 3) 15:18 (WEA 3)
25	05:42 21:35	06:31 20:38	07:22 19:27	08:14 17:20	08:09 16:30	41 14:25 (WEA 3)	08:41 15:06 (WEA 3) 16:25 40 14:38 (WEA 3) 15:18 (WEA 3)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18	08:10 16:29	41 14:26 (WEA 3)	08:41 15:07 (WEA 3) 16:25 40 14:38 (WEA 3) 15:18 (WEA 3)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16	08:12 16:29	42 14:26 (WEA 3)	08:41 15:08 (WEA 3) 16:26 40 14:40 (WEA 3) 15:20 (WEA 3)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14	08:13 16:28	42 14:26 (WEA 3)	08:41 15:08 (WEA 3) 16:27 40 14:40 (WEA 3) 15:20 (WEA 3)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12	08:15 16:27	42 14:26 (WEA 3)	08:42 15:08 (WEA 3) 16:28 41 14:40 (WEA 3) 15:21 (WEA 3)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	08:16 16:26	42 14:27 (WEA 3)	08:42 15:09 (WEA 3) 16:29 40 14:41 (WEA 3) 15:21 (WEA 3)
31	05:51 21:26	06:41 20:25	07:32 19:14	08:25 17:08			08:42 16:30 41 14:41 (WEA 3) 15:22 (WEA 3)
Sonnenscheinstunden	503	454	381	331	266		243
astr.max.mögl.Beschattung					731		1264

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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		
1	08:42 16:31	14:55 (WEA 3) 15:32 (WEA 3)	08:15 17:19	15:13 (WEA 3) 15:36 (WEA 3)	07:21 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	14:56 (WEA 3) 15:33 (WEA 3)	08:13 17:21	15:15 (WEA 3) 15:33 (WEA 3)	07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44
3	08:42 16:33	14:56 (WEA 3) 15:34 (WEA 3)	08:11 17:23	15:19 (WEA 3) 15:31 (WEA 3)	07:17 18:15	07:05 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	14:56 (WEA 3) 15:34 (WEA 3)	08:10 17:25	07:14 18:16	07:03 18:16	05:59 20:11	05:17 21:02	05:17 21:46
5	08:41 16:35	14:56 (WEA 3) 15:35 (WEA 3)	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	14:56 (WEA 3) 15:35 (WEA 3)	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	14:57 (WEA 3) 15:36 (WEA 3)	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	14:57 (WEA 3) 15:36 (WEA 3)	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	14:58 (WEA 3) 15:37 (WEA 3)	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	14:58 (WEA 3) 15:38 (WEA 3)	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	14:58 (WEA 3) 15:38 (WEA 3)	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	14:58 (WEA 3) 15:38 (WEA 3)	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	14:58 (WEA 3) 15:39 (WEA 3)	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	14:58 (WEA 3) 15:39 (WEA 3)	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	14:59 (WEA 3) 15:39 (WEA 3)	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	14:59 (WEA 3) 15:40 (WEA 3)	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	15:00 (WEA 3) 15:40 (WEA 3)	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	15:00 (WEA 3) 15:40 (WEA 3)	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	15:01 (WEA 3) 15:41 (WEA 3)	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	15:01 (WEA 3) 15:41 (WEA 3)	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	15:02 (WEA 3) 15:42 (WEA 3)	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	15:02 (WEA 3) 15:41 (WEA 3)	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	15:03 (WEA 3) 15:41 (WEA 3)	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	15:03 (WEA 3) 15:41 (WEA 3)	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	15:04 (WEA 3) 15:41 (WEA 3)	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	15:06 (WEA 3) 15:41 (WEA 3)	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	15:06 (WEA 3) 15:40 (WEA 3)	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	15:08 (WEA 3) 15:40 (WEA 3)	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	15:08 (WEA 3) 15:39 (WEA 3)	07:21 18:09	06:17 19:00	06:09 20:53	05:22 21:39	05:15 21:57	05:15 21:57
30	08:18 17:15	15:09 (WEA 3) 15:38 (WEA 3)	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	15:12 (WEA 3) 15:37 (WEA 3)	07:17 18:09	06:13 20:04	06:05 20:57	05:19 21:42	05:15 21:57	05:15 21:57
Sonnenscheinstunden	258			367	416	486	500	
astr.max.mögl.Beschattung	1166	277	53					

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	40 14:40 (WEA 3) 15:20 (WEA 3)
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	40 14:41 (WEA 3) 15:21 (WEA 3)
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	39 14:41 (WEA 3) 15:20 (WEA 3)
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	39 14:42 (WEA 3) 15:21 (WEA 3)
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	39 14:42 (WEA 3) 15:21 (WEA 3)
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	39 14:42 (WEA 3) 15:21 (WEA 3)
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	38 14:44 (WEA 3) 15:22 (WEA 3)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	07:39 16:54	14:48 (WEA 3)	08:27 16:22	38 14:44 (WEA 3) 15:22 (WEA 3)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52	14 14:46 (WEA 3) 19 15:05 (WEA 3)	08:28 16:21	38 14:44 (WEA 3) 15:22 (WEA 3)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	23 14:44 (WEA 3) 15:07 (WEA 3)	08:29 16:21	37 14:45 (WEA 3) 15:22 (WEA 3)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	26 14:42 (WEA 3) 15:08 (WEA 3)	08:31 16:21	37 14:46 (WEA 3) 15:23 (WEA 3)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	29 14:41 (WEA 3) 15:10 (WEA 3)	08:32 16:21	36 14:47 (WEA 3) 15:23 (WEA 3)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	31 14:40 (WEA 3) 15:11 (WEA 3)	08:33 16:21	36 14:47 (WEA 3) 15:23 (WEA 3)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	32 14:40 (WEA 3) 15:12 (WEA 3)	08:34 16:21	36 14:48 (WEA 3) 15:24 (WEA 3)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	34 14:39 (WEA 3) 15:13 (WEA 3)	08:34 16:21	36 14:48 (WEA 3) 15:24 (WEA 3)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	35 14:39 (WEA 3) 15:14 (WEA 3)	08:35 16:21	36 14:48 (WEA 3) 15:24 (WEA 3)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	37 14:38 (WEA 3) 15:15 (WEA 3)	08:36 16:21	35 14:49 (WEA 3) 15:24 (WEA 3)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	38 14:37 (WEA 3) 15:15 (WEA 3)	08:37 16:21	35 14:50 (WEA 3) 15:25 (WEA 3)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	38 14:37 (WEA 3) 15:15 (WEA 3)	08:38 16:22	35 14:51 (WEA 3) 15:26 (WEA 3)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	39 14:37 (WEA 3) 15:16 (WEA 3)	08:38 16:22	34 14:51 (WEA 3) 15:25 (WEA 3)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	40 14:37 (WEA 3) 15:17 (WEA 3)	08:39 16:22	35 14:51 (WEA 3) 15:26 (WEA 3)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	40 14:37 (WEA 3) 15:17 (WEA 3)	08:39 16:23	35 14:51 (WEA 3) 15:26 (WEA 3)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	40 14:38 (WEA 3) 15:18 (WEA 3)	08:40 16:23	35 14:52 (WEA 3) 15:27 (WEA 3)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	41 14:37 (WEA 3) 15:18 (WEA 3)	08:40 16:24	34 14:53 (WEA 3) 15:27 (WEA 3)
25	05:42 21:35	06:31 20:38	07:22 19:26	08:14 17:20	08:09 16:30	40 14:38 (WEA 3) 15:18 (WEA 3)	08:41 16:25	35 14:53 (WEA 3) 15:28 (WEA 3)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18	08:10 16:29	41 14:38 (WEA 3) 15:19 (WEA 3)	08:41 16:25	35 14:53 (WEA 3) 15:28 (WEA 3)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16	08:12 16:29	40 14:39 (WEA 3) 15:19 (WEA 3)	08:41 16:26	35 14:54 (WEA 3) 15:29 (WEA 3)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14	08:13 16:28	41 14:38 (WEA 3) 15:19 (WEA 3)	08:41 16:27	36 14:54 (WEA 3) 15:30 (WEA 3)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12	08:15 16:27	41 14:39 (WEA 3) 15:20 (WEA 3)	08:42 16:28	35 14:55 (WEA 3) 15:30 (WEA 3)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	08:16 16:26	40 14:40 (WEA 3) 15:20 (WEA 3)	08:42 16:29	36 14:55 (WEA 3) 15:31 (WEA 3)
31	05:51 21:26	06:41 20:25		08:25 17:08			08:42 16:30	37 14:55 (WEA 3) 15:32 (WEA 3)
Sonnenscheinstunden	503	454	381	331	266		243	
astr.max.mögl.Beschattung					799			1131

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinstrahlrichtung  
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:42 16:31	14:51 (WEA 3) 15:29 (WEA 3)	08:15 17:19	15:12 (WEA 3) 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	14:51 (WEA 3) 15:30 (WEA 3)	08:13 17:21	15:15 (WEA 3) 18:13	07:08 20:07	06:03 20:58	05:18 21:44
3	08:42 16:33	14:52 (WEA 3) 15:31 (WEA 3)	08:11 17:23	15:17 (WEA 3) 18:15	07:05 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	14:52 (WEA 3) 15:31 (WEA 3)	08:10 17:25	15:14 (WEA 3) 18:16	07:03 20:11	05:59 21:02	05:17 21:46
5	08:41 16:35	14:52 (WEA 3) 15:32 (WEA 3)	08:08 17:26	15:12 (WEA 3) 18:18	07:01 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	14:52 (WEA 3) 15:32 (WEA 3)	08:06 17:28	15:10 (WEA 3) 18:20	06:58 20:14	05:55 21:05	05:15 21:48
7	08:40 16:38	14:53 (WEA 3) 15:33 (WEA 3)	08:05 17:30	15:08 (WEA 3) 18:22	06:56 20:16	05:54 21:07	05:15 21:49
8	08:40 16:39	14:53 (WEA 3) 15:33 (WEA 3)	08:03 17:32	15:05 (WEA 3) 18:24	06:54 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	14:54 (WEA 3) 15:34 (WEA 3)	08:01 17:34	15:03 (WEA 3) 18:25	06:52 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	14:54 (WEA 3) 15:34 (WEA 3)	07:59 17:36	15:01 (WEA 3) 18:27	06:49 20:21	05:48 21:12	05:13 21:51
11	08:38 16:43	14:54 (WEA 3) 15:35 (WEA 3)	07:58 17:38	14:59 (WEA 3) 18:29	06:47 20:23	05:47 21:13	05:13 21:52
12	08:38 16:45	14:54 (WEA 3) 15:35 (WEA 3)	07:56 17:40	14:56 (WEA 3) 18:31	06:45 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	14:54 (WEA 3) 15:35 (WEA 3)	07:54 17:41	14:54 (WEA 3) 18:32	06:43 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	14:55 (WEA 3) 15:35 (WEA 3)	07:52 17:43	14:52 (WEA 3) 18:34	06:40 20:28	05:42 21:18	05:12 21:54
15	08:35 16:50	14:55 (WEA 3) 15:36 (WEA 3)	07:50 17:45	14:50 (WEA 3) 18:36	06:38 20:29	05:40 21:19	05:12 21:55
16	08:34 16:51	14:56 (WEA 3) 15:36 (WEA 3)	07:48 17:47	14:48 (WEA 3) 18:38	06:36 20:31	05:39 21:21	05:12 21:55
17	08:34 16:53	14:56 (WEA 3) 15:36 (WEA 3)	07:46 17:49	14:46 (WEA 3) 18:39	06:34 20:33	05:37 21:23	05:12 21:56
18	08:33 16:54	14:57 (WEA 3) 15:37 (WEA 3)	07:44 17:51	14:44 (WEA 3) 18:41	06:32 20:35	05:36 21:24	05:12 21:56
19	08:32 16:56	14:57 (WEA 3) 15:37 (WEA 3)	07:42 17:53	14:42 (WEA 3) 18:43	06:29 20:36	05:34 21:26	05:12 21:57
20	08:31 16:58	14:58 (WEA 3) 15:37 (WEA 3)	07:40 17:55	14:40 (WEA 3) 18:45	06:27 20:38	05:33 21:27	05:12 21:57
21	08:29 16:59	14:59 (WEA 3) 15:38 (WEA 3)	07:38 17:56	14:38 (WEA 3) 18:46	06:25 20:40	05:31 21:28	05:12 21:57
22	08:28 17:01	14:59 (WEA 3) 15:37 (WEA 3)	07:36 17:58	14:36 (WEA 3) 18:48	06:23 20:41	05:30 21:30	05:12 21:57
23	08:27 17:03	15:00 (WEA 3) 15:37 (WEA 3)	07:34 18:00	14:34 (WEA 3) 18:50	06:21 20:43	05:29 21:31	05:12 21:57
24	08:26 17:05	15:00 (WEA 3) 15:36 (WEA 3)	07:32 18:02	14:32 (WEA 3) 18:52	06:19 20:45	05:28 21:33	05:13 21:58
25	08:25 17:06	15:02 (WEA 3) 15:37 (WEA 3)	07:30 18:04	14:30 (WEA 3) 18:53	06:17 20:46	05:26 21:34	05:13 21:58
26	08:23 17:08	15:03 (WEA 3) 15:37 (WEA 3)	07:27 18:06	14:28 (WEA 3) 18:55	06:15 20:48	05:25 21:35	05:13 21:58
27	08:22 17:10	15:04 (WEA 3) 15:36 (WEA 3)	07:25 18:07	14:26 (WEA 3) 18:57	06:13 20:50	05:24 21:37	05:14 21:58
28	08:21 17:12	15:05 (WEA 3) 15:36 (WEA 3)	07:23 18:09	14:24 (WEA 3) 18:58	06:11 20:52	05:23 21:38	05:14 21:57
29	08:19 17:14	15:06 (WEA 3) 15:34 (WEA 3)		14:22 (WEA 3) 18:57	06:09 20:53	05:22 21:39	05:15 21:57
30	08:18 17:15	15:07 (WEA 3) 15:33 (WEA 3)		14:20 (WEA 3) 20:02	06:07 20:55	05:21 21:40	05:15 21:57
31	08:16 17:17	15:10 (WEA 3) 15:32 (WEA 3)		14:18 (WEA 3) 20:04		05:20 21:42	
Sonnenscheinstunden	258			367	416	486	500
astr.max.mögl.Beschattung	1156	277	30				

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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 41 14:36 (WEA 3) 15:17 (WEA 3)
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 40 14:37 (WEA 3) 15:17 (WEA 3)
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 40 14:37 (WEA 3) 15:17 (WEA 3)
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 40 14:38 (WEA 3) 15:18 (WEA 3)
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 40 14:38 (WEA 3) 15:18 (WEA 3)
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 40 14:38 (WEA 3) 15:18 (WEA 3)
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 40 14:39 (WEA 3) 15:19 (WEA 3)
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 39 14:40 (WEA 3) 15:19 (WEA 3)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52	12	14:46 (WEA 3) 08:28 14:40 (WEA 3) 14:58 (WEA 3) 16:21 39 15:19 (WEA 3)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	18	14:43 (WEA 3) 08:29 14:40 (WEA 3) 15:01 (WEA 3) 16:21 39 15:19 (WEA 3)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	22	14:41 (WEA 3) 08:31 14:42 (WEA 3) 15:03 (WEA 3) 16:21 38 15:20 (WEA 3)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	26	14:39 (WEA 3) 08:32 14:42 (WEA 3) 15:05 (WEA 3) 16:21 38 15:20 (WEA 3)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	28	14:38 (WEA 3) 08:33 14:43 (WEA 3) 15:06 (WEA 3) 16:21 38 15:21 (WEA 3)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	31	14:37 (WEA 3) 08:34 14:43 (WEA 3) 15:08 (WEA 3) 16:21 38 15:21 (WEA 3)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	33	14:36 (WEA 3) 08:34 14:44 (WEA 3) 15:09 (WEA 3) 16:21 37 15:21 (WEA 3)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	34	14:36 (WEA 3) 08:35 14:44 (WEA 3) 15:10 (WEA 3) 16:21 37 15:21 (WEA 3)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	35	14:36 (WEA 3) 08:36 14:45 (WEA 3) 15:11 (WEA 3) 16:21 36 15:21 (WEA 3)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	36	14:34 (WEA 3) 08:37 14:45 (WEA 3) 15:10 (WEA 3) 16:21 37 15:22 (WEA 3)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	37	14:34 (WEA 3) 08:38 14:46 (WEA 3) 15:11 (WEA 3) 16:22 37 15:23 (WEA 3)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	38	14:34 (WEA 3) 08:38 14:46 (WEA 3) 15:12 (WEA 3) 16:22 37 15:23 (WEA 3)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	39	14:34 (WEA 3) 08:39 14:47 (WEA 3) 15:13 (WEA 3) 16:22 37 15:24 (WEA 3)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	39	14:34 (WEA 3) 08:39 14:47 (WEA 3) 15:13 (WEA 3) 16:23 37 15:24 (WEA 3)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	40	14:34 (WEA 3) 08:40 14:48 (WEA 3) 15:14 (WEA 3) 16:23 37 15:25 (WEA 3)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	40	14:34 (WEA 3) 08:40 14:48 (WEA 3) 15:14 (WEA 3) 16:24 37 15:25 (WEA 3)
25	05:42 21:35	06:31 20:38	07:22 19:26	08:14 17:20	08:09 16:30	41	14:34 (WEA 3) 08:41 14:48 (WEA 3) 15:15 (WEA 3) 16:25 37 15:25 (WEA 3)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18	08:10 16:29	40	14:35 (WEA 3) 08:41 14:48 (WEA 3) 15:15 (WEA 3) 16:25 37 15:25 (WEA 3)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16	08:12 16:29	41	14:35 (WEA 3) 08:41 14:50 (WEA 3) 15:16 (WEA 3) 16:26 37 15:27 (WEA 3)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14	08:13 16:28	41	14:35 (WEA 3) 08:41 14:50 (WEA 3) 15:16 (WEA 3) 16:27 37 15:27 (WEA 3)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12	08:15 16:27	41	14:35 (WEA 3) 08:42 14:50 (WEA 3) 15:16 (WEA 3) 16:28 38 15:28 (WEA 3)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	08:16 16:26	41	14:36 (WEA 3) 08:42 14:51 (WEA 3) 15:17 (WEA 3) 16:29 37 15:28 (WEA 3)
31	05:51 21:26	06:41 20:25		08:25 17:08			08:42 14:51 (WEA 3) 16:30 38 15:29 (WEA 3) 243
Sonnenscheinstunden	503	454	381	331	266		243
astr.max.mögl.Beschattung					753		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	Zeitpunkt (SS:MM) Schattende	Schattenanfang (WEA mit erstem Schatten)	Schattende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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		
1	08:42 16:31	14:57 (WEA 3) 15:33 (WEA 3)	08:15 17:19	15:15 (WEA 3) 15:37 (WEA 3)	07:21 18:11	07:10 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	14:58 (WEA 3) 15:34 (WEA 3)	08:13 17:21	15:17 (WEA 3) 15:35 (WEA 3)	07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44
3	08:42 16:33	14:58 (WEA 3) 15:35 (WEA 3)	08:11 17:23	15:22 (WEA 3) 15:32 (WEA 3)	07:17 18:15	07:05 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	14:58 (WEA 3) 15:35 (WEA 3)	08:10 17:25	07:14 18:16	07:03 18:16	05:59 20:11	05:17 21:02	05:17 21:46
5	08:41 16:35	14:59 (WEA 3) 15:36 (WEA 3)	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	14:58 (WEA 3) 15:36 (WEA 3)	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	14:59 (WEA 3) 15:37 (WEA 3)	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	14:59 (WEA 3) 15:37 (WEA 3)	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	15:00 (WEA 3) 15:39 (WEA 3)	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	15:00 (WEA 3) 15:39 (WEA 3)	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	15:00 (WEA 3) 15:39 (WEA 3)	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	15:00 (WEA 3) 15:40 (WEA 3)	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	15:00 (WEA 3) 15:40 (WEA 3)	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	15:01 (WEA 3) 15:40 (WEA 3)	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	15:01 (WEA 3) 15:41 (WEA 3)	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	15:01 (WEA 3) 15:41 (WEA 3)	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	15:02 (WEA 3) 15:42 (WEA 3)	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	15:02 (WEA 3) 15:42 (WEA 3)	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	15:03 (WEA 3) 15:42 (WEA 3)	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	15:04 (WEA 3) 15:43 (WEA 3)	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	15:04 (WEA 3) 15:43 (WEA 3)	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	15:04 (WEA 3) 15:42 (WEA 3)	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	15:05 (WEA 3) 15:43 (WEA 3)	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	15:05 (WEA 3) 15:42 (WEA 3)	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	15:06 (WEA 3) 15:42 (WEA 3)	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	15:08 (WEA 3) 15:42 (WEA 3)	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	15:08 (WEA 3) 15:42 (WEA 3)	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	15:10 (WEA 3) 15:42 (WEA 3)	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	15:11 (WEA 3) 15:40 (WEA 3)	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	15:12 (WEA 3) 15:39 (WEA 3)	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	15:14 (WEA 3) 15:39 (WEA 3)	07:17 18:09	06:13 20:04	06:05 20:57	05:19 21:42	05:15 21:57	05:15 21:57
Sonnenscheinstunden	258							
astr.max.mögl.Beschattung	1140	277	50	367	416	486	500	

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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 39 14:42 (WEA 3)
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 39 14:43 (WEA 3)
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 39 14:43 (WEA 3)
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 39 14:44 (WEA 3)
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 38 14:44 (WEA 3)
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 38 14:44 (WEA 3)
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 37 14:46 (WEA 3)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	07:39 16:54	14:51 (WEA 3)	08:27 16:22 37 14:46 (WEA 3)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52	12 15:03 (WEA 3)	08:28 16:21 37 14:46 (WEA 3)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	18 15:06 (WEA 3)	08:29 16:21 36 14:47 (WEA 3)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	22 14:45 (WEA 3)	08:31 16:21 36 14:48 (WEA 3)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	25 15:10 (WEA 3)	08:32 16:21 35 14:49 (WEA 3)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	28 15:11 (WEA 3)	08:33 16:21 36 14:49 (WEA 3)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	30 14:42 (WEA 3)	08:34 16:21 35 14:50 (WEA 3)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	32 15:14 (WEA 3)	08:34 16:21 35 14:51 (WEA 3)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	34 14:41 (WEA 3)	08:35 16:21 35 14:50 (WEA 3)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	34 15:15 (WEA 3)	08:36 16:21 35 14:51 (WEA 3)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	36 14:41 (WEA 3)	08:37 16:21 35 14:52 (WEA 3)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	37 15:16 (WEA 3)	08:38 16:21 34 14:53 (WEA 3)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	38 14:39 (WEA 3)	08:38 16:22 34 14:53 (WEA 3)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	38 15:17 (WEA 3)	08:39 16:22 34 14:54 (WEA 3)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	39 14:40 (WEA 3)	08:39 16:23 34 14:54 (WEA 3)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	39 14:40 (WEA 3)	08:40 16:23 34 14:55 (WEA 3)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	39 15:19 (WEA 3)	08:40 16:24 34 14:55 (WEA 3)
25	05:42 21:35	06:31 20:38	07:22 19:26	08:14 17:20	08:09 16:30	40 14:40 (WEA 3)	08:41 16:25 34 14:55 (WEA 3)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18	08:10 16:29	40 14:40 (WEA 3)	08:41 16:25 34 14:55 (WEA 3)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16	08:12 16:29	40 14:41 (WEA 3)	08:41 16:26 35 14:56 (WEA 3)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14	08:13 16:28	40 15:21 (WEA 3)	08:41 16:27 35 14:57 (WEA 3)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12	08:15 16:27	39 14:41 (WEA 3)	08:42 16:28 34 14:57 (WEA 3)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	08:16 16:26	40 15:21 (WEA 3)	08:42 16:29 35 14:57 (WEA 3)
31	05:51 21:26	06:41 20:25		08:25 17:08		40 15:22 (WEA 3)	08:42 16:30 35 14:58 (WEA 3)
Sonnenscheinstunden	503	454	381	331	266		243
astr.max.mögl.Beschattung					780		1105

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	--	--

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinstrahlung  
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:42 16:31	15:06 (WEA 3) 17:19	08:15 17:19	15:12 (WEA 3) 18:11	07:21 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	15:07 (WEA 3) 17:21	08:13 17:21	15:12 (WEA 3) 18:13	07:19 20:07	06:03 20:58	05:18 21:44
3	08:42 16:33	15:07 (WEA 3) 17:23	08:11 17:23	15:14 (WEA 3) 18:15	07:17 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	15:06 (WEA 3) 17:25	08:10 17:25	15:15 (WEA 3) 18:16	07:14 20:11	05:59 21:02	05:17 21:46
5	08:41 16:35	15:07 (WEA 3) 17:26	08:08 17:26	15:16 (WEA 3) 18:18	07:12 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	15:06 (WEA 3) 17:28	08:06 17:28	15:17 (WEA 3) 18:20	07:10 20:14	05:55 21:05	05:15 21:48
7	08:40 16:38	15:07 (WEA 3) 17:30	08:05 17:30	15:18 (WEA 3) 18:22	07:08 20:16	05:54 21:07	05:15 21:49
8	08:40 16:39	15:06 (WEA 3) 17:32	08:03 17:32	15:20 (WEA 3) 18:24	07:05 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	15:07 (WEA 3) 17:34	08:01 17:34	15:23 (WEA 3) 18:25	07:03 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	15:07 (WEA 3) 17:36	07:59 17:36	15:27 (WEA 3) 18:27	07:01 20:21	05:48 21:12	05:13 21:51
11	08:38 16:43	15:07 (WEA 3) 17:38	07:58 17:38	15:41 (WEA 3) 18:29	06:59 20:23	05:47 21:13	05:13 21:52
12	08:38 16:45	15:06 (WEA 3) 17:40	07:56 17:40	15:44 (WEA 3) 18:31	06:56 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	15:06 (WEA 3) 17:41	07:54 17:41	15:46 (WEA 3) 18:32	06:54 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	15:06 (WEA 3) 17:43	07:52 17:43	15:48 (WEA 3) 18:34	06:52 20:28	05:42 21:18	05:12 21:54
15	08:35 16:50	15:06 (WEA 3) 17:45	07:50 17:45	15:50 (WEA 3) 18:36	06:49 20:29	05:40 21:19	05:12 21:55
16	08:34 16:51	15:06 (WEA 3) 17:47	07:48 17:47	15:51 (WEA 3) 18:38	06:47 20:31	05:39 21:21	05:12 21:55
17	08:34 16:53	15:07 (WEA 3) 17:49	07:46 17:49	15:52 (WEA 3) 18:39	06:45 20:33	05:37 21:23	05:12 21:56
18	08:33 16:54	15:07 (WEA 3) 17:51	07:44 17:51	15:54 (WEA 3) 18:41	06:42 20:35	05:36 21:24	05:12 21:56
19	08:32 16:56	15:07 (WEA 3) 17:53	07:42 17:53	15:55 (WEA 3) 18:43	06:40 20:36	05:34 21:26	05:12 21:57
20	08:31 16:58	15:07 (WEA 3) 17:55	07:40 17:55	15:56 (WEA 3) 18:45	06:38 20:38	05:33 21:27	05:12 21:57
21	08:29 16:59	15:08 (WEA 3) 17:56	07:38 17:56	15:57 (WEA 3) 18:46	06:35 20:40	05:31 21:28	05:12 21:57
22	08:28 17:01	15:07 (WEA 3) 17:58	07:36 17:58	15:58 (WEA 3) 18:48	06:33 20:41	05:30 21:30	05:12 21:57
23	08:27 17:03	15:08 (WEA 3) 18:00	07:34 18:00	15:59 (WEA 3) 18:50	06:31 20:43	05:29 21:31	05:12 21:57
24	08:26 17:05	15:08 (WEA 3) 18:02	07:32 18:02	16:00 (WEA 3) 18:52	06:29 20:45	05:28 21:33	05:13 21:58
25	08:25 17:06	15:08 (WEA 3) 18:04	07:30 18:04	16:01 (WEA 3) 18:53	06:26 20:46	05:26 21:34	05:13 21:58
26	08:23 17:08	15:09 (WEA 3) 18:06	07:27 18:06	16:02 (WEA 3) 18:55	06:24 20:48	05:25 21:35	05:13 21:58
27	08:22 17:10	15:09 (WEA 3) 18:07	07:25 18:07	16:03 (WEA 3) 18:57	06:22 20:50	05:24 21:37	05:14 21:58
28	08:21 17:12	15:10 (WEA 3) 18:09	07:23 18:09	16:04 (WEA 3) 18:58	06:19 20:52	05:23 21:38	05:14 21:57
29	08:19 17:14	15:10 (WEA 3)		16:05 (WEA 3) 19:00	07:17 20:00	06:09 21:39	05:15 21:57
30	08:18 17:15	15:10 (WEA 3)		16:06 (WEA 3) 19:01	07:15 20:02	06:07 21:40	05:15 21:57
31	08:16 17:17	15:12 (WEA 3)		16:07 (WEA 3) 19:02	07:12 20:04	06:05 21:42	
Sonnenscheinstunden	258		277	367	416	486	500
astr.max.mögl.Beschattung	1214		304				

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 3 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 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	15	14:55 (WEA 3) 15:10 (WEA 3)	08:18 16:25	38	14:49 (WEA 3) 15:27 (WEA 3)
2	05:17 21:57	05:54 21:23	06:45 20:20	07:34 19:10		07:28 17:04	21	14:52 (WEA 3) 15:13 (WEA 3)	08:19 16:25	37	14:50 (WEA 3) 15:27 (WEA 3)
3	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08		07:30 17:02	26	14:49 (WEA 3) 15:15 (WEA 3)	08:21 16:24	36	14:50 (WEA 3) 15:26 (WEA 3)
4	05:18 21:56	05:58 21:20	06:48 20:16	07:37 19:06		07:32 17:01	29	14:48 (WEA 3) 15:17 (WEA 3)	08:22 16:23	36	14:51 (WEA 3) 15:27 (WEA 3)
5	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03		07:34 16:59	31	14:47 (WEA 3) 15:18 (WEA 3)	08:23 16:23	34	14:52 (WEA 3) 15:26 (WEA 3)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01		07:35 16:57	34	14:45 (WEA 3) 15:19 (WEA 3)	08:25 16:22	34	14:52 (WEA 3) 15:26 (WEA 3)
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59		07:37 16:55	36	14:44 (WEA 3) 15:20 (WEA 3)	08:26 16:22	33	14:54 (WEA 3) 15:27 (WEA 3)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56		07:39 16:54	37	14:44 (WEA 3) 15:21 (WEA 3)	08:27 16:22	32	14:54 (WEA 3) 15:26 (WEA 3)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54		07:41 16:52	39	14:43 (WEA 3) 15:22 (WEA 3)	08:28 16:21	31	14:55 (WEA 3) 15:26 (WEA 3)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52		07:43 16:50	40	14:43 (WEA 3) 15:23 (WEA 3)	08:29 16:21	30	14:56 (WEA 3) 15:26 (WEA 3)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50		07:44 16:49	41	14:42 (WEA 3) 15:23 (WEA 3)	08:31 16:21	30	14:57 (WEA 3) 15:27 (WEA 3)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47		07:46 16:47	42	14:42 (WEA 3) 15:24 (WEA 3)	08:32 16:21	29	14:58 (WEA 3) 15:27 (WEA 3)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45		07:48 16:46	42	14:42 (WEA 3) 15:24 (WEA 3)	08:33 16:21	28	14:59 (WEA 3) 15:27 (WEA 3)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43		07:50 16:44	43	14:42 (WEA 3) 15:25 (WEA 3)	08:34 16:21	27	15:00 (WEA 3) 15:27 (WEA 3)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41		07:52 16:43	43	14:42 (WEA 3) 15:25 (WEA 3)	08:34 16:21	26	15:01 (WEA 3) 15:27 (WEA 3)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39		07:53 16:41	44	14:42 (WEA 3) 15:26 (WEA 3)	08:35 16:21	27	15:00 (WEA 3) 15:27 (WEA 3)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36		07:55 16:40	44	14:42 (WEA 3) 15:26 (WEA 3)	08:36 16:21	26	15:01 (WEA 3) 15:27 (WEA 3)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34		07:57 16:39	43	14:42 (WEA 3) 15:25 (WEA 3)	08:37 16:21	26	15:02 (WEA 3) 15:28 (WEA 3)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32		07:59 16:37	44	14:42 (WEA 3) 15:26 (WEA 3)	08:38 16:22	25	15:03 (WEA 3) 15:28 (WEA 3)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30		08:00 16:36	44	14:42 (WEA 3) 15:26 (WEA 3)	08:38 16:22	25	15:03 (WEA 3) 15:28 (WEA 3)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28		08:02 16:35	43	14:43 (WEA 3) 15:26 (WEA 3)	08:39 16:23	25	15:04 (WEA 3) 15:29 (WEA 3)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26		08:04 16:34	44	14:43 (WEA 3) 15:27 (WEA 3)	08:39 16:23	25	15:04 (WEA 3) 15:29 (WEA 3)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24		08:05 16:33	43	14:44 (WEA 3) 15:27 (WEA 3)	08:40 16:23	25	15:05 (WEA 3) 15:30 (WEA 3)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22		08:07 16:31	42	14:44 (WEA 3) 15:26 (WEA 3)	08:40 16:24	25	15:05 (WEA 3) 15:30 (WEA 3)
25	05:42 21:35	06:31 20:38	07:22 19:27	08:14 17:20		08:09 16:30	41	14:44 (WEA 3) 15:26 (WEA 3)	08:41 16:25	25	15:05 (WEA 3) 15:30 (WEA 3)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18		08:10 16:29	42	14:45 (WEA 3) 15:27 (WEA 3)	08:41 16:25	26	15:05 (WEA 3) 15:31 (WEA 3)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16		08:12 16:29	41	14:46 (WEA 3) 15:27 (WEA 3)	08:41 16:26	26	15:06 (WEA 3) 15:32 (WEA 3)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14		08:13 16:28	40	14:46 (WEA 3) 15:26 (WEA 3)	08:41 16:27	26	15:07 (WEA 3) 15:33 (WEA 3)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12		08:15 16:27	40	14:47 (WEA 3) 15:27 (WEA 3)	08:42 16:28	27	15:07 (WEA 3) 15:34 (WEA 3)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10		08:16 16:26	39	14:48 (WEA 3) 15:27 (WEA 3)	08:42 16:29	28	15:07 (WEA 3) 15:35 (WEA 3)
31	05:51 21:26	06:41 20:25		08:25 17:08	15:01 (WEA 3) 15:04 (WEA 3)				08:42 16:30	29	15:07 (WEA 3) 15:36 (WEA 3)
Sonnenscheinstunden	503	454	381	331	3	266	1153		243	897	
astr.max.mögl.Beschattung					3						

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinstrahlung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar		Februar		März		April		Mai		Juni	
1	08:42		15:03 (WEA 3)	08:15	15:10 (WEA 3)	07:21	07:10	06:05	05:19			
	16:31	31	15:34 (WEA 3)	17:19	15:49 (WEA 3)	18:11	20:05	20:57	21:43			
2	08:42		15:03 (WEA 3)	08:13	15:10 (WEA 3)	07:19	07:08	06:03	05:18			
	16:32	32	15:35 (WEA 3)	17:21	15:48 (WEA 3)	18:13	20:07	20:58	21:44			
3	08:42		15:03 (WEA 3)	08:11	15:12 (WEA 3)	07:17	07:05	06:01	05:18			
	16:33	34	15:37 (WEA 3)	17:23	15:48 (WEA 3)	18:15	20:09	21:00	21:45			
4	08:41		15:03 (WEA 3)	08:10	15:13 (WEA 3)	07:14	07:03	05:59	05:17			
	16:34	34	15:37 (WEA 3)	17:25	15:47 (WEA 3)	18:16	20:11	21:02	21:46			
5	08:41		15:03 (WEA 3)	08:08	15:14 (WEA 3)	07:12	07:01	05:57	05:16			
	16:35	35	15:38 (WEA 3)	17:26	15:46 (WEA 3)	18:18	20:12	21:03	21:47			
6	08:41		15:03 (WEA 3)	08:06	15:15 (WEA 3)	07:10	06:58	05:55	05:15			
	16:37	35	15:38 (WEA 3)	17:28	15:45 (WEA 3)	18:20	20:14	21:05	21:48			
7	08:40		15:03 (WEA 3)	08:05	15:17 (WEA 3)	07:08	06:56	05:54	05:15			
	16:38	37	15:40 (WEA 3)	17:30	15:43 (WEA 3)	18:22	20:16	21:07	21:49			
8	08:40		15:03 (WEA 3)	08:03	15:19 (WEA 3)	07:05	06:54	05:52	05:14			
	16:39	37	15:40 (WEA 3)	17:32	15:42 (WEA 3)	18:24	20:17	21:08	21:50			
9	08:39		15:04 (WEA 3)	08:01	15:23 (WEA 3)	07:03	06:52	05:50	05:14			
	16:41	38	15:42 (WEA 3)	17:34	15:40 (WEA 3)	18:25	20:19	21:10	21:51			
10	08:39		15:04 (WEA 3)	07:59	15:27 (WEA 3)	07:01	06:49	05:48	05:13			
	16:42	38	15:42 (WEA 3)	17:36	15:36 (WEA 3)	18:27	20:21	21:12	21:51			
11	08:38		15:03 (WEA 3)	07:58		06:59	06:47	05:47	05:13			
	16:43	40	15:43 (WEA 3)	17:38		18:29	20:23	21:13	21:52			
12	08:38		15:03 (WEA 3)	07:56		06:56	06:45	05:45	05:13			
	16:45	40	15:43 (WEA 3)	17:40		18:31	20:24	21:15	21:53			
13	08:37		15:03 (WEA 3)	07:54		06:54	06:43	05:43	05:12			
	16:46	41	15:44 (WEA 3)	17:41		18:32	20:26	21:16	21:54			
14	08:36		15:03 (WEA 3)	07:52		06:52	06:40	05:42	05:12			
	16:48	41	15:44 (WEA 3)	17:43		18:34	20:28	21:18	21:54			
15	08:35		15:03 (WEA 3)	07:50		06:49	06:38	05:40	05:12			
	16:50	42	15:45 (WEA 3)	17:45		18:36	20:29	21:19	21:55			
16	08:34		15:03 (WEA 3)	07:48		06:47	06:36	05:39	05:12			
	16:51	43	15:46 (WEA 3)	17:47		18:38	20:31	21:21	21:55			
17	08:34		15:04 (WEA 3)	07:46		06:45	06:34	05:37	05:12			
	16:53	42	15:46 (WEA 3)	17:49		18:39	20:33	21:23	21:56			
18	08:33		15:04 (WEA 3)	07:44		06:42	06:32	05:36	05:12			
	16:54	43	15:47 (WEA 3)	17:51		18:41	20:35	21:24	21:56			
19	08:32		15:04 (WEA 3)	07:42		06:40	06:29	05:34	05:12			
	16:56	44	15:48 (WEA 3)	17:53		18:43	20:36	21:26	21:57			
20	08:31		15:05 (WEA 3)	07:40		06:38	06:27	05:33	05:12			
	16:58	43	15:48 (WEA 3)	17:55		18:45	20:38	21:27	21:57			
21	08:29		15:05 (WEA 3)	07:38		06:35	06:25	05:31	05:12			
	16:59	44	15:49 (WEA 3)	17:56		18:46	20:40	21:28	21:57			
22	08:28		15:05 (WEA 3)	07:36		06:33	06:23	05:30	05:12			
	17:01	44	15:49 (WEA 3)	17:58		18:48	20:41	21:30	21:57			
23	08:27		15:05 (WEA 3)	07:34		06:31	06:21	05:29	05:12			
	17:03	44	15:49 (WEA 3)	18:00		18:50	20:43	21:31	21:57			
24	08:26		15:05 (WEA 3)	07:32		06:29	06:19	05:28	05:13			
	17:05	44	15:49 (WEA 3)	18:02		18:52	20:45	21:33	21:58			
25	08:25		15:06 (WEA 3)	07:30		06:26	06:17	05:26	05:13			
	17:06	44	15:50 (WEA 3)	18:04		18:53	20:46	21:34	21:58			
26	08:23		15:07 (WEA 3)	07:27		06:24	06:15	05:25	05:13			
	17:08	43	15:50 (WEA 3)	18:06		18:55	20:48	21:35	21:58			
27	08:22		15:07 (WEA 3)	07:25		06:22	06:13	05:24	05:14			
	17:10	43	15:50 (WEA 3)	18:07		18:57	20:50	21:37	21:58			
28	08:21		15:08 (WEA 3)	07:23		06:19	06:11	05:23	05:14			
	17:12	42	15:50 (WEA 3)	18:09		18:58	20:52	21:38	21:57			
29	08:19		15:08 (WEA 3)			07:17	06:09	05:22	05:15			
	17:14	42	15:50 (WEA 3)			20:00	20:53	21:39	21:57			
30	08:18		15:08 (WEA 3)			07:15	06:07	05:21	05:15			
	17:15	41	15:49 (WEA 3)			20:02	20:55	21:40	21:57			
31	08:16		15:09 (WEA 3)			07:12		05:20				
	17:17	41	15:50 (WEA 3)			20:04		21:42				
Sonnenscheinstunden	258			277		367	416	486	500			
astr.max.mögl.Beschattung	1242			284								

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

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



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	10	14:55 (WEA 3) 15:05 (WEA 3)	08:18 16:25	14:45 (WEA 3) 15:25 (WEA 3)
2	05:17 21:57	05:54 21:23	06:45 20:20	07:34 19:10	07:28 17:04	18	14:51 (WEA 3) 15:09 (WEA 3)	08:19 16:25	14:47 (WEA 3) 15:25 (WEA 3)
3	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02	24	14:48 (WEA 3) 15:12 (WEA 3)	08:21 16:24	14:47 (WEA 3) 15:25 (WEA 3)
4	05:18 21:56	05:58 21:20	06:48 20:16	07:37 19:06	07:32 17:01	27	14:46 (WEA 3) 15:13 (WEA 3)	08:22 16:23	14:48 (WEA 3) 15:25 (WEA 3)
5	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03	07:34 16:59	30	14:45 (WEA 3) 15:15 (WEA 3)	08:23 16:23	14:48 (WEA 3) 15:25 (WEA 3)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01	07:35 16:57	32	14:44 (WEA 3) 15:16 (WEA 3)	08:25 16:22	14:49 (WEA 3) 15:24 (WEA 3)
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59	07:37 16:55	34	14:43 (WEA 3) 15:17 (WEA 3)	08:26 16:22	14:50 (WEA 3) 15:25 (WEA 3)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	07:39 16:54	36	14:42 (WEA 3) 15:18 (WEA 3)	08:27 16:22	14:51 (WEA 3) 15:25 (WEA 3)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	07:41 16:52	38	14:41 (WEA 3) 15:19 (WEA 3)	08:28 16:21	14:51 (WEA 3) 15:25 (WEA 3)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	07:43 16:50	39	14:41 (WEA 3) 15:20 (WEA 3)	08:29 16:21	14:52 (WEA 3) 15:25 (WEA 3)
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	07:44 16:49	41	14:40 (WEA 3) 15:21 (WEA 3)	08:31 16:21	14:54 (WEA 3) 15:26 (WEA 3)
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	07:46 16:47	41	14:40 (WEA 3) 15:21 (WEA 3)	08:32 16:21	14:54 (WEA 3) 15:26 (WEA 3)
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	07:48 16:46	42	14:40 (WEA 3) 15:22 (WEA 3)	08:33 16:21	14:55 (WEA 3) 15:26 (WEA 3)
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	43	14:39 (WEA 3) 15:22 (WEA 3)	08:34 16:21	14:56 (WEA 3) 15:26 (WEA 3)
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	07:52 16:43	44	14:39 (WEA 3) 15:23 (WEA 3)	08:34 16:21	14:57 (WEA 3) 15:26 (WEA 3)
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	07:53 16:41	43	14:40 (WEA 3) 15:23 (WEA 3)	08:35 16:21	14:57 (WEA 3) 15:25 (WEA 3)
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	07:55 16:40	44	14:40 (WEA 3) 15:24 (WEA 3)	08:36 16:21	14:57 (WEA 3) 15:26 (WEA 3)
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	07:57 16:39	44	14:39 (WEA 3) 15:23 (WEA 3)	08:37 16:21	14:58 (WEA 3) 15:27 (WEA 3)
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	07:59 16:37	44	14:39 (WEA 3) 15:23 (WEA 3)	08:38 16:22	14:59 (WEA 3) 15:27 (WEA 3)
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	08:00 16:36	44	14:40 (WEA 3) 15:24 (WEA 3)	08:38 16:22	14:59 (WEA 3) 15:27 (WEA 3)
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	08:02 16:35	44	14:40 (WEA 3) 15:24 (WEA 3)	08:39 16:23	15:00 (WEA 3) 15:28 (WEA 3)
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	08:04 16:34	43	14:41 (WEA 3) 15:24 (WEA 3)	08:39 16:23	15:00 (WEA 3) 15:28 (WEA 3)
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	08:05 16:33	44	14:41 (WEA 3) 15:25 (WEA 3)	08:40 16:23	15:01 (WEA 3) 15:29 (WEA 3)
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:31	43	14:41 (WEA 3) 15:24 (WEA 3)	08:40 16:24	15:01 (WEA 3) 15:29 (WEA 3)
25	05:42 21:35	06:31 20:38	07:22 19:27	08:14 17:20	08:09 16:30	42	14:42 (WEA 3) 15:24 (WEA 3)	08:41 16:25	15:01 (WEA 3) 15:29 (WEA 3)
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 17:18	08:10 16:29	43	14:42 (WEA 3) 15:25 (WEA 3)	08:41 16:25	15:01 (WEA 3) 15:30 (WEA 3)
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 17:16	08:12 16:29	42	14:43 (WEA 3) 15:25 (WEA 3)	08:41 16:26	15:02 (WEA 3) 15:31 (WEA 3)
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 17:14	08:13 16:28	41	14:43 (WEA 3) 15:24 (WEA 3)	08:41 16:27	15:03 (WEA 3) 15:32 (WEA 3)
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 17:12	08:15 16:27	41	14:44 (WEA 3) 15:25 (WEA 3)	08:42 16:28	15:03 (WEA 3) 15:33 (WEA 3)
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	08:16 16:26	40	14:45 (WEA 3) 15:25 (WEA 3)	08:42 16:29	15:03 (WEA 3) 15:33 (WEA 3)
31	05:51 21:26	06:41 20:25		07:25 17:08				08:42 16:30	15:03 (WEA 3) 15:34 (WEA 3)
Sonnenscheinstunden	503	454	381	331	266			243	975
astr.max.mögl.Beschattung					1141				975

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	Januar	Februar	März	April	Mai	Juni	
1	08:42 16:31	08:15 17:19	15:55 (WEA 3) 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	15:54 (WEA 3) 16:30 (WEA 3)	07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	15:55 (WEA 3) 16:31 (WEA 3)	07:17 18:15	07:05 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	15:55 (WEA 3) 16:31 (WEA 3)	07:14 18:16	07:03 20:10	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	15:55 (WEA 3) 16:31 (WEA 3)	07:12 18:18	07:01 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	15:55 (WEA 3) 16:31 (WEA 3)	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	15:55 (WEA 3) 16:30 (WEA 3)	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	15:56 (WEA 3) 16:30 (WEA 3)	07:05 18:24	06:54 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	15:56 (WEA 3) 16:30 (WEA 3)	07:03 18:25	06:52 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	15:58 (WEA 3) 16:30 (WEA 3)	07:01 18:27	06:49 20:21	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	15:58 (WEA 3) 16:29 (WEA 3)	06:59 18:29	06:47 20:23	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	15:59 (WEA 3) 16:28 (WEA 3)	06:56 18:31	06:45 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	16:01 (WEA 3) 16:27 (WEA 3)	06:54 18:32	06:43 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	16:02 (WEA 3) 16:26 (WEA 3)	06:52 18:34	06:40 20:28	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	16:04 (WEA 3) 16:24 (WEA 3)	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	16:06 (WEA 3) 16:22 (WEA 3)	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	16:10 (WEA 3) 16:17 (WEA 3)	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 20:35	05:36 21:24	05:12 21:56	
19	08:32 16:56	16:04 (WEA 3) 17:53	07:42 18:43	06:40 20:36	05:34 21:26	05:12 21:57	
20	08:31 16:58	16:02 (WEA 3) 16:17 (WEA 3)	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	16:01 (WEA 3) 16:20 (WEA 3)	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	15:59 (WEA 3) 16:21 (WEA 3)	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	15:58 (WEA 3) 16:22 (WEA 3)	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	15:57 (WEA 3) 16:23 (WEA 3)	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	15:57 (WEA 3) 16:25 (WEA 3)	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	15:57 (WEA 3) 16:26 (WEA 3)	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	15:56 (WEA 3) 16:27 (WEA 3)	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	15:55 (WEA 3) 16:27 (WEA 3)	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	15:55 (WEA 3) 16:28 (WEA 3)	07:21 18:09	06:17 20:00	06:09 20:53	05:22 21:39	05:15 21:57
30	08:18 17:15	15:55 (WEA 3) 16:29 (WEA 3)	07:19 18:09	06:15 20:02	06:07 20:55	05:21 21:40	05:15 21:57
31	08:16 17:17	15:55 (WEA 3) 16:30 (WEA 3)	07:17 20:04	06:13 20:04	05:20 21:42	05:20 21:42	
Sonnenscheinstunden	258	277	367	416	486	500	
astr.max.mögl.Beschattung	338	503					

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

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



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	July	August	September	Oktober		November	Dezember
1	05:16	05:53	06:43	07:32		07:26	15:26 (WEA 3) 08:18
	21:57	21:25	20:22	19:12		17:06 33	15:59 (WEA 3) 16:25
2	05:17	05:54	06:45	07:34		07:28	15:26 (WEA 3) 08:19
	21:56	21:23	20:20	19:10		17:04 33	15:59 (WEA 3) 16:25
3	05:17	05:56	06:46	07:36		07:30	15:25 (WEA 3) 08:21
	21:56	21:21	20:18	19:08		17:02 35	16:00 (WEA 3) 16:24
4	05:18	05:58	06:48	07:37		07:32	15:25 (WEA 3) 08:22
	21:56	21:20	20:15	19:06		17:01 35	16:00 (WEA 3) 16:23
5	05:19	05:59	06:49	07:39		07:34	15:25 (WEA 3) 08:23
	21:55	21:18	20:13	19:03		16:59 36	16:01 (WEA 3) 16:23
6	05:20	06:01	06:51	07:41		07:35	15:25 (WEA 3) 08:25
	21:55	21:16	20:11	19:01		16:57 36	16:01 (WEA 3) 16:22
7	05:21	06:02	06:53	07:42		07:37	15:25 (WEA 3) 08:26
	21:54	21:14	20:09	18:59		16:55 36	16:01 (WEA 3) 16:22
8	05:22	06:04	06:54	07:44		07:39	15:25 (WEA 3) 08:27
	21:53	21:12	20:06	18:56		16:54 36	16:01 (WEA 3) 16:22
9	05:23	06:05	06:56	07:46		07:41	15:25 (WEA 3) 08:28
	21:53	21:11	20:04	18:54		16:52 36	16:01 (WEA 3) 16:21
10	05:24	06:07	06:58	07:48		07:43	15:25 (WEA 3) 08:29
	21:52	21:09	20:02	18:52		16:50 36	16:01 (WEA 3) 16:21
11	05:25	06:09	06:59	07:49		07:44	15:26 (WEA 3) 08:30
	21:51	21:07	19:59	18:50		16:49 35	16:01 (WEA 3) 16:21
12	05:26	06:10	07:01	07:51		07:46	15:26 (WEA 3) 08:32
	21:50	21:05	19:57	18:47		16:47 35	16:01 (WEA 3) 16:21
13	05:27	06:12	07:03	07:53		07:48	15:27 (WEA 3) 08:33
	21:50	21:03	19:55	18:45		16:46 33	16:00 (WEA 3) 16:21
14	05:28	06:14	07:04	07:54		07:50	15:28 (WEA 3) 08:34
	21:49	21:01	19:52	18:43		16:44 32	16:00 (WEA 3) 16:21
15	05:29	06:15	07:06	07:56		07:52	15:29 (WEA 3) 08:34
	21:48	20:59	19:50	18:41		16:43 31	16:00 (WEA 3) 16:21
16	05:30	06:17	07:07	07:58		07:53	15:30 (WEA 3) 08:35
	21:47	20:57	19:48	18:39		16:41 29	15:59 (WEA 3) 16:21
17	05:32	06:18	07:09	08:00		07:55	15:31 (WEA 3) 08:36
	21:46	20:55	19:45	18:36		16:40 28	15:59 (WEA 3) 16:21
18	05:33	06:20	07:11	08:01		07:57	15:31 (WEA 3) 08:37
	21:44	20:53	19:43	18:34		16:39 26	15:57 (WEA 3) 16:21
19	05:34	06:22	07:12	08:03		07:59	15:32 (WEA 3) 08:38
	21:43	20:51	19:41	18:32		16:37 24	15:56 (WEA 3) 16:22
20	05:36	06:23	07:14	08:05		08:00	15:34 (WEA 3) 08:38
	21:42	20:49	19:38	18:30		16:36 22	15:56 (WEA 3) 16:22
21	05:37	06:25	07:16	08:07		08:02	15:36 (WEA 3) 08:39
	21:41	20:46	19:36	18:28		16:35 19	15:55 (WEA 3) 16:22
22	05:38	06:27	07:17	08:08		08:04	15:38 (WEA 3) 08:39
	21:40	20:44	19:34	18:26		16:34 15	15:53 (WEA 3) 16:23
23	05:40	06:28	07:19	08:10		08:05	15:41 (WEA 3) 08:40
	21:38	20:42	19:31	18:24		16:33 10	15:51 (WEA 3) 16:23
24	05:41	06:30	07:21	08:12		08:07	15:43 (WEA 3) 08:40
	21:37	20:40	19:29	18:22		16:31	16:24
25	05:42	06:31	07:22	08:14	10	15:39 (WEA 3) 08:09	08:41
	21:35	20:38	19:26	17:20		16:30	16:25
26	05:44	06:33	07:24	08:16	17	15:35 (WEA 3) 08:10	08:41
	21:34	20:36	19:24	17:18		16:29	16:25
27	05:45	06:35	07:26	08:17	21	15:33 (WEA 3) 08:12	08:41
	21:33	20:33	19:22	17:16		16:29	16:26
28	05:47	06:36	07:27	08:19	25	15:31 (WEA 3) 08:13	08:41
	21:31	20:31	19:19	17:14		16:28	16:27
29	05:48	06:38	07:29	08:21	27	15:30 (WEA 3) 08:15	08:42
	21:30	20:29	19:17	17:12		16:27	16:28
30	05:50	06:40	07:31	08:23	29	15:28 (WEA 3) 08:16	08:42
	21:28	20:27	19:15	17:10		16:26	16:29
31	05:51	06:41	07:32	08:25	31	15:27 (WEA 3) 08:17	08:42
	21:26	20:25	19:13	17:08		16:25	16:30
Sonnenscheinstunden	503	454	381	331		266	243
astr.max.mögl.Beschattung				160		691	

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinstrahlungsrichtung

Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	März	April	Mai	Juni	
1	08:42 16:31	08:15 17:19	15:51 (WEA 3) 16:27 (WEA 3)	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	15:51 (WEA 3) 16:27 (WEA 3)	07:19 18:13	07:08 20:07	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	15:52 (WEA 3) 16:28 (WEA 3)	07:17 18:15	07:05 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	15:52 (WEA 3) 16:28 (WEA 3)	07:14 18:16	07:03 20:10	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	15:52 (WEA 3) 16:28 (WEA 3)	07:12 18:18	07:01 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	15:52 (WEA 3) 16:27 (WEA 3)	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	15:52 (WEA 3) 16:27 (WEA 3)	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	15:53 (WEA 3) 16:27 (WEA 3)	07:05 18:24	06:54 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	15:54 (WEA 3) 16:26 (WEA 3)	07:03 18:25	06:52 20:19	05:50 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	15:55 (WEA 3) 16:26 (WEA 3)	07:01 18:27	06:49 20:21	05:48 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	15:56 (WEA 3) 16:25 (WEA 3)	06:59 18:29	06:47 20:23	05:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	15:57 (WEA 3) 16:24 (WEA 3)	06:56 18:31	06:45 20:24	05:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	15:59 (WEA 3) 16:23 (WEA 3)	06:54 18:32	06:43 20:26	05:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	16:01 (WEA 3) 16:21 (WEA 3)	06:52 18:34	06:40 20:28	05:42 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	16:03 (WEA 3) 16:19 (WEA 3)	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	16:07 (WEA 3) 16:15 (WEA 3)	06:47 18:38	06:36 20:31	05:39 21:21	05:12 21:55
17	08:34 16:53	16:00 (WEA 3) 16:10 (WEA 3)	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	15:58 (WEA 3) 16:13 (WEA 3)	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	15:57 (WEA 3) 16:15 (WEA 3)	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	15:56 (WEA 3) 16:17 (WEA 3)	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	15:55 (WEA 3) 16:19 (WEA 3)	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	15:54 (WEA 3) 16:19 (WEA 3)	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	15:54 (WEA 3) 16:21 (WEA 3)	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	15:53 (WEA 3) 16:21 (WEA 3)	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	15:53 (WEA 3) 16:23 (WEA 3)	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	15:53 (WEA 3) 16:24 (WEA 3)	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	15:52 (WEA 3) 16:25 (WEA 3)	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	15:51 (WEA 3) 16:25 (WEA 3)	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	15:51 (WEA 3) 16:26 (WEA 3)	07:21 18:09	06:17 20:00	06:09 20:53	05:22 21:39	05:15 21:57
30	08:18 17:15	15:51 (WEA 3) 16:26 (WEA 3)	07:19 18:09	07:15 20:02	06:07 20:55	05:21 21:40	05:15 21:57
31	08:16 17:17	15:52 (WEA 3) 16:27 (WEA 3)	07:17 18:09	07:12 20:04	06:05 20:57	05:20 21:42	05:15 21:57
Sonnenscheinstunden	258	277	367	416	486	500	
astr.max.mögl.Beschattung	401	471					

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	July	August	September	Oktober		November	Dezember
1	05:16	05:53	06:43	07:32		07:26	15:24 (WEA 3) 08:18
	21:57	21:25	20:22	19:12		17:06 31	15:55 (WEA 3) 16:25
2	05:17	05:54	06:45	07:34		07:28	15:23 (WEA 3) 08:19
	21:56	21:23	20:20	19:10		17:04 33	15:56 (WEA 3) 16:25
3	05:17	05:56	06:46	07:36		07:30	15:23 (WEA 3) 08:21
	21:56	21:21	20:18	19:08		17:02 33	15:56 (WEA 3) 16:24
4	05:18	05:58	06:48	07:37		07:32	15:22 (WEA 3) 08:22
	21:56	21:20	20:15	19:06		17:01 35	15:57 (WEA 3) 16:23
5	05:19	05:59	06:50	07:39		07:34	15:22 (WEA 3) 08:23
	21:55	21:18	20:13	19:03		16:59 35	15:57 (WEA 3) 16:23
6	05:20	06:01	06:51	07:41		07:35	15:22 (WEA 3) 08:25
	21:55	21:16	20:11	19:01		16:57 36	15:58 (WEA 3) 16:22
7	05:21	06:02	06:53	07:42		07:37	15:22 (WEA 3) 08:26
	21:54	21:14	20:09	18:59		16:55 36	15:58 (WEA 3) 16:22
8	05:22	06:04	06:54	07:44		07:39	15:22 (WEA 3) 08:27
	21:53	21:12	20:06	18:56		16:54 36	15:58 (WEA 3) 16:22
9	05:23	06:05	06:56	07:46		07:41	15:22 (WEA 3) 08:28
	21:53	21:11	20:04	18:54		16:52 36	15:58 (WEA 3) 16:21
10	05:24	06:07	06:58	07:48		07:43	15:22 (WEA 3) 08:29
	21:52	21:09	20:02	18:52		16:50 36	15:58 (WEA 3) 16:21
11	05:25	06:09	06:59	07:49		07:44	15:22 (WEA 3) 08:30
	21:51	21:07	19:59	18:50		16:49 36	15:58 (WEA 3) 16:21
12	05:26	06:10	07:01	07:51		07:46	15:23 (WEA 3) 08:32
	21:50	21:05	19:57	18:47		16:47 35	15:58 (WEA 3) 16:21
13	05:27	06:12	07:03	07:53		07:48	15:23 (WEA 3) 08:33
	21:50	21:03	19:55	18:45		16:46 35	15:58 (WEA 3) 16:21
14	05:28	06:14	07:04	07:54		07:50	15:24 (WEA 3) 08:34
	21:49	21:01	19:52	18:43		16:44 34	15:58 (WEA 3) 16:21
15	05:29	06:15	07:06	07:56		07:52	15:25 (WEA 3) 08:34
	21:48	20:59	19:50	18:41		16:43 32	15:57 (WEA 3) 16:21
16	05:30	06:17	07:07	07:58		07:53	15:26 (WEA 3) 08:35
	21:47	20:57	19:48	18:39		16:41 31	15:57 (WEA 3) 16:21
17	05:32	06:18	07:09	08:00		07:55	15:26 (WEA 3) 08:36
	21:46	20:55	19:45	18:36		16:40 31	15:57 (WEA 3) 16:21
18	05:33	06:20	07:11	08:01		07:57	15:27 (WEA 3) 08:37
	21:44	20:53	19:43	18:34		16:39 28	15:55 (WEA 3) 16:21
19	05:34	06:22	07:12	08:03		07:59	15:28 (WEA 3) 08:38
	21:43	20:51	19:41	18:32		16:37 27	15:55 (WEA 3) 16:22
20	05:36	06:23	07:14	08:05		08:00	15:29 (WEA 3) 08:38
	21:42	20:49	19:38	18:30		16:36 25	15:54 (WEA 3) 16:22
21	05:37	06:25	07:16	08:07		08:02	15:30 (WEA 3) 08:39
	21:41	20:46	19:36	18:28		16:35 24	15:54 (WEA 3) 16:22
22	05:38	06:27	07:17	08:08		08:04	15:32 (WEA 3) 08:39
	21:40	20:44	19:34	18:26		16:34 21	15:53 (WEA 3) 16:23
23	05:40	06:28	07:19	08:10		08:05	15:34 (WEA 3) 08:40
	21:38	20:42	19:31	18:24		16:33 18	15:52 (WEA 3) 16:23
24	05:41	06:30	07:21	08:12		08:07	15:35 (WEA 3) 08:40
	21:37	20:40	19:29	18:22		16:31 15	15:50 (WEA 3) 16:24
25	05:42	06:31	07:22	07:14		08:09	15:38 (WEA 3) 08:41
	21:35	20:38	19:26	17:20		16:30 10	15:48 (WEA 3) 16:25
26	05:44	06:33	07:24	07:16	15:36 (WEA 3)	08:10	08:41
	21:34	20:36	19:24	17:18	10 15:46 (WEA 3)	16:29	16:25
27	05:45	06:35	07:26	07:17	15:32 (WEA 3)	08:12	08:41
	21:33	20:33	19:22	17:16	17 15:49 (WEA 3)	16:29	16:26
28	05:47	06:36	07:27	07:19	15:30 (WEA 3)	08:13	08:41
	21:31	20:31	19:19	17:14	21 15:51 (WEA 3)	16:28	16:27
29	05:48	06:38	07:29	07:21	15:28 (WEA 3)	08:15	08:42
	21:30	20:29	19:17	17:12	25 15:53 (WEA 3)	16:27	16:28
30	05:50	06:40	07:31	07:23	15:26 (WEA 3)	08:16	08:42
	21:28	20:27	19:15	17:10	27 15:53 (WEA 3)	16:26	16:29
31	05:51	06:41		07:25	15:25 (WEA 3)		08:42
	21:26	20:25		17:08	29 15:54 (WEA 3)		16:30
Sonnenscheinstunden	503	454	381	331		266	243
astr.max.mögl.Beschattung				129		749	

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	Januar	Februar	März	April	Mai	Juni
1	08:42 16:31	08:15 17:19	07:21 18:11	16:08 (WEA 3) 18:11	07:10 20:05	06:05 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	16:10 (WEA 3) 16:42 (WEA 3)	07:08 20:07	06:03 20:58
3	08:41 16:33	08:11 17:23	16:21 (WEA 3) 16:33 (WEA 3)	07:17 18:15	16:12 (WEA 3) 16:41 (WEA 3)	07:05 20:09
4	08:41 16:34	08:10 17:25	16:17 (WEA 3) 16:37 (WEA 3)	07:14 18:16	16:14 (WEA 3) 16:39 (WEA 3)	07:03 20:11
5	08:41 16:35	08:08 17:26	16:15 (WEA 3) 16:39 (WEA 3)	07:12 18:18	16:16 (WEA 3) 16:35 (WEA 3)	07:01 20:12
6	08:41 16:37	08:06 17:28	16:13 (WEA 3) 16:41 (WEA 3)	07:10 18:20	16:21 (WEA 3) 16:30 (WEA 3)	06:58 20:14
7	08:40 16:38	08:05 17:30	16:11 (WEA 3) 16:42 (WEA 3)	07:08 18:22	06:56 20:16	05:54 21:07
8	08:40 16:39	08:03 17:32	16:10 (WEA 3) 16:43 (WEA 3)	07:05 18:24	06:54 20:17	05:52 21:08
9	08:39 16:41	08:01 17:34	16:09 (WEA 3) 16:45 (WEA 3)	07:03 18:25	06:52 20:19	05:50 21:10
10	08:39 16:42	07:59 17:36	16:09 (WEA 3) 16:47 (WEA 3)	07:01 18:27	06:49 20:21	05:48 21:12
11	08:38 16:43	07:58 17:38	16:08 (WEA 3) 16:47 (WEA 3)	06:59 18:29	06:47 20:23	05:47 21:13
12	08:38 16:45	07:56 17:40	16:07 (WEA 3) 16:48 (WEA 3)	06:56 18:31	06:45 20:24	05:45 21:15
13	08:37 16:46	07:54 17:41	16:06 (WEA 3) 16:49 (WEA 3)	06:54 18:32	06:43 20:26	05:43 21:16
14	08:36 16:48	07:52 17:43	16:06 (WEA 3) 16:49 (WEA 3)	06:52 18:34	06:40 20:28	05:42 21:18
15	08:35 16:50	07:50 17:45	16:05 (WEA 3) 16:50 (WEA 3)	06:49 18:36	06:38 20:29	05:40 21:19
16	08:34 16:51	07:48 17:47	16:05 (WEA 3) 16:50 (WEA 3)	06:47 18:38	06:36 20:31	05:39 21:21
17	08:34 16:53	07:46 17:49	16:04 (WEA 3) 16:50 (WEA 3)	06:45 18:39	06:34 20:33	05:37 21:23
18	08:33 16:54	07:44 17:51	16:04 (WEA 3) 16:50 (WEA 3)	06:42 18:41	06:32 20:35	05:36 21:24
19	08:32 16:56	07:42 17:53	16:04 (WEA 3) 16:50 (WEA 3)	06:40 18:43	06:29 20:36	05:34 21:26
20	08:31 16:58	07:40 17:55	16:04 (WEA 3) 16:50 (WEA 3)	06:38 18:45	06:27 20:38	05:33 21:27
21	08:29 16:59	07:38 17:56	16:04 (WEA 3) 16:50 (WEA 3)	06:35 18:46	06:25 20:40	05:31 21:28
22	08:28 17:01	07:36 17:58	16:04 (WEA 3) 16:50 (WEA 3)	06:33 18:48	06:23 20:41	05:30 21:30
23	08:27 17:03	07:34 18:00	16:05 (WEA 3) 16:50 (WEA 3)	06:31 18:50	06:21 20:43	05:29 21:31
24	08:26 17:05	07:32 18:02	16:05 (WEA 3) 16:49 (WEA 3)	06:29 18:52	06:19 20:45	05:28 21:33
25	08:25 17:06	07:30 18:04	16:05 (WEA 3) 16:48 (WEA 3)	06:26 18:53	06:17 20:46	05:26 21:34
26	08:23 17:08	07:27 18:06	16:06 (WEA 3) 16:47 (WEA 3)	06:24 18:55	06:15 20:48	05:25 21:35
27	08:22 17:10	07:25 18:07	16:07 (WEA 3) 16:46 (WEA 3)	06:22 18:57	06:13 20:50	05:24 21:37
28	08:21 17:12	07:23 18:09	16:08 (WEA 3) 16:46 (WEA 3)	06:19 18:58	06:11 20:52	05:23 21:38
29	08:19 17:14		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		1004	150			

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	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	15:37 (WEA 3) 16:15 (WEA 3)
2	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10		07:28 17:04	15:38 (WEA 3) 16:14 (WEA 3)
3	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08		07:30 17:02	15:40 (WEA 3) 16:13 (WEA 3)
4	05:18 21:56	05:58 21:20	06:48 20:15	07:37 19:06		07:32 17:01	15:41 (WEA 3) 16:12 (WEA 3)
5	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03		07:34 16:59	15:43 (WEA 3) 16:10 (WEA 3)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01		07:35 16:57	15:45 (WEA 3) 16:08 (WEA 3)
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59		07:37 16:55	15:47 (WEA 3) 16:06 (WEA 3)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	15	07:39 17:09 (WEA 3)	15:51 (WEA 3) 16:03 (WEA 3)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	21	07:41 17:11 (WEA 3)	16:03 (WEA 3) 16:21
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	27	07:43 17:14 (WEA 3)	16:21 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	31	07:44 17:16 (WEA 3)	16:21 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	34	07:46 17:17 (WEA 3)	16:21 16:21
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	36	07:48 17:18 (WEA 3)	16:21 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	38	07:50 17:18 (WEA 3)	16:21 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	40	07:52 17:19 (WEA 3)	16:21 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	42	07:53 17:20 (WEA 3)	16:21 16:21
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	43	07:55 17:20 (WEA 3)	16:21 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	45	07:57 17:21 (WEA 3)	16:21 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	45	07:59 17:20 (WEA 3)	16:21 16:21
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	45	08:00 17:20 (WEA 3)	16:21 16:21
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	46	08:02 17:20 (WEA 3)	16:21 16:21
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	46	08:04 17:20 (WEA 3)	16:21 16:21
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	46	08:05 17:20 (WEA 3)	16:21 16:21
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	46	08:07 17:20 (WEA 3)	16:21 16:21
25	05:42 21:35	06:31 20:38	07:22 19:26	08:14 18:20	46	08:09 16:20 (WEA 3)	16:21 16:21
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16 18:18	45	08:10 16:20 (WEA 3)	16:21 16:21
27	05:45 21:33	06:35 20:33	07:26 19:22	08:17 18:16	44	08:12 16:19 (WEA 3)	16:21 16:21
28	05:47 21:31	06:36 20:31	07:27 19:19	08:19 18:14	44	08:13 16:19 (WEA 3)	16:21 16:21
29	05:48 21:30	06:38 20:29	07:29 19:17	08:21 18:12	42	08:15 16:18 (WEA 3)	16:21 16:21
30	05:50 21:28	06:40 20:27	07:31 19:15	08:23 18:10	41	08:16 16:17 (WEA 3)	16:21 16:21
31	05:51 21:26	06:41 20:25		08:25 18:08	39	16:16 (WEA 3)	16:21 16:21
Sonnenscheinstunden	503	454	381	331		266	243
astr.max.mögl.Beschattung				947		219	

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	Januar	Februar	März	April	Mai	Juni
1	08:42 16:31	08:15 17:19		16:07 (WEA 3) 18:11	07:10 20:05	06:05 21:43
2	08:42 16:32	08:13 17:21	12 16:18 (WEA 3) 16:30 (WEA 3)	07:19 18:13	16:09 (WEA 3) 20:07	06:03 21:44
3	08:41 16:33	08:11 17:23	20 16:15 (WEA 3) 16:35 (WEA 3)	07:17 18:15	16:11 (WEA 3) 20:09	06:01 21:45
4	08:41 16:34	08:10 17:25	24 16:13 (WEA 3) 16:37 (WEA 3)	07:14 18:16	16:14 (WEA 3) 20:11	05:59 21:46
5	08:41 16:35	08:08 17:26	28 16:11 (WEA 3) 16:39 (WEA 3)	07:12 18:18	16:16 (WEA 3) 20:12	05:57 21:47
6	08:41 16:37	08:06 17:28	31 16:09 (WEA 3) 16:40 (WEA 3)	07:10 18:20	16:16 (WEA 3) 20:14	05:55 21:48
7	08:40 16:38	08:05 17:30	33 16:08 (WEA 3) 16:41 (WEA 3)	07:08 18:22	16:16 (WEA 3) 20:16	05:54 21:49
8	08:40 16:39	08:03 17:32	36 16:07 (WEA 3) 16:43 (WEA 3)	07:05 18:24	16:16 (WEA 3) 20:17	05:52 21:50
9	08:39 16:41	08:01 17:34	38 16:06 (WEA 3) 16:44 (WEA 3)	07:03 18:25	16:16 (WEA 3) 20:19	05:50 21:51
10	08:39 16:42	07:59 17:36	39 16:06 (WEA 3) 16:45 (WEA 3)	07:01 18:27	16:16 (WEA 3) 20:21	05:48 21:51
11	08:38 16:43	07:58 17:38	41 16:05 (WEA 3) 16:46 (WEA 3)	06:59 18:29	16:16 (WEA 3) 20:23	05:47 21:52
12	08:38 16:45	07:56 17:40	43 16:04 (WEA 3) 16:47 (WEA 3)	06:56 18:31	16:16 (WEA 3) 20:24	05:45 21:53
13	08:37 16:46	07:54 17:41	43 16:04 (WEA 3) 16:47 (WEA 3)	06:54 18:32	16:16 (WEA 3) 20:26	05:43 21:54
14	08:36 16:48	07:52 17:43	45 16:03 (WEA 3) 16:48 (WEA 3)	06:52 18:34	16:16 (WEA 3) 20:28	05:42 21:54
15	08:35 16:50	07:50 17:45	45 16:03 (WEA 3) 16:48 (WEA 3)	06:49 18:36	16:16 (WEA 3) 20:29	05:40 21:55
16	08:34 16:51	07:48 17:47	46 16:03 (WEA 3) 16:49 (WEA 3)	06:47 18:38	16:16 (WEA 3) 20:31	05:39 21:55
17	08:34 16:53	07:46 17:49	46 16:02 (WEA 3) 16:48 (WEA 3)	06:45 18:39	16:16 (WEA 3) 20:33	05:37 21:56
18	08:33 16:54	07:44 17:51	46 16:02 (WEA 3) 16:48 (WEA 3)	06:42 18:41	16:16 (WEA 3) 20:35	05:36 21:56
19	08:32 16:56	07:42 17:53	46 16:02 (WEA 3) 16:48 (WEA 3)	06:40 18:43	16:16 (WEA 3) 20:36	05:34 21:57
20	08:31 16:58	07:40 17:55	46 16:02 (WEA 3) 16:48 (WEA 3)	06:38 18:45	16:16 (WEA 3) 20:38	05:33 21:57
21	08:29 16:59	07:38 17:56	46 16:02 (WEA 3) 16:48 (WEA 3)	06:35 18:46	16:16 (WEA 3) 20:40	05:31 21:57
22	08:28 17:01	07:36 17:58	46 16:02 (WEA 3) 16:48 (WEA 3)	06:33 18:48	16:16 (WEA 3) 20:41	05:30 21:57
23	08:27 17:03	07:34 18:00	44 16:03 (WEA 3) 16:47 (WEA 3)	06:31 18:50	16:16 (WEA 3) 20:43	05:29 21:57
24	08:26 17:05	07:32 18:02	43 16:04 (WEA 3) 16:47 (WEA 3)	06:29 18:52	16:16 (WEA 3) 20:45	05:28 21:58
25	08:25 17:06	07:30 18:04	43 16:03 (WEA 3) 16:46 (WEA 3)	06:26 18:53	16:16 (WEA 3) 20:46	05:26 21:58
26	08:23 17:08	07:27 18:06	41 16:04 (WEA 3) 16:45 (WEA 3)	06:24 18:55	16:16 (WEA 3) 20:48	05:25 21:58
27	08:22 17:10	07:25 18:07	39 16:05 (WEA 3) 16:44 (WEA 3)	06:22 18:57	16:16 (WEA 3) 20:50	05:24 21:58
28	08:21 17:12	07:23 18:09	36 16:07 (WEA 3) 16:43 (WEA 3)	06:19 18:58	16:16 (WEA 3) 20:51	05:23 21:57
29	08:19 17:14			07:17 20:00	16:16 (WEA 3) 20:53	05:22 21:57
30	08:18 17:15			07:15 20:02	16:16 (WEA 3) 20:55	05:21 21:57
31	08:16 17:17			07:12 20:04	16:16 (WEA 3) 20:57	05:20 21:57
Sonnenscheinstunden	258	277				
astr.max.mögl.Beschattung		1046		129	416	500

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

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



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	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	15:34 (WEA 3) 16:14 (WEA 3)
2	05:17 21:56	05:54 21:23	06:45 20:20	07:34 19:10		07:28 17:04	15:35 (WEA 3) 16:13 (WEA 3)
3	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08		07:30 17:02	15:36 (WEA 3) 16:12 (WEA 3)
4	05:18 21:56	05:58 21:20	06:48 20:15	07:37 19:06		07:32 17:01	15:38 (WEA 3) 16:11 (WEA 3)
5	05:19 21:55	05:59 21:18	06:50 20:13	07:39 19:03		07:34 16:59	15:39 (WEA 3) 16:10 (WEA 3)
6	05:20 21:55	06:01 21:16	06:51 20:11	07:41 19:01		07:35 16:57	15:41 (WEA 3) 16:08 (WEA 3)
7	05:21 21:54	06:02 21:14	06:53 20:09	07:42 18:59		07:37 16:55	15:43 (WEA 3) 16:06 (WEA 3)
8	05:22 21:53	06:04 21:12	06:54 20:06	07:44 18:56	9	16:55 (WEA 3) 17:04 (WEA 3)	15:45 (WEA 3) 16:04 (WEA 3)
9	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	19	16:49 (WEA 3) 17:08 (WEA 3)	15:49 (WEA 3) 16:01 (WEA 3)
10	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	25	16:46 (WEA 3) 17:11 (WEA 3)	16:22 16:50
11	05:25 21:51	06:09 21:07	06:59 19:59	07:49 18:50	29	16:44 (WEA 3) 17:13 (WEA 3)	08:30 16:49
12	05:26 21:50	06:10 21:05	07:01 19:57	07:51 18:47	32	16:42 (WEA 3) 17:14 (WEA 3)	08:32 16:47
13	05:27 21:50	06:12 21:03	07:03 19:55	07:53 18:45	35	16:41 (WEA 3) 17:16 (WEA 3)	08:33 16:46
14	05:28 21:49	06:14 21:01	07:04 19:52	07:54 18:43	38	16:38 (WEA 3) 17:16 (WEA 3)	08:33 16:44
15	05:29 21:48	06:15 20:59	07:06 19:50	07:56 18:41	40	16:37 (WEA 3) 17:17 (WEA 3)	08:34 16:43
16	05:30 21:47	06:17 20:57	07:07 19:48	07:58 18:39	41	16:36 (WEA 3) 17:17 (WEA 3)	08:35 16:41
17	05:32 21:46	06:18 20:55	07:09 19:45	08:00 18:36	43	16:35 (WEA 3) 17:18 (WEA 3)	08:36 16:40
18	05:33 21:44	06:20 20:53	07:11 19:43	08:01 18:34	44	16:35 (WEA 3) 17:19 (WEA 3)	08:37 16:39
19	05:34 21:43	06:22 20:51	07:12 19:41	08:03 18:32	45	16:33 (WEA 3) 17:18 (WEA 3)	08:38 16:37
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05 18:30	45	16:33 (WEA 3) 17:18 (WEA 3)	08:38 16:36
21	05:37 21:41	06:25 20:46	07:16 19:36	08:07 18:28	46	16:32 (WEA 3) 17:18 (WEA 3)	08:39 16:35
22	05:38 21:40	06:27 20:44	07:17 19:34	08:08 18:26	47	16:32 (WEA 3) 17:19 (WEA 3)	08:39 16:34
23	05:40 21:38	06:28 20:42	07:19 19:31	08:10 18:24	47	16:32 (WEA 3) 17:19 (WEA 3)	08:40 16:33
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	46	16:32 (WEA 3) 17:18 (WEA 3)	08:40 16:31
25	05:42 21:35	06:31 20:38	07:22 19:26	07:14 17:20	46	15:32 (WEA 3) 16:18 (WEA 3)	08:09 16:30
26	05:44 21:34	06:33 20:36	07:24 19:24	07:16 17:18	46	15:32 (WEA 3) 16:18 (WEA 3)	08:10 16:29
27	05:45 21:33	06:35 20:33	07:26 19:22	07:17 17:16	45	15:33 (WEA 3) 16:18 (WEA 3)	08:12 16:29
28	05:47 21:31	06:36 20:31	07:27 19:19	07:19 17:14	44	15:33 (WEA 3) 16:17 (WEA 3)	08:13 16:28
29	05:48 21:30	06:38 20:29	07:29 19:17	07:21 17:12	44	15:33 (WEA 3) 16:17 (WEA 3)	08:15 16:27
30	05:50 21:28	06:40 20:27	07:31 19:15	07:23 17:10	42	15:33 (WEA 3) 16:15 (WEA 3)	08:16 16:26
31	05:51 21:26	06:41 20:25		07:25 17:08	41	15:34 (WEA 3) 16:15 (WEA 3)	08:42 16:30
Sonnenscheinstunden	503	454	381	331		266	243
astr.max.mögl.Beschattung				939		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)	Schattenende (WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	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 3) 18:33 (WEA 3)	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	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	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	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	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	6	17:30 (WEA 3) 17:36 (WEA 3)			06:58 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	17	17:25 (WEA 3) 17:42 (WEA 3)			06:56 20:16	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	23	17:21 (WEA 3) 17:44 (WEA 3)			06:54 20:17	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	27	17:19 (WEA 3) 17:46 (WEA 3)			06:52 20:19	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	31	17:17 (WEA 3) 17:48 (WEA 3)			06:49 20:21	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	33	17:16 (WEA 3) 17:49 (WEA 3)			06:47 20:23	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	35	17:14 (WEA 3) 17:49 (WEA 3)			06:45 20:24	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	37	17:13 (WEA 3) 17:50 (WEA 3)			06:43 20:26	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	38	17:13 (WEA 3) 17:51 (WEA 3)			06:40 20:28	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	40	17:11 (WEA 3) 17:51 (WEA 3)			06:38 20:29	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	40	17:11 (WEA 3) 17:51 (WEA 3)			06:36 20:31	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	42	17:10 (WEA 3) 17:52 (WEA 3)			06:34 20:33	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	42	17:09 (WEA 3) 17:51 (WEA 3)			06:32 20:34	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	42	17:09 (WEA 3) 17:51 (WEA 3)			06:29 20:36	05:12 21:57
20	08:31 16:58	07:40 17:54	06:38 18:45	42	17:09 (WEA 3) 17:51 (WEA 3)			06:27 20:38	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	41	17:09 (WEA 3) 17:50 (WEA 3)			06:25 20:40	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	41	17:09 (WEA 3) 17:50 (WEA 3)			06:23 20:41	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	41	17:09 (WEA 3) 17:50 (WEA 3)			06:21 20:43	05:12 21:57
24	08:26 17:05	07:32 18:02	06:29 18:52	39	17:09 (WEA 3) 17:48 (WEA 3)			06:19 20:45	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	37	17:10 (WEA 3) 17:47 (WEA 3)			06:17 20:46	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	36	17:11 (WEA 3) 17:47 (WEA 3)			06:15 20:48	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	34	17:11 (WEA 3) 17:45 (WEA 3)			06:13 20:50	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	31	17:12 (WEA 3) 17:43 (WEA 3)			06:11 20:52	05:14 21:57
29	08:19 17:14		07:17 20:00	28	18:14 (WEA 3) 18:42 (WEA 3)			06:09 20:53	05:15 21:57
30	08:18 17:15		07:15 20:02	24	18:15 (WEA 3) 18:39 (WEA 3)			06:07 20:55	05:15 21:57
31	08:16 17:17		07:12 20:04	19	18:18 (WEA 3) 18:37 (WEA 3)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416	11		486	500
astr.max.mögl.Beschattung				866					

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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		07:32 19:12	17:54 (WEA 3) 18:30 (WEA 3)	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	17:54 (WEA 3) 18:28 (WEA 3)	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18		07:36 19:08	17:55 (WEA 3) 18:26 (WEA 3)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15		07:37 19:06	17:56 (WEA 3) 18:25 (WEA 3)	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:50 20:13		07:39 19:03	17:57 (WEA 3) 18:22 (WEA 3)	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	17:59 (WEA 3) 18:19 (WEA 3)	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	18:03 (WEA 3) 18:16 (WEA 3)	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		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		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		07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	9	18:15 (WEA 3) 18:24 (WEA 3)	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	18:09 (WEA 3) 18:27 (WEA 3)	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	23	18:07 (WEA 3) 18:30 (WEA 3)	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	27	18:05 (WEA 3) 18:32 (WEA 3)	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	31	18:02 (WEA 3) 18:33 (WEA 3)	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	33	18:01 (WEA 3) 18:34 (WEA 3)	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	36	17:58 (WEA 3) 18:34 (WEA 3)	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	37	17:58 (WEA 3) 18:35 (WEA 3)	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	38	17:57 (WEA 3) 18:35 (WEA 3)	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	40	17:55 (WEA 3) 18:35 (WEA 3)	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	40	17:55 (WEA 3) 18:35 (WEA 3)	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	42	17:54 (WEA 3) 18:36 (WEA 3)	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	42	17:53 (WEA 3) 18:35 (WEA 3)	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	42	17:53 (WEA 3) 18:35 (WEA 3)	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	42	17:52 (WEA 3) 18:34 (WEA 3)	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	42	17:52 (WEA 3) 18:34 (WEA 3)	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	41	17:52 (WEA 3) 18:33 (WEA 3)	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	40	17:52 (WEA 3) 18:32 (WEA 3)	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	39	17:52 (WEA 3) 18:31 (WEA 3)	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	38	17:53 (WEA 3) 18:31 (WEA 3)	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			700		188			

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	9	18:24 (WEA 3) 18:33 (WEA 3)	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	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	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	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	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	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	15	17:29 (WEA 3) 17:44 (WEA 3)			06:54 20:17	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	22	17:25 (WEA 3) 17:47 (WEA 3)			06:52 20:19	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	26	17:23 (WEA 3) 17:49 (WEA 3)			06:49 20:21	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	29	17:22 (WEA 3) 17:51 (WEA 3)			06:47 20:23	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	32	17:19 (WEA 3) 17:51 (WEA 3)			06:45 20:24	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	34	17:18 (WEA 3) 17:52 (WEA 3)			06:43 20:26	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	36	17:17 (WEA 3) 17:53 (WEA 3)			06:40 20:28	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	37	17:16 (WEA 3) 17:53 (WEA 3)			06:38 20:29	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	39	17:15 (WEA 3) 17:54 (WEA 3)			06:36 20:31	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	39	17:15 (WEA 3) 17:54 (WEA 3)			06:34 20:33	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	39	17:14 (WEA 3) 17:53 (WEA 3)			06:32 20:34	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	38	17:14 (WEA 3) 17:52 (WEA 3)			06:29 20:36	05:12 21:57
20	08:31 16:58	07:40 17:54	06:38 18:45	37	17:14 (WEA 3) 17:51 (WEA 3)			06:27 20:38	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	36	17:13 (WEA 3) 17:49 (WEA 3)			06:25 20:40	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	34	17:13 (WEA 3) 17:47 (WEA 3)			06:23 20:41	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	33	17:13 (WEA 3) 17:46 (WEA 3)			06:21 20:43	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	31	17:13 (WEA 3) 17:44 (WEA 3)			06:19 20:45	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	29	17:14 (WEA 3) 17:43 (WEA 3)			06:17 20:46	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	28	17:14 (WEA 3) 17:42 (WEA 3)			06:15 20:48	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	24	17:15 (WEA 3) 17:39 (WEA 3)			06:13 20:50	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	22	17:16 (WEA 3) 17:38 (WEA 3)			06:11 20:52	05:14 21:57
29	08:19 17:14		07:17 20:00	20	18:17 (WEA 3) 18:37 (WEA 3)			06:09 20:53	05:15 21:57
30	08:18 17:15		07:15 20:02	17	18:18 (WEA 3) 18:35 (WEA 3)			06:07 20:55	05:15 21:57
31	08:16 17:17		07:12 20:04	13	18:21 (WEA 3) 18:34 (WEA 3)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416	9		486	500
astr.max.mögl.Beschattung				710					

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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		07:32 19:12	17:59 (WEA 3) 33 18:32 (WEA 3)	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	17:59 (WEA 3) 30 18:29 (WEA 3)	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18		07:36 19:08	18:00 (WEA 3) 28 18:28 (WEA 3)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15		07:37 19:06	18:02 (WEA 3) 24 18:26 (WEA 3)	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:50 20:13		07:39 19:03	18:04 (WEA 3) 18 18:22 (WEA 3)	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	18:08 (WEA 3) 10 18:18 (WEA 3)	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		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		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		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		07:43 16:50	08:29 16:21
11	05:25 21:51	06:09 21:07	06:59 19:59	8	18:17 (WEA 3) 18:25 (WEA 3)	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	13	18:12 (WEA 3) 18:25 (WEA 3)	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	16	18:10 (WEA 3) 18:26 (WEA 3)	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	19	18:08 (WEA 3) 18:27 (WEA 3)	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	22	18:05 (WEA 3) 18:27 (WEA 3)	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	25	18:04 (WEA 3) 18:29 (WEA 3)	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	27	18:02 (WEA 3) 18:29 (WEA 3)	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	29	18:01 (WEA 3) 18:30 (WEA 3)	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	30	18:01 (WEA 3) 18:31 (WEA 3)	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	32	17:59 (WEA 3) 18:31 (WEA 3)	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	34	17:59 (WEA 3) 18:33 (WEA 3)	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	36	17:58 (WEA 3) 18:34 (WEA 3)	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	37	17:57 (WEA 3) 18:34 (WEA 3)	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	17:57 (WEA 3) 18:35 (WEA 3)	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	39	17:56 (WEA 3) 18:35 (WEA 3)	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	40	17:56 (WEA 3) 18:36 (WEA 3)	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	39	17:57 (WEA 3) 18:36 (WEA 3)	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	38	17:56 (WEA 3) 18:34 (WEA 3)	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	36	17:57 (WEA 3) 18:33 (WEA 3)	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	35	17:58 (WEA 3) 18:33 (WEA 3)	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			593		143			

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	--	--

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	5	18:27 (WEA 3) 18:32 (WEA 3)	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	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	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	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	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	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	14	17:29 (WEA 3) 17:43 (WEA 3)			06:56 20:16	05:54 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	20	17:25 (WEA 3) 17:45 (WEA 3)			06:54 20:17	05:52 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	26	17:22 (WEA 3) 17:48 (WEA 3)			06:52 20:19	05:50 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	29	17:21 (WEA 3) 17:50 (WEA 3)			06:49 20:21	05:48 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	32	17:19 (WEA 3) 17:51 (WEA 3)			06:47 20:23	05:47 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	34	17:17 (WEA 3) 17:51 (WEA 3)			06:45 20:24	05:45 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	36	17:16 (WEA 3) 17:52 (WEA 3)			06:43 20:26	05:43 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	37	17:16 (WEA 3) 17:53 (WEA 3)			06:40 20:28	05:42 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36	39	17:14 (WEA 3) 17:53 (WEA 3)			06:38 20:29	05:40 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	39	17:14 (WEA 3) 17:53 (WEA 3)			06:36 20:31	05:39 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	41	17:13 (WEA 3) 17:54 (WEA 3)			06:34 20:33	05:37 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	41	17:12 (WEA 3) 17:53 (WEA 3)			06:32 20:34	05:36 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	41	17:12 (WEA 3) 17:53 (WEA 3)			06:29 20:36	05:34 21:57
20	08:31 16:58	07:40 17:54	06:38 18:45	41	17:12 (WEA 3) 17:53 (WEA 3)			06:27 20:38	05:33 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	40	17:12 (WEA 3) 17:52 (WEA 3)			06:25 20:40	05:31 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	40	17:12 (WEA 3) 17:52 (WEA 3)			06:23 20:41	05:30 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	38	17:13 (WEA 3) 17:51 (WEA 3)			06:21 20:43	05:29 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	38	17:12 (WEA 3) 17:50 (WEA 3)			06:19 20:45	05:28 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	36	17:13 (WEA 3) 17:49 (WEA 3)			06:17 20:46	05:26 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	34	17:14 (WEA 3) 17:48 (WEA 3)			06:15 20:48	05:25 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	32	17:14 (WEA 3) 17:46 (WEA 3)			06:13 20:50	05:24 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	29	17:16 (WEA 3) 17:45 (WEA 3)			06:11 20:52	05:23 21:57
29	08:19 17:14		07:17 20:00	27	18:17 (WEA 3) 18:44 (WEA 3)			06:09 20:53	05:22 21:57
30	08:18 17:15		07:15 20:02	21	18:19 (WEA 3) 18:40 (WEA 3)			06:07 20:55	05:21 21:57
31	08:16 17:17		07:12 20:04	16	18:22 (WEA 3) 18:38 (WEA 3)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416	5		486	500
astr.max.mögl.Beschattung				821					

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	35	17:57 (WEA 3) 18:32 (WEA 3)	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	33	17:57 (WEA 3) 18:30 (WEA 3)	07:28 17:04	08:19 16:25
3	05:18 21:56	05:56 21:21	06:46 20:18		07:36 19:08	30	17:58 (WEA 3) 18:28 (WEA 3)	07:30 17:02	08:21 16:24
4	05:18 21:56	05:58 21:20	06:48 20:15		07:37 19:06	27	18:00 (WEA 3) 18:27 (WEA 3)	07:32 17:01	08:22 16:23
5	05:19 21:55	05:59 21:18	06:50 20:13		07:39 19:03	23	18:00 (WEA 3) 18:23 (WEA 3)	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	18	18:03 (WEA 3) 18:21 (WEA 3)	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	8	18:08 (WEA 3) 18:16 (WEA 3)	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			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			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			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			07:44 16:49	08:30 16:21
12	05:26 21:50	06:10 21:05	07:01 19:57	15	07:51 18:47		18:13 (WEA 3) 18:28 (WEA 3)	07:51 16:47	08:32 16:21
13	05:27 21:50	06:12 21:03	07:03 19:55	21	07:53 18:45		18:10 (WEA 3) 18:31 (WEA 3)	07:48 16:46	08:33 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	26	07:54 18:43		18:08 (WEA 3) 18:34 (WEA 3)	07:50 16:44	08:33 16:21
15	05:29 21:48	06:15 20:59	07:06 19:50	29	07:56 18:41		18:05 (WEA 3) 18:34 (WEA 3)	07:52 16:43	08:34 16:21
16	05:30 21:47	06:17 20:57	07:07 19:48	32	07:58 18:39		18:04 (WEA 3) 18:36 (WEA 3)	07:53 16:41	08:35 16:21
17	05:32 21:46	06:18 20:55	07:09 19:45	34	08:00 18:36		18:02 (WEA 3) 18:36 (WEA 3)	08:00 16:40	08:36 16:21
18	05:33 21:44	06:20 20:53	07:11 19:43	36	08:01 18:34		18:01 (WEA 3) 18:37 (WEA 3)	08:01 16:39	08:37 16:21
19	05:34 21:43	06:22 20:51	07:12 19:41	37	08:03 18:32		18:00 (WEA 3) 18:37 (WEA 3)	08:03 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	07:14 19:38	39	08:05 18:30		17:58 (WEA 3) 18:37 (WEA 3)	08:05 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	07:16 19:36	39	08:07 18:28		17:58 (WEA 3) 18:37 (WEA 3)	08:07 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	07:17 19:34	41	08:08 18:26		17:57 (WEA 3) 18:38 (WEA 3)	08:08 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	07:19 19:31	41	08:10 18:24		17:56 (WEA 3) 18:37 (WEA 3)	08:10 16:33	08:40 16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	41	08:12 18:22		17:56 (WEA 3) 18:37 (WEA 3)	08:12 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	41	07:14 17:20		17:55 (WEA 3) 18:36 (WEA 3)	08:09 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	41	07:16 17:18		17:55 (WEA 3) 18:36 (WEA 3)	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	40	07:17 17:16		17:55 (WEA 3) 18:35 (WEA 3)	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	39	07:19 17:14		17:55 (WEA 3) 18:34 (WEA 3)	08:13 16:28	08:41 16:27
29	05:48 21:30	06:38 20:29	07:29 19:17	38	07:21 17:12		17:55 (WEA 3) 18:33 (WEA 3)	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	37	07:23 17:10		17:56 (WEA 3) 18:33 (WEA 3)	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			667		174				

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	------------------------------	--	---------------------------------------



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	38	18:39 (WEA 3) 19:17 (WEA 3)	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	37	18:39 (WEA 3) 19:16 (WEA 3)	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	37	18:39 (WEA 3) 19:16 (WEA 3)	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	36	18:39 (WEA 3) 19:15 (WEA 3)	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	35	18:39 (WEA 3) 19:14 (WEA 3)	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	33	18:40 (WEA 3) 19:13 (WEA 3)	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	31	18:41 (WEA 3) 19:12 (WEA 3)	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	29	18:42 (WEA 3) 19:11 (WEA 3)	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	27	18:42 (WEA 3) 19:09 (WEA 3)	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	23	18:44 (WEA 3) 19:07 (WEA 3)	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	19	18:46 (WEA 3) 19:05 (WEA 3)	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	13	18:49 (WEA 3) 19:02 (WEA 3)	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			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			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			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	08:31 16:58	07:40 17:54	06:38 18:45	12	17:56 (WEA 3) 18:08 (WEA 3)			05:33 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	20	17:51 (WEA 3) 18:11 (WEA 3)			05:31 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	24	17:49 (WEA 3) 18:13 (WEA 3)			05:30 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	27	17:48 (WEA 3) 18:15 (WEA 3)			05:29 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	30	17:45 (WEA 3) 18:15 (WEA 3)			05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	32	17:44 (WEA 3) 18:16 (WEA 3)			05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	34	17:42 (WEA 3) 18:16 (WEA 3)			05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	35	17:42 (WEA 3) 18:17 (WEA 3)			05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	36	17:41 (WEA 3) 18:17 (WEA 3)			05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	37	18:41 (WEA 3) 19:18 (WEA 3)			05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	37	18:40 (WEA 3) 19:17 (WEA 3)			05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	38	18:39 (WEA 3) 19:17 (WEA 3)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416			486	500
astr.max.mögl.Beschattung				362		358			

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	18:45 (WEA 3) 19:04 (WEA 3)	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	18:43 (WEA 3) 19:06 (WEA 3)	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	18:40 (WEA 3) 19:07 (WEA 3)	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	18:39 (WEA 3) 19:08 (WEA 3)	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	18:37 (WEA 3) 19:08 (WEA 3)	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	18:36 (WEA 3) 19:09 (WEA 3)	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	18:35 (WEA 3) 19:10 (WEA 3)	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	18:34 (WEA 3) 19:09 (WEA 3)	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	18:33 (WEA 3) 19:10 (WEA 3)	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	18:32 (WEA 3) 19:09 (WEA 3)	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	18:32 (WEA 3) 19:09 (WEA 3)	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	18:31 (WEA 3) 19:09 (WEA 3)	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	18:31 (WEA 3) 19:08 (WEA 3)	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	18:31 (WEA 3) 19:08 (WEA 3)	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	18:30 (WEA 3) 19:07 (WEA 3)	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	18:31 (WEA 3) 19:06 (WEA 3)	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	18:31 (WEA 3) 19:05 (WEA 3)	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	18:31 (WEA 3) 19:04 (WEA 3)	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	18:32 (WEA 3) 19:03 (WEA 3)	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	18:33 (WEA 3) 19:01 (WEA 3)	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	18:34 (WEA 3) 18:59 (WEA 3)	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	18:36 (WEA 3) 18:57 (WEA 3)	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	18:38 (WEA 3) 18:53 (WEA 3)	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	18:53 (WEA 3) 19:21	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	18:53 (WEA 3) 19:20	08:12 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	07:24 19:24	18:53 (WEA 3) 19:18	08:12 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	18:53 (WEA 3) 19:16	08:12 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	07:27 19:19	18:53 (WEA 3) 19:14	08:12 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	07:29 19:17	18:53 (WEA 3) 19:12	08:12 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	07:31 19:15	18:53 (WEA 3) 19:10	08:12 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	18:49 (WEA 3) 19:02 (WEA 3)	19:08 (WEA 3)	07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381	714	331	266	243
astr.max.mögl.Beschattung			13				

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) 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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	Juli	August	September	Oktober	November	Dezember	
1	08:42	08:15	07:21	07:10	18:36 (WEA 3)	06:05	05:19	05:16	05:53	06:43	07:32	07:26	08:18
	16:31	17:19	18:11	20:05	32 19:08 (WEA 3)	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	18:36 (WEA 3)	06:03	05:18	05:17	05:54	06:45	07:34	07:28	08:19
	16:32	17:21	18:13	20:07	31 19:07 (WEA 3)	20:58	21:44	21:56	21:23	20:20	19:10	17:04	16:25
3	08:41	08:11	07:17	07:05	18:37 (WEA 3)	06:01	05:18	05:18	05:56	06:46	07:36	07:30	08:21
	16:33	17:23	18:15	20:09	28 19:05 (WEA 3)	21:00	21:45	21:56	21:21	20:18	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	18:39 (WEA 3)	05:59	05:17	05:18	05:58	06:48	07:37	07:32	08:22
	16:34	17:25	18:16	20:10	25 19:04 (WEA 3)	21:02	21:46	21:56	21:20	20:15	19:06	17:01	16:23
5	08:41	08:08	07:12	07:01	18:40 (WEA 3)	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 19:01 (WEA 3)	21:03	21:47	21:55	21:18	20:13	9 18:42 (WEA 3)	07:39	16:23
6	08:41	08:06	07:10	06:58	18:42 (WEA 3)	05:55	05:15	05:20	06:01	06:51	17 18:38 (WEA 3)	07:41	08:25
	16:37	17:28	18:20	20:14	17 18:59 (WEA 3)	21:05	21:48	21:55	21:16	20:11	17 18:55 (WEA 3)	07:41	16:22
7	08:40	08:05	07:08	06:56	18:45 (WEA 3)	05:54	05:15	05:21	06:02	06:53	18:36 (WEA 3)	07:42	08:26
	16:38	17:30	18:22	20:16	11 18:56 (WEA 3)	21:07	21:49	21:54	21:14	20:09	21 18:57 (WEA 3)	07:42	16:22
8	08:40	08:03	07:05	06:54	05:52	05:14	05:22	06:04	06:54	07:44	25 18:33 (WEA 3)	07:44	08:27
	16:39	17:32	18:24	20:17	21:08	21:50	21:53	21:12	20:06	25 18:58 (WEA 3)	07:44	16:22	
9	08:39	08:01	07:03	06:52	05:50	05:14	05:23	06:05	06:56	07:46	28 18:32 (WEA 3)	07:46	08:28
	16:41	17:34	18:25	20:19	21:10	21:51	21:53	21:11	20:04	28 19:00 (WEA 3)	07:46	16:21	
10	08:39	07:59	07:01	06:49	05:48	05:13	05:24	06:07	06:58	07:48	30 18:30 (WEA 3)	07:48	08:29
	16:42	17:36	18:27	20:21	21:12	21:51	21:52	21:09	20:02	30 19:00 (WEA 3)	07:48	16:21	
11	08:38	07:58	06:59	06:47	05:47	05:13	05:25	06:09	06:59	07:49	32 18:29 (WEA 3)	07:49	08:30
	16:43	17:38	18:29	20:22	21:13	21:52	21:51	21:07	19:59	32 19:01 (WEA 3)	07:49	16:21	
12	08:38	07:56	06:56	06:45	05:45	05:13	05:26	06:10	07:01	07:51	33 18:27 (WEA 3)	07:51	08:32
	16:45	17:40	18:31	20:24	21:15	21:53	21:50	21:05	19:57	33 19:00 (WEA 3)	07:51	16:21	
13	08:37	07:54	06:54	06:43	05:43	05:12	05:27	06:12	07:03	07:53	34 18:27 (WEA 3)	07:53	08:33
	16:46	17:41	18:32	20:26	21:16	21:54	21:49	21:03	19:55	34 19:01 (WEA 3)	07:53	16:21	
14	08:36	07:52	06:52	06:40	05:42	05:12	05:28	06:14	07:04	07:54	35 18:26 (WEA 3)	07:54	08:33
	16:48	17:43	18:34	20:28	21:18	21:54	21:49	21:01	19:52	35 19:01 (WEA 3)	07:54	16:21	
15	08:35	07:50	06:49	06:38	05:40	05:12	05:29	06:15	07:06	07:56	35 18:25 (WEA 3)	07:56	08:34
	16:50	17:45	18:36	20:29	21:19	21:55	21:48	20:59	19:50	35 19:00 (WEA 3)	07:56	16:21	
16	08:34	07:48	06:47	17:52 (WEA 3)	06:36	05:39	05:12	05:30	06:17	07:07	36 18:25 (WEA 3)	07:58	08:35
	16:51	17:47	18:38	10 18:02 (WEA 3)	20:31	21:21	21:55	21:47	20:57	19:48	36 19:01 (WEA 3)	07:58	16:21
17	08:34	07:46	06:45	17:48 (WEA 3)	06:34	05:37	05:12	05:32	06:18	07:09	36 18:24 (WEA 3)	08:00	08:36
	16:53	17:49	18:39	18 18:06 (WEA 3)	20:33	21:23	21:56	21:45	20:55	19:45	36 19:00 (WEA 3)	08:00	16:21
18	08:33	07:44	06:42	17:45 (WEA 3)	06:32	05:36	05:12	05:33	06:20	07:11	36 18:24 (WEA 3)	08:01	08:37
	16:54	17:51	18:41	22 18:07 (WEA 3)	20:34	21:24	21:56	21:44	20:53	19:43	35 18:59 (WEA 3)	08:01	16:21
19	08:32	07:42	06:40	17:43 (WEA 3)	06:29	05:34	05:12	05:34	06:22	07:12	35 18:24 (WEA 3)	08:03	08:38
	16:56	17:53	18:43	26 18:09 (WEA 3)	20:36	21:26	21:56	21:43	20:51	19:41	35 18:59 (WEA 3)	08:03	16:22
20	08:30	07:40	06:38	17:42 (WEA 3)	06:27	05:33	05:12	05:36	06:23	07:14	35 18:24 (WEA 3)	08:05	08:38
	16:58	17:54	18:45	28 18:10 (WEA 3)	20:38	21:27	21:57	21:42	20:49	19:38	34 18:58 (WEA 3)	08:07	16:22
21	08:29	07:38	06:35	17:40 (WEA 3)	06:25	05:31	05:12	05:37	06:25	07:16	34 18:24 (WEA 3)	08:10	08:39
	16:59	17:56	18:46	30 18:10 (WEA 3)	20:40	21:28	21:57	21:41	20:46	19:36	33 18:57 (WEA 3)	08:12	16:23
22	08:28	07:36	06:33	17:39 (WEA 3)	06:23	05:30	05:12	05:38	06:27	07:17	33 18:25 (WEA 3)	08:12	08:39
	17:01	17:58	18:48	32 18:11 (WEA 3)	20:41	21:30	21:57	21:40	20:44	19:34	31 18:56 (WEA 3)	08:12	16:23
23	08:27	07:34	06:31	17:38 (WEA 3)	06:21	05:29	05:12	05:40	06:28	07:19	31 18:25 (WEA 3)	08:10	08:40
	17:03	18:00	18:50	34 18:12 (WEA 3)	20:43	21:31	21:57	21:38	20:42	19:31	29 18:54 (WEA 3)	08:12	16:23
24	08:26	07:32	06:28	17:37 (WEA 3)	06:19	05:28	05:13	05:41	06:30	07:21	29 18:26 (WEA 3)	08:12	08:40
	17:05	18:02	18:52	35 18:12 (WEA 3)	20:45	21:33	21:58	21:37	20:40	19:29	27 18:53 (WEA 3)	08:12	16:24
25	08:25	07:30	06:26	17:37 (WEA 3)	06:17	05:26	05:13	05:42	06:31	07:22	27 18:27 (WEA 3)	08:14	08:41
	17:06	18:04	18:53	35 18:12 (WEA 3)	20:46	21:34	21:58	21:35	20:38	19:26	23 18:50 (WEA 3)	08:14	16:25
26	08:23	07:27	06:24	17:35 (WEA 3)	06:15	05:25	05:13	05:44	06:33	07:24	23 18:29 (WEA 3)	08:16	08:41
	17:08	18:06	18:55	36 18:11 (WEA 3)	20:48	21:35	21:58	21:34	20:36	19:24	19 18:48 (WEA 3)	08:16	16:25
27	08:22	07:25	06:22	17:35 (WEA 3)	06:13	05:24	05:14	05:45	06:35	07:26	19 18:32 (WEA 3)	08:17	08:41
	17:10	18:07	18:57	36 18:11 (WEA 3)	20:50	21:37	21:58	21:33	20:33	19:22	13 18:45 (WEA 3)	08:17	16:26
28	08:21	07:23	06:19	17:36 (WEA 3)	06:11	05:23	05:14	05:47	06:36	07:27	13 18:45 (WEA 3)	08:17	16:26
	17:12	18:09	18:58	35 18:11 (WEA 3)	20:52	21:38	21:57	21:31	20:31	19:19	13 18:45 (WEA 3)	08:17	16:27
29	08:19	07:17	06:13	18:36 (WEA 3)	06:09	05:22	05:15	05:48	06:38	07:29	13 18:45 (WEA 3)	08:17	16:28
	17:14	18:11	19:00	35 19:11 (WEA 3)	20:53	21:39	21:57	21:29	20:29	19:17	13 18:45 (WEA 3)	08:17	16:28
30	08:18	07:15	06:11	18:35 (WEA 3)	06:07	05:21	05:15	05:50	06:40	07:31	13 18:45 (WEA 3)	08:17	16:29
	17:15	18:12	19:01	35 19:10 (WEA 3)	20:55	21:40	21:57	21:28	20:27	19:15	13 18:45 (WEA 3)	08:17	16:29
31	08:16	07:12	06:08	18:36 (WEA 3)	06:05	05:20	05:15	05:51	06:41	07:32	13 18:45 (WEA 3)	08:17	16:30
	17:17	18:14	19:03	33 19:09 (WEA 3)	20:57	21:42	21:56	21:26	20:25	19:15	13 18:45 (WEA 3)	08:17	16:30
Sonnenscheinstunden	258	277	367	480	416	486	500	503	454	381	331	266	243
astr.max.mögl.Beschattung				165						650			

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 3 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 Sonneneinflussrichtung  
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	18:37 (WEA 3) 19:10 (WEA 3)	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	18:37 (WEA 3) 19:08 (WEA 3)	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	07:17 18:15	07:05 20:09	18:38 (WEA 3) 19:07 (WEA 3)	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	08:21 16:24
4	08:41 16:34	08:10 17:25	07:14 18:16	07:03 20:10	18:39 (WEA 3) 19:06 (WEA 3)	05:59 21:02	05:17 21:46	05:18 21:56	05:58 21:20	06:48 20:15	18:46 (WEA 3) 19:06 (WEA 3)	07:37 17:01	08:22 16:23
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12	18:40 (WEA 3) 19:04 (WEA 3)	05:57 21:03	05:16 21:47	05:19 21:55	05:59 21:18	06:49 20:13	18:40 (WEA 3) 18:55 (WEA 3)	07:39 19:03	08:23 16:23
6	08:41 16:37	08:06 17:28	07:10 18:20	06:58 20:14	18:41 (WEA 3) 19:02 (WEA 3)	05:55 21:05	05:15 21:48	05:20 21:55	06:01 21:16	06:51 20:11	18:38 (WEA 3) 18:58 (WEA 3)	07:41 19:01	08:25 16:22
7	08:40 16:38	08:05 17:30	07:08 18:22	06:56 20:16	18:44 (WEA 3) 18:59 (WEA 3)	05:54 21:07	05:15 21:49	05:21 21:54	06:02 21:14	06:53 20:09	18:36 (WEA 3) 18:59 (WEA 3)	07:42 18:59	08:26 16:22
8	08:40 16:39	08:03 17:32	07:05 18:24	06:54 20:17	18:49 (WEA 3) 18:54 (WEA 3)	05:52 21:08	05:14 21:50	05:22 21:53	06:04 21:12	06:54 20:06	18:33 (WEA 3) 19:00 (WEA 3)	07:44 18:56	08:27 16:22
9	08:39 16:41	08:01 17:34	07:03 18:25	06:52 20:19	18:54 (WEA 3)	05:50 21:10	05:14 21:51	05:23 21:53	06:05 21:11	06:56 20:04	18:32 (WEA 3) 19:01 (WEA 3)	07:46 18:54	08:28 16:21
10	08:39 16:42	07:59 17:36	07:01 18:27	06:49 20:21		05:48 21:12	05:13 21:51	05:24 21:52	06:07 21:09	06:58 20:02	18:30 (WEA 3) 19:01 (WEA 3)	07:48 18:52	08:29 16:20
11	08:38 16:43	07:58 17:38	06:59 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	18:29 (WEA 3) 19:02 (WEA 3)	07:49 18:50	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	18:28 (WEA 3) 19:02 (WEA 3)	07:51 18:47	08:32 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	18:27 (WEA 3) 19:02 (WEA 3)	07:53 18:45	08:33 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	06:14 21:01	07:04 19:52	18:27 (WEA 3) 19:03 (WEA 3)	07:54 18:43	08:33 16:21
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	05:29 21:48	06:15 20:59	07:06 19:50	18:26 (WEA 3) 19:02 (WEA 3)	07:56 18:41	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	18:26 (WEA 3) 19:02 (WEA 3)	07:58 18:39	08:35 16:21
17	08:34 16:53	07:46 17:49	06:45 18:39	06:34 20:33	17:51 (WEA 3) 18:05 (WEA 3)	05:37 21:23	05:12 21:56	05:32 21:45	06:18 20:55	07:09 19:45	18:25 (WEA 3) 19:01 (WEA 3)	08:00 18:36	08:36 16:21
18	08:33 16:54	07:44 17:51	06:42 18:41	06:32 20:34	17:47 (WEA 3) 18:07 (WEA 3)	05:36 21:24	05:12 21:56	05:33 21:44	06:20 20:53	07:11 19:43	18:25 (WEA 3) 19:01 (WEA 3)	08:01 18:34	08:37 16:21
19	08:32 16:56	07:42 17:53	06:40 18:43	06:29 20:36	17:45 (WEA 3) 18:09 (WEA 3)	05:34 21:26	05:12 21:56	05:34 21:43	06:22 20:51	07:12 19:41	18:26 (WEA 3) 19:00 (WEA 3)	08:03 18:32	08:38 16:22
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	17:44 (WEA 3) 18:11 (WEA 3)	05:33 21:27	05:12 21:57	05:36 21:42	06:23 20:49	07:14 19:38	18:25 (WEA 3) 18:59 (WEA 3)	08:05 18:30	08:38 16:22
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	17:42 (WEA 3) 18:11 (WEA 3)	05:31 21:28	05:12 21:57	05:37 21:41	06:25 20:46	07:16 19:36	18:26 (WEA 3) 18:58 (WEA 3)	08:02 18:28	08:39 16:23
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	17:41 (WEA 3) 18:12 (WEA 3)	05:30 21:30	05:12 21:57	05:38 21:40	06:27 20:44	07:17 19:34	18:27 (WEA 3) 18:57 (WEA 3)	08:08 18:26	08:40 16:23
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	17:40 (WEA 3) 18:13 (WEA 3)	05:29 21:31	05:12 21:57	05:40 21:38	06:28 20:42	07:19 19:31	18:27 (WEA 3) 18:55 (WEA 3)	08:10 18:24	08:40 16:23
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	17:38 (WEA 3) 18:13 (WEA 3)	05:28 21:33	05:13 21:58	05:41 21:37	06:30 20:40	07:21 19:29	18:28 (WEA 3) 18:53 (WEA 3)	08:12 18:22	08:40 16:24
25	08:25 17:06	07:30 18:04	06:26 18:53	06:17 20:46	17:38 (WEA 3) 18:13 (WEA 3)	05:26 21:34	05:13 21:58	05:42 21:35	06:31 20:38	07:22 19:26	18:29 (WEA 3) 18:50 (WEA 3)	08:14 17:20	08:41 16:25
26	08:23 17:08	07:27 18:06	06:24 18:55	06:15 20:48	17:37 (WEA 3) 18:12 (WEA 3)	05:25 21:35	05:13 21:58	05:44 21:34	06:33 20:36	07:24 19:24	18:32 (WEA 3) 18:48 (WEA 3)	08:16 17:18	08:41 16:25
27	08:22 17:10	07:25 18:07	06:22 18:57	06:13 20:50	17:37 (WEA 3) 18:12 (WEA 3)	05:24 21:37	05:14 21:58	05:45 21:33	06:35 20:33	07:26 19:22	18:36 (WEA 3) 18:43 (WEA 3)	08:17 17:16	08:41 16:26
28	08:21 17:12	07:23 18:09	06:19 18:58	06:11 20:52	17:37 (WEA 3) 18:12 (WEA 3)	05:23 21:38	05:14 21:57	05:47 21:31	06:36 20:31	07:27 19:19	18:43 (WEA 3)	08:13 17:14	08:41 16:27
29	08:19 17:14	07:17 18:09	06:17 18:59	06:09 20:53	18:37 (WEA 3) 19:12 (WEA 3)	05:22 21:39	05:15 21:57	05:48 21:29	06:38 20:29	07:29 19:17	18:43 (WEA 3)	08:15 17:12	08:42 16:28
30	08:18 17:15	07:15 18:02	06:15 18:59	06:07 20:55	18:36 (WEA 3) 19:11 (WEA 3)	05:21 21:40	05:15 21:57	05:50 21:28	06:40 20:27	07:31 19:15	18:43 (WEA 3)	08:16 17:10	08:42 16:29
31	08:16 17:17	07:12 18:04	06:12 19:04	06:05 20:58	18:36 (WEA 3) 19:11 (WEA 3)	05:20 21:42	05:15 21:58	05:51 21:26	06:41 20:25	07:32 19:15	18:43 (WEA 3)	08:17 17:08	08:42 16:30
	Sonnenscheinstunden astr.max.mögl.Beschattung	258 277	367 458	416 185		486 500	503 503	454 381	660		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)
--------------	-----------------------	-------------------------	----------------------	--	--

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	Juli	August	September	Oktober	November	Dezember	
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05	18:44 (WEA 3) 19:18 (WEA 3)	06:05 20:57	05:19 21:43	05:16 21:57	06:43 21:25		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	18:43 (WEA 3) 19:17 (WEA 3)	06:03 20:58	05:18 21:44	05:17 21:56	06:45 21:23	18:51 (WEA 3)	07:34 19:10	07:28 17:04	08:19 16:25
3	08:41 16:33	08:11 17:23	07:17 18:15	07:05 20:09	18:44 (WEA 3) 19:17 (WEA 3)	06:01 21:00	05:18 21:45	05:18 21:56	06:46 21:21	18:47 (WEA 3)	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	18:44 (WEA 3) 19:16 (WEA 3)	05:59 21:02	05:17 21:46	05:18 21:56	06:48 21:20	18:45 (WEA 3)	07:37 19:06	07:32 17:01	08:22 16:23
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12	18:44 (WEA 3) 19:14 (WEA 3)	05:57 21:03	05:16 21:47	05:19 21:55	06:49 21:18	18:42 (WEA 3)	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	18:45 (WEA 3) 19:13 (WEA 3)	05:55 21:05	05:15 21:48	05:20 21:55	06:01 21:16	18:41 (WEA 3)	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	18:46 (WEA 3) 19:12 (WEA 3)	05:54 21:07	05:15 21:49	05:21 21:54	06:02 21:14	18:40 (WEA 3)	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	18:48 (WEA 3) 19:10 (WEA 3)	05:52 21:08	05:14 21:50	05:22 21:53	06:04 21:12	18:39 (WEA 3)	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	18:49 (WEA 3) 19:07 (WEA 3)	05:50 21:10	05:14 21:51	05:23 21:53	06:05 21:11	18:38 (WEA 3)	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	18:52 (WEA 3) 19:04 (WEA 3)	05:48 21:12	05:13 21:51	05:24 21:52	06:07 21:09	18:36 (WEA 3)	07:48 18:52	07:43 16:50	08:29 16:21
11	08:38 16:43	07:58 17:38	06:59 18:29	06:47 20:22		05:47 21:13	05:13 21:52	05:25 21:51	06:09 21:07	18:36 (WEA 3)	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	18:35 (WEA 3)	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	18:35 (WEA 3)	07:53 18:45	07:48 16:46	08:33 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	06:14 21:01	18:35 (WEA 3)	07:54 18:43	07:50 16:44	08:33 16:21
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	05:29 21:48	06:15 20:59	18:34 (WEA 3)	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	18:35 (WEA 3)	07:58 18:39	07:53 16:41	08:35 16:21
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	05:32 21:45	06:18 20:55	18:34 (WEA 3)	07:59 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	18:35 (WEA 3)	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 21:26	05:12 21:56	05:34 21:43	06:22 20:51	18:36 (WEA 3)	08:03 18:32	07:58 16:37	08:38 16:22
20	08:30 16:58	07:40 17:54	06:38 18:45	06:27 20:38	17:59 (WEA 3)	05:33 21:27	05:12 21:57	05:36 21:42	06:23 20:49	18:36 (WEA 3)	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	17:55 (WEA 3)	05:31 21:28	05:12 21:57	05:37 21:41	06:25 20:46	18:38 (WEA 3)	08:30 18:28	08:02 16:35	08:39 16:23
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	17:53 (WEA 3)	05:30 21:30	05:12 21:57	05:38 21:40	06:27 20:44	18:40 (WEA 3)	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	17:51 (WEA 3)	05:29 21:31	05:12 21:57	05:40 21:38	06:28 20:42	18:59 (WEA 3)	08:26 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	17:49 (WEA 3)	05:28 21:33	05:13 21:58	05:41 21:37	06:30 20:40	18:56 (WEA 3)	08:24 18:29	08:12 16:31	08:40 16:24
25	08:25 17:06	07:30 18:04	06:26 18:53	06:17 20:46	17:48 (WEA 3)	05:26 21:34	05:13 21:58	05:42 21:35	06:31 20:38		08:22 18:26	07:14 16:30	08:41 16:25
26	08:23 17:08	07:27 18:06	06:24 18:55	06:15 20:48	17:46 (WEA 3)	05:25 21:35	05:13 21:58	05:44 21:34	06:33 20:36		08:24 18:24	07:16 16:29	08:41 16:25
27	08:22 17:10	07:25 18:07	06:22 18:57	06:13 20:50	17:45 (WEA 3)	05:24 21:37	05:14 21:58	05:45 21:33	06:35 20:33		08:26 18:22	07:17 16:29	08:41 16:26
28	08:21 17:12	07:23 18:09	06:19 18:58	06:11 20:52	17:45 (WEA 3)	05:23 21:38	05:14 21:57	05:47 21:31	06:36 20:31		08:27 18:19	07:19 16:28	08:41 16:27
29	08:19 17:14	07:17 18:00	06:17 18:45	06:09 20:53	17:45 (WEA 3)	05:22 21:39	05:15 21:57	05:48 21:29	06:38 20:29		08:29 18:16	07:21 16:27	08:42 16:28
30	08:18 17:15	07:15 18:02	06:15 18:44	06:07 20:55	17:44 (WEA 3)	05:21 21:40	05:15 21:57	05:50 21:28	06:40 20:27		08:31 18:15	07:23 16:26	08:42 16:29
31	08:16 17:17	07:12 18:04	06:12 18:44	06:07 20:55	17:44 (WEA 3)	05:20 21:42	05:15 21:57	05:51 21:26	06:41 20:25		08:32 18:14	07:25 17:08	08:42 16:30
	Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243
	astr.max.mögl.Beschattung			339	269					619			

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	---------------------------	----------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	Juli	August	September	Oktober	November	Dezember		
1	08:42 16:31	08:15 17:19	07:21 18:11	07:10 20:05	18:45 (WEA 3) 19:20 (WEA 3)	06:05 20:57	05:19 21:43	05:16 21:57	05:53 21:25	06:43 20:22	18:53 (WEA 3) 19:03 (WEA 3)	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	18:44 (WEA 3) 19:19 (WEA 3)	06:03 20:58	05:18 21:44	05:17 21:56	05:54 21:23	06:45 20:20	18:50 (WEA 3) 19:07 (WEA 3)	07:34 19:10	07:28 17:04	08:19 16:25
3	08:41 16:33	08:11 17:23	07:17 18:15	07:05 20:09	18:45 (WEA 3) 19:18 (WEA 3)	06:01 21:00	05:18 21:45	05:18 21:56	05:56 21:21	06:46 20:18	18:47 (WEA 3) 19:08 (WEA 3)	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	18:45 (WEA 3) 19:18 (WEA 3)	05:59 21:02	05:17 21:46	05:18 21:56	05:58 21:20	06:48 20:15	18:45 (WEA 3) 19:10 (WEA 3)	07:37 19:06	07:32 17:01	08:22 16:23
5	08:41 16:35	08:08 17:26	07:12 18:18	07:01 20:12	18:45 (WEA 3) 19:16 (WEA 3)	05:57 21:03	05:16 21:47	05:19 21:55	05:59 21:18	06:49 20:13	18:43 (WEA 3) 19:10 (WEA 3)	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	18:46 (WEA 3) 19:15 (WEA 3)	05:55 21:05	05:15 21:48	05:20 21:55	06:01 21:16	06:51 20:11	18:42 (WEA 3) 19:11 (WEA 3)	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	18:47 (WEA 3) 19:14 (WEA 3)	05:54 21:07	05:15 21:49	05:21 21:54	06:02 21:14	06:53 20:09	18:41 (WEA 3) 19:12 (WEA 3)	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	18:48 (WEA 3) 19:08 (WEA 3)	05:52 21:08	05:14 21:50	05:22 21:53	06:04 21:12	06:54 20:06	18:39 (WEA 3) 19:12 (WEA 3)	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	18:49 (WEA 3) 19:10 (WEA 3)	05:50 21:10	05:14 21:51	05:23 21:53	06:05 21:11	06:56 20:04	18:39 (WEA 3) 19:12 (WEA 3)	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	18:51 (WEA 3) 19:08 (WEA 3)	05:48 21:12	05:13 21:51	05:24 21:52	06:07 20:02	06:58 20:02	18:37 (WEA 3) 19:12 (WEA 3)	07:48 18:52	07:43 16:50	08:29 16:21
11	08:38 16:43	07:58 17:38	06:59 18:29	06:47 20:22	18:54 (WEA 3) 19:04 (WEA 3)	05:47 21:13	05:13 21:52	05:25 21:51	06:09 21:07	06:59 19:59	18:37 (WEA 3) 19:12 (WEA 3)	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	18:54 (WEA 3) 19:04 (WEA 3)	05:45 21:15	05:13 21:53	05:26 21:50	06:10 21:05	07:01 19:57	18:36 (WEA 3) 19:11 (WEA 3)	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	18:54 (WEA 3) 19:04 (WEA 3)	05:43 21:16	05:12 21:54	05:27 21:49	06:12 21:03	07:03 19:55	18:36 (WEA 3) 19:11 (WEA 3)	07:53 18:45	07:48 16:46	08:33 16:21
14	08:36 16:48	07:52 17:43	06:52 18:34	06:40 20:28	18:54 (WEA 3) 19:04 (WEA 3)	05:42 21:18	05:12 21:54	05:28 21:49	06:14 21:01	07:04 19:52	18:36 (WEA 3) 19:11 (WEA 3)	07:54 18:43	07:50 16:44	08:33 16:21
15	08:35 16:50	07:50 17:45	06:49 18:36	06:38 20:29	18:54 (WEA 3) 19:04 (WEA 3)	05:40 21:19	05:12 21:55	05:29 21:48	06:15 20:59	07:06 19:50	18:36 (WEA 3) 19:10 (WEA 3)	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	18:54 (WEA 3) 19:04 (WEA 3)	05:39 21:21	05:12 21:55	05:30 21:47	06:17 20:57	07:07 19:48	18:36 (WEA 3) 19:09 (WEA 3)	07:58 18:39	07:53 16:41	08:35 16:21
17	08:34 16:53	07:46 17:49	06:45 18:39	06:34 20:33	18:54 (WEA 3) 19:04 (WEA 3)	05:37 21:23	05:12 21:56	05:32 21:45	06:18 20:55	07:09 19:45	18:36 (WEA 3) 19:07 (WEA 3)	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	18:54 (WEA 3) 19:04 (WEA 3)	05:36 21:24	05:12 21:56	05:33 21:44	06:20 20:53	07:11 19:43	18:37 (WEA 3) 19:07 (WEA 3)	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	18:54 (WEA 3) 19:04 (WEA 3)	05:34 21:26	05:12 21:56	05:34 21:43	06:22 20:51	07:12 19:41	18:38 (WEA 3) 19:06 (WEA 3)	08:03 18:32	07:58 16:37	08:38 16:22
20	08:30 16:58	07:40 17:54	06:38 18:45	18:05 (WEA 3) 20:38	18:54 (WEA 3) 19:04 (WEA 3)	05:33 21:27	05:12 21:57	05:36 21:42	06:23 20:49	07:14 19:38	18:38 (WEA 3) 19:03 (WEA 3)	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	17:58 (WEA 3) 20:40	18:54 (WEA 3) 19:04 (WEA 3)	05:31 21:28	05:12 21:57	05:37 21:41	06:25 20:46	07:16 19:36	18:40 (WEA 3) 19:01 (WEA 3)	08:30 18:28	08:02 16:35	08:39 16:23
22	08:28 17:01	07:36 17:58	06:33 18:48	17:55 (WEA 3) 20:41	18:54 (WEA 3) 19:04 (WEA 3)	05:30 21:30	05:12 21:57	05:38 21:40	06:27 20:44	07:17 19:34	18:42 (WEA 3) 18:59 (WEA 3)	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	17:53 (WEA 3) 20:43	18:54 (WEA 3) 19:04 (WEA 3)	05:29 21:31	05:12 21:57	05:40 21:38	06:28 20:42	07:19 19:31	18:45 (WEA 3) 18:54 (WEA 3)	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	17:51 (WEA 3) 20:45	18:54 (WEA 3) 19:04 (WEA 3)	05:28 21:33	05:13 21:58	05:41 21:37	06:30 20:40	07:21 19:29	18:45 (WEA 3) 18:54 (WEA 3)	08:12 18:22	08:07 16:31	08:40 16:24
25	08:25 17:06	07:30 18:04	06:26 18:53	17:50 (WEA 3) 20:46	18:54 (WEA 3) 19:04 (WEA 3)	05:26 21:34	05:13 21:58	05:42 21:35	06:31 20:38	07:22 19:26	18:36 (WEA 3) 19:06 (WEA 3)	08:13 18:26	08:08 16:30	08:41 16:25
26	08:23 17:08	07:27 18:06	06:24 18:55	17:48 (WEA 3) 20:48	18:54 (WEA 3) 19:04 (WEA 3)	05:25 21:35	05:13 21:58	05:44 21:34	06:33 20:36	07:24 19:24	18:36 (WEA 3) 19:06 (WEA 3)	08:14 18:26	08:10 16:29	08:41 16:25
27	08:22 17:10	07:25 18:07	06:22 18:57	17:47 (WEA 3) 20:50	18:54 (WEA 3) 19:04 (WEA 3)	05:24 21:37	05:14 21:58	05:45 21:33	06:35 20:33	07:26 19:22	18:36 (WEA 3) 19:06 (WEA 3)	08:15 18:27	08:12 16:29	08:41 16:26
28	08:21 17:12	07:23 18:09	06:19 18:58	17:46 (WEA 3) 20:52	18:54 (WEA 3) 19:04 (WEA 3)	05:23 21:38	05:14 21:57	05:47 21:31	06:36 20:31	07:27 19:19	18:36 (WEA 3) 19:06 (WEA 3)	08:16 18:28	08:13 16:28	08:41 16:27
29	08:19 17:14	07:17 18:00	06:17 18:59	17:44 (WEA 3) 20:53	18:54 (WEA 3) 19:04 (WEA 3)	05:22 21:39	05:15 21:57	05:48 21:29	06:38 20:29	07:29 19:17	18:36 (WEA 3) 19:06 (WEA 3)	08:17 18:29	08:14 16:27	08:42 16:28
30	08:18 17:15	07:15 18:02	06:15 18:59	17:42 (WEA 3) 20:55	18:54 (WEA 3) 19:04 (WEA 3)	05:21 21:40	05:15 21:57	05:50 21:28	06:40 20:27	07:31 19:15	18:36 (WEA 3) 19:06 (WEA 3)	08:18 18:30	08:15 16:26	08:42 16:29
31	08:16 17:17	07:12 18:04	06:13 19:00	17:40 (WEA 3) 20:57	18:54 (WEA 3) 19:04 (WEA 3)	05:20 21:42	05:16 21:58	05:51 21:26	06:41 20:25	07:32 19:14	18:36 (WEA 3) 19:06 (WEA 3)	08:19 18:31	08:16 16:25	08:42 16:30
Sonnenscheinstunden	258	277	367	416	496	586	686	796	906	1016	1126	1236	1346	1456
astr.max.mögl.Beschattung			320	296					629		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	Zeitpunkt (SS:MM) Schatteneende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	---------------------------	----------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	17	19:14 (WEA 3) 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	21	19:11 (WEA 3) 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:17 18:15		07:05 20:09	25	19:09 (WEA 3) 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	28	19:08 (WEA 3) 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	31	19:05 (WEA 3) 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	33	19:04 (WEA 3) 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	33	19:04 (WEA 3) 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	35	19:03 (WEA 3) 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	35	19:02 (WEA 3) 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	36	19:01 (WEA 3) 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	36	19:01 (WEA 3) 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	36	19:01 (WEA 3) 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	36	19:01 (WEA 3) 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	36	19:00 (WEA 3) 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	35	19:00 (WEA 3) 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	34	19:01 (WEA 3) 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	33	19:01 (WEA 3) 21:22	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	31	19:02 (WEA 3) 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	29	19:03 (WEA 3) 21:25	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45		06:27 20:38	27	19:04 (WEA 3) 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40	25	19:05 (WEA 3) 21:28	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41	22	19:06 (WEA 3) 21:30	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43	16	19:09 (WEA 3) 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52		06:19 20:45	10	19:12 (WEA 3) 21:33	05:13 21:58
25	08:25 17:06	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	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	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	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		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	19:19 (WEA 3) 19:27 (WEA 3)			05:20 21:42	
Sonnenscheinstunden	258	277	367	8	416	700	486	500
astr.max.mögl.Beschattung				8				

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

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



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	19:00 (WEA 3) 19:36 (WEA 3)	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	19:00 (WEA 3) 19:36 (WEA 3)	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	19:00 (WEA 3) 19:35 (WEA 3)	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	19:00 (WEA 3) 19:35 (WEA 3)	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	19:00 (WEA 3) 19:33 (WEA 3)	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	19:00 (WEA 3) 19:33 (WEA 3)	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	19:01 (WEA 3) 19:32 (WEA 3)	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	19:02 (WEA 3) 19:30 (WEA 3)	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	19:03 (WEA 3) 19:29 (WEA 3)	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	19:04 (WEA 3) 19:26 (WEA 3)	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	19:06 (WEA 3) 19:24 (WEA 3)	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	19:09 (WEA 3) 19:19 (WEA 3)	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		07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:49	06:14 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	19:17 (WEA 3) 07:12		08:03 18:32	07:58 16:37	08:38 16:22
20	05:36 21:42	06:23 20:49	19:13 (WEA 3) 07:14		08:05 18:30	08:00 16:36	08:38 16:22
21	05:37 21:41	06:25 20:46	19:11 (WEA 3) 07:16		08:07 18:28	08:02 16:35	08:39 16:23
22	05:38 21:40	06:27 20:44	19:09 (WEA 3) 07:17		08:08 18:26	08:04 16:34	08:39 16:23
23	05:40 21:38	06:28 20:42	19:07 (WEA 3) 07:19		08:10 18:24	08:05 16:33	08:40 16:24
24	05:41 21:37	06:30 20:40	19:06 (WEA 3) 07:21		08:12 18:22	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	19:05 (WEA 3) 07:22		07:14 17:20	08:08 16:30	08:41 16:25
26	05:44 21:34	06:33 20:36	19:04 (WEA 3) 07:24		07:16 17:18	08:10 16:29	08:41 16:25
27	05:45 21:33	06:35 20:33	19:03 (WEA 3) 07:26		07:17 17:16	08:12 16:29	08:41 16:26
28	05:47 21:31	06:36 20:31	19:02 (WEA 3) 07:27		07:19 17:14	08:13 16:28	08:41 16:27
29	05:48 21:29	06:38 20:29	19:01 (WEA 3) 07:29		07:21 17:12	08:15 16:27	08:42 16:28
30	05:50 21:28	06:40 20:27	19:37 (WEA 3) 07:31		07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25	19:01 (WEA 3) 19:37 (WEA 3)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		374	343				

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	May	Juni	Juli	August	September	Oktober	November	Dezember			
1	08:42	08:15	07:21	07:10	19:19 (WEA 3)	06:05	05:19	05:16	05:53	06:43	19:01 (WEA 3)	07:32	07:26	08:18	
	16:31	17:19	18:11	20:05	10	19:29 (WEA 3)	20:57	21:43	21:57	20:22	37	19:38 (WEA 3)	19:12	17:06	16:25
2	08:42	08:13	07:19	07:08	19:14 (WEA 3)	06:03	05:18	05:17	05:54	06:45	19:02 (WEA 3)	07:34	07:28	08:19	
	16:32	17:21	18:13	20:07	18	19:32 (WEA 3)	20:58	21:44	21:56	20:20	36	19:38 (WEA 3)	19:10	17:04	16:25
3	08:41	08:11	07:17	07:05	19:12 (WEA 3)	06:01	05:18	05:18	05:56	06:46	19:01 (WEA 3)	07:36	07:30	08:21	
	16:33	17:23	18:15	20:09	22	19:34 (WEA 3)	21:00	21:45	21:56	20:18	35	19:36 (WEA 3)	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	19:10 (WEA 3)	05:59	05:17	05:18	05:58	06:48	19:02 (WEA 3)	07:37	07:32	08:22	
	16:34	17:25	18:16	20:10	26	19:36 (WEA 3)	21:02	21:46	21:56	20:15	34	19:36 (WEA 3)	19:06	17:01	16:23
5	08:41	08:08	07:12	07:01	19:08 (WEA 3)	05:57	05:16	05:19	05:59	06:49	19:02 (WEA 3)	07:39	07:34	08:23	
	16:35	17:26	18:18	20:12	28	19:36 (WEA 3)	21:03	21:47	21:55	20:13	32	19:34 (WEA 3)	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	19:06 (WEA 3)	05:55	05:15	05:20	06:01	06:51	19:02 (WEA 3)	07:41	07:35	08:25	
	16:37	17:28	18:20	20:14	31	19:37 (WEA 3)	21:05	21:48	21:55	20:11	32	19:34 (WEA 3)	19:01	16:57	16:22
7	08:40	08:05	07:08	06:56	19:06 (WEA 3)	05:54	05:15	05:21	06:02	06:53	19:04 (WEA 3)	07:42	07:37	08:26	
	16:38	17:30	18:22	20:16	32	19:38 (WEA 3)	21:07	21:49	21:54	20:09	29	19:33 (WEA 3)	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	19:05 (WEA 3)	05:52	05:14	05:22	06:04	06:54	19:04 (WEA 3)	07:44	07:39	08:27	
	16:39	17:32	18:24	20:17	34	19:39 (WEA 3)	21:08	21:50	21:53	20:06	26	19:30 (WEA 3)	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	19:03 (WEA 3)	05:50	05:14	05:23	06:05	06:56	19:06 (WEA 3)	07:46	07:41	08:28	
	16:41	17:34	18:25	20:19	35	19:38 (WEA 3)	21:10	21:51	21:53	20:04	23	19:29 (WEA 3)	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	19:03 (WEA 3)	05:48	05:13	05:24	06:07	06:58	19:07 (WEA 3)	07:48	07:43	08:29	
	16:42	17:36	18:27	20:21	36	19:39 (WEA 3)	21:12	21:51	21:52	20:02	18	19:25 (WEA 3)	18:52	16:50	16:21
11	08:38	07:58	06:59	06:47	19:02 (WEA 3)	05:47	05:13	05:25	06:09	06:59	19:10 (WEA 3)	07:49	07:44	08:30	
	16:43	17:38	18:29	20:22	37	19:39 (WEA 3)	21:13	21:52	21:51	19:59	12	19:22 (WEA 3)	18:50	16:49	16:21
12	08:38	07:56	06:56	06:45	19:02 (WEA 3)	05:45	05:13	05:26	06:10	07:01	19:11 (WEA 3)	07:51	07:46	08:31	
	16:45	17:40	18:31	20:24	37	19:39 (WEA 3)	21:15	21:53	21:50	19:57	12	18:47	16:47	16:21	
13	08:37	07:54	06:54	06:43	19:02 (WEA 3)	05:43	05:12	05:27	06:12	07:03	19:12 (WEA 3)	07:53	07:48	08:32	
	16:46	17:41	18:32	20:26	37	19:39 (WEA 3)	21:16	21:54	21:49	19:55	12	18:45	16:46	16:21	
14	08:36	07:52	06:52	06:40	19:01 (WEA 3)	05:42	05:12	05:28	06:14	07:04	19:13 (WEA 3)	07:54	07:50	08:33	
	16:48	17:43	18:34	20:28	37	19:38 (WEA 3)	21:18	21:54	21:49	19:52	12	18:43	16:44	16:21	
15	08:35	07:50	06:49	06:38	19:01 (WEA 3)	05:40	05:12	05:29	06:15	07:06	19:14 (WEA 3)	07:56	07:52	08:34	
	16:50	17:45	18:36	20:29	36	19:37 (WEA 3)	21:19	21:55	21:48	19:50	12	18:41	16:43	16:21	
16	08:34	07:48	06:47	06:36	19:02 (WEA 3)	05:39	05:12	05:30	06:17	07:07	19:15 (WEA 3)	07:58	07:53	08:35	
	16:51	17:47	18:38	20:31	35	19:37 (WEA 3)	21:21	21:55	21:47	19:48	12	18:39	16:41	16:21	
17	08:34	07:46	06:45	06:34	19:02 (WEA 3)	05:37	05:12	05:32	06:18	07:09	19:16 (WEA 3)	08:00	07:55	08:36	
	16:53	17:49	18:39	20:33	34	19:36 (WEA 3)	21:22	21:56	21:45	19:45	12	18:36	16:40	16:21	
18	08:33	07:44	06:42	06:32	19:02 (WEA 3)	05:36	05:12	05:33	06:20	07:11	19:17 (WEA 3)	08:01	07:57	08:37	
	16:54	17:51	18:41	20:34	34	19:36 (WEA 3)	21:24	21:56	21:44	20:53	13	18:34	16:39	16:21	
19	08:32	07:42	06:40	06:29	19:03 (WEA 3)	05:34	05:12	05:34	06:22	07:12	19:18 (WEA 3)	08:03	07:58	08:38	
	16:56	17:53	18:43	20:36	32	19:35 (WEA 3)	21:25	21:56	21:43	20:51	18	18:32	16:37	16:22	
20	08:30	07:40	06:38	06:27	19:04 (WEA 3)	05:33	05:12	05:36	06:23	07:14	19:19 (WEA 3)	08:05	08:00	08:38	
	16:58	17:54	18:45	20:38	30	19:34 (WEA 3)	21:27	21:57	21:42	20:49	22	18:30	16:36	16:22	
21	08:29	07:38	06:35	06:25	19:05 (WEA 3)	05:31	05:12	05:37	06:25	07:16	19:20 (WEA 3)	08:07	08:02	08:39	
	16:59	17:56	18:46	20:40	28	19:33 (WEA 3)	21:28	21:57	21:41	20:46	25	18:28	16:35	16:23	
22	08:28	07:36	06:33	06:23	19:06 (WEA 3)	05:30	05:12	05:38	06:27	07:17	19:21 (WEA 3)	08:08	08:04	08:39	
	17:01	17:58	18:48	20:41	25	19:31 (WEA 3)	21:30	21:57	21:40	20:44	28	18:26	16:34	16:23	
23	08:27	07:34	06:31	06:21	19:08 (WEA 3)	05:29	05:12	05:40	06:28	07:19	19:22 (WEA 3)	08:10	08:05	08:40	
	17:03	18:00	18:50	20:43	21	19:29 (WEA 3)	21:31	21:57	21:38	20:42	30	18:24	16:33	16:24	
24	08:26	07:32	06:28	06:19	19:10 (WEA 3)	05:28	05:13	05:41	06:30	07:21	19:23 (WEA 3)	08:12	08:07	08:40	
	17:05	18:02	18:52	20:45	17	19:27 (WEA 3)	21:33	21:58	21:37	20:40	32	18:22	16:31	16:24	
25	08:25	07:30	06:26	06:17	19:13 (WEA 3)	05:26	05:13	05:42	06:31	07:22	19:24 (WEA 3)	08:14	08:08	08:41	
	17:06	18:04	18:53	20:46	11	19:24 (WEA 3)	21:34	21:58	21:35	20:38	34	18:20	16:30	16:25	
26	08:23	07:27	06:24	06:15	19:16 (WEA 3)	05:25	05:13	05:44	06:33	07:24	19:25 (WEA 3)	08:16	08:10	08:41	
	17:08	18:06	18:55	20:48	10	19:21 (WEA 3)	21:35	21:58	21:34	20:36	34	18:18	16:29	16:25	
27	08:22	07:25	06:22	06:13	19:18 (WEA 3)	05:24	05:14	05:45	06:35	07:26	19:26 (WEA 3)	08:17	08:12	08:41	
	17:10	18:07	18:57	20:50	9	19:17 (WEA 3)	21:37	21:58	21:33	20:33	36	18:16	16:29	16:26	
28	08:21	07:23	06:19	06:11	19:19 (WEA 3)	05:23	05:14	05:47	06:36	07:27	19:27 (WEA 3)	08:19	08:13	08:41	
	17:12	18:09	18:58	20:52	8	19:16 (WEA 3)	21:38	21:57	21:31	20:31	36	18:14	16:28	16:27	
29	08:19	07:17	06:09	06:01	19:17 (WEA 3)	05:22	05:15	05:48	06:38	07:29	19:28 (WEA 3)	08:21	08:15	08:42	
	17:14	18:11	19:00	20:53	7	19:14 (WEA 3)	21:39	21:57	21:29	20:29	37	18:12	16:27	16:28	
30	08:18	07:15	06:07	06:00	19:15 (WEA 3)	05:21	05:15	05:50	06:40	07:31	19:29 (WEA 3)	08:23	08:16	08:42	
	17:15	18:12	19:01	20:55	6	19:12 (WEA 3)	21:40	21:57	21:28	20:27	37	18:10	16:26	16:29	
31	08:16	07:12	06:04	06:00	19:14 (WEA 3)	05:20	05:15	05:51	06:41	07:32	19:30 (WEA 3)	08:25	08:18	08:42	
	17:17	18:14	19:03	20:04	5	19:11 (WEA 3)	21:42	21:26	20:25	37	19:39 (WEA 3)	17:08	16:25	16:30	
Sonnenscheinstunden	258	277	367	416	723	486	500	503	454	419	381	314	331	266	243
astr.max.mögl.Beschattung															

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	28	19:04 (WEA 3) 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	30	19:02 (WEA 3) 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15		07:05 20:09	31	19:01 (WEA 3) 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	33	19:00 (WEA 3) 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	33	18:59 (WEA 3) 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	35	18:58 (WEA 3) 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	35	18:58 (WEA 3) 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	35	18:58 (WEA 3) 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	35	18:57 (WEA 3) 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	35	18:57 (WEA 3) 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	33	18:58 (WEA 3) 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	33	18:58 (WEA 3) 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	31	18:59 (WEA 3) 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	30	18:58 (WEA 3) 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	28	18:59 (WEA 3) 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	26	19:00 (WEA 3) 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	22	19:02 (WEA 3) 21:22	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	18	19:04 (WEA 3) 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	12	19:07 (WEA 3) 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	07:30 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 18:06	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	06:22 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	10	06:11 20:52		05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	17	06:09 20:53		05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	22	06:07 20:55		05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	25	19:05 (WEA 3) 19:30 (WEA 3)		05:20 21:42	
Sonnenscheinstunden	258	277	367		416		486	500
astr.max.mögl.Beschattung			74		563			

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	06:43 20:22	18:57 (WEA 3) 19:30 (WEA 3)	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	18:56 (WEA 3) 19:30 (WEA 3)	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	18:55 (WEA 3) 19:30 (WEA 3)	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	18:55 (WEA 3) 19:30 (WEA 3)	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	18:54 (WEA 3) 19:29 (WEA 3)	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	18:54 (WEA 3) 19:29 (WEA 3)	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	18:55 (WEA 3) 19:29 (WEA 3)	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	18:54 (WEA 3) 19:27 (WEA 3)	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	18:55 (WEA 3) 19:27 (WEA 3)	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	18:55 (WEA 3) 19:25 (WEA 3)	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	18:56 (WEA 3) 19:24 (WEA 3)	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	18:56 (WEA 3) 19:22 (WEA 3)	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	18:58 (WEA 3) 19:20 (WEA 3)	07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	19:00 (WEA 3) 19:18 (WEA 3)	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	19:02 (WEA 3) 19:14 (WEA 3)	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	05:36 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	19:10 (WEA 3) 19:23 (WEA 3)	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	19:06 (WEA 3) 19:25 (WEA 3)	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	19:05 (WEA 3) 19:27 (WEA 3)	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	19:02 (WEA 3) 19:27 (WEA 3)	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	19:01 (WEA 3) 19:29 (WEA 3)	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	18:59 (WEA 3) 19:29 (WEA 3)	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	18:58 (WEA 3) 19:30 (WEA 3)	07:23 17:10	08:16 16:26	08:42 16:29
31	05:51 21:26	06:41 20:25		18:58 (WEA 3) 19:30 (WEA 3)	07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		201	442				

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	25	19:07 (WEA 3) 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13		07:08 20:07	28	19:05 (WEA 3) 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15		07:05 20:09	31	19:03 (WEA 3) 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16		07:03 20:10	31	19:03 (WEA 3) 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18		07:01 20:12	33	19:01 (WEA 3) 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20		06:58 20:14	33	19:01 (WEA 3) 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22		06:56 20:16	35	19:00 (WEA 3) 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24		06:54 20:17	35	19:00 (WEA 3) 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25		06:52 20:19	35	18:59 (WEA 3) 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27		06:49 20:21	35	18:59 (WEA 3) 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29		06:47 20:22	34	18:59 (WEA 3) 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31		06:45 20:24	34	18:59 (WEA 3) 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32		06:43 20:26	32	19:00 (WEA 3) 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34		06:40 20:28	31	19:00 (WEA 3) 21:18	05:12 21:54
15	08:35 16:50	07:50 17:45	06:49 18:36		06:38 20:29	30	19:00 (WEA 3) 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38		06:36 20:31	27	19:01 (WEA 3) 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39		06:34 20:33	25	19:02 (WEA 3) 21:22	05:12 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41		06:32 20:34	21	19:04 (WEA 3) 21:24	05:12 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43		06:29 20:36	17	19:06 (WEA 3) 21:25	05:12 21:56
20	08:30 16:58	07:40 17:54	06:38 18:45		06:27 20:38	11	19:09 (WEA 3) 21:27	05:12 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46		06:25 20:40		19:20 (WEA 3) 21:27	05:12 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48		06:23 20:41		05:31 21:28	05:12 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50		06:21 20:43		21:30 21:31	05:12 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52		06:19 20:45		05:29 21:33	05:12 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53		06:17 20:46		05:28 21:34	05:13 21:58
26	08:23 17:08	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	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	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		07:17 20:00	11	19:15 (WEA 3) 19:26 (WEA 3)	06:09 20:53	05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	17	19:11 (WEA 3) 19:28 (WEA 3)	06:07 20:55	05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	23	19:08 (WEA 3) 19:31 (WEA 3)		05:20 21:42	21:57
Sonnenscheinstunden	258	277	367		416		486	500
astr.max.mögl.Beschattung			51		583			

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	July	August	September	Oktober	November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22	18:58 (WEA 3) 19:32 (WEA 3)	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	18:58 (WEA 3) 19:33 (WEA 3)	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	18:57 (WEA 3) 19:32 (WEA 3)	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	18:57 (WEA 3) 19:32 (WEA 3)	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	18:56 (WEA 3) 19:31 (WEA 3)	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	18:57 (WEA 3) 19:30 (WEA 3)	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	18:57 (WEA 3) 19:30 (WEA 3)	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	18:57 (WEA 3) 19:29 (WEA 3)	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	18:58 (WEA 3) 19:28 (WEA 3)	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	18:58 (WEA 3) 19:26 (WEA 3)	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	18:59 (WEA 3) 19:25 (WEA 3)	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	19:00 (WEA 3) 19:22 (WEA 3)	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	19:02 (WEA 3) 19:20 (WEA 3)	07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:49	06:14 21:01	07:04 19:52	19:05 (WEA 3) 19:17 (WEA 3)	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	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	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	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	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	08:37 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	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	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	08:39 16:23
23	05:40 21:38	06:28 20:42	19:12 (WEA 3) 19:24 (WEA 3)	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	19:09 (WEA 3) 19:27 (WEA 3)	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	19:06 (WEA 3) 19:28 (WEA 3)	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	19:05 (WEA 3) 19:30 (WEA 3)	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	19:03 (WEA 3) 19:30 (WEA 3)	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	19:02 (WEA 3) 19:32 (WEA 3)	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	19:00 (WEA 3) 19:31 (WEA 3)	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	19:00 (WEA 3) 19:32 (WEA 3)	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	18:59 (WEA 3) 19:33 (WEA 3)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381	331	266	243	
astr.max.mögl.Beschattung		231	408				

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	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	19:12 (WEA 3)	07:32	07:26	08:18		
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	32	19:44 (WEA 3)	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		19:12 (WEA 3)	07:34	07:28	08:19	
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	31	19:43 (WEA 3)	19:10	17:04	16:25	
3	08:41	08:11	07:16	07:05	06:01	05:18	05:18	05:56	06:46		19:12 (WEA 3)	07:36	07:30	08:21	
	16:33	17:23	18:15	20:09	5	19:34 (WEA 3)	21:00	21:45	20:18	30	19:42 (WEA 3)	19:08	17:02	16:24	
4	08:41	08:10	07:14	07:03	05:59	05:17	05:18	05:58	06:48		19:13 (WEA 3)	07:37	07:32	08:22	
	16:34	17:25	18:16	20:10	14	19:38 (WEA 3)	21:02	21:46	20:15	28	19:41 (WEA 3)	19:06	17:01	16:23	
5	08:41	08:08	07:12	07:01	05:57	05:16	05:19	05:59	06:49		19:13 (WEA 3)	07:39	07:34	08:23	
	16:35	17:26	18:18	20:12	20	19:40 (WEA 3)	21:03	21:47	20:13	26	19:39 (WEA 3)	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		19:14 (WEA 3)	07:41	07:35	08:25	
	16:37	17:28	18:20	20:14	24	19:42 (WEA 3)	21:05	21:48	20:11	24	19:38 (WEA 3)	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		19:16 (WEA 3)	07:42	07:37	08:26	
	16:38	17:30	18:22	20:16	26	19:43 (WEA 3)	21:07	21:49	20:09	20	19:36 (WEA 3)	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		19:18 (WEA 3)	07:44	07:39	08:27	
	16:39	17:32	18:24	20:17	28	19:44 (WEA 3)	21:08	21:50	20:06	15	19:33 (WEA 3)	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		19:22 (WEA 3)	07:46	07:41	08:28	
	16:41	17:34	18:25	20:19	30	19:44 (WEA 3)	21:10	21:51	20:04	7	19:29 (WEA 3)	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		07:48	07:43	08:29		
	16:42	17:36	18:27	20:21	31	19:44 (WEA 3)	21:11	21:51	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	07:44	08:30		
	16:43	17:38	18:29	20:22	32	19:45 (WEA 3)	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	20:24	33	19:45 (WEA 3)	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	20:26	33	19:45 (WEA 3)	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	06:14	07:04		07:54	07:50	08:33		
	16:48	17:43	18:34	20:28	33	19:44 (WEA 3)	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		
	16:50	17:45	18:36	20:29	33	19:44 (WEA 3)	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	20:31	32	19:43 (WEA 3)	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	20:33	32	19:43 (WEA 3)	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	20:34	30	19:42 (WEA 3)	21:24	21:56	19:43	11	19:37 (WEA 3)	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	20:36	29	19:41 (WEA 3)	21:25	21:56	19:41	16	19:40 (WEA 3)	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	20:38	28	19:41 (WEA 3)	21:27	21:57	19:38	20	19:41 (WEA 3)	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		08:07	08:02	08:39		
	16:59	17:56	18:46	20:40	25	19:39 (WEA 3)	21:28	21:57	19:36	23	19:43 (WEA 3)	19:36	18:28	16:35	16:23
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	20:41	23	19:38 (WEA 3)	21:30	21:57	19:34	26	19:44 (WEA 3)	19:34	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	20:43	20	19:36 (WEA 3)	21:31	21:57	19:31	27	19:44 (WEA 3)	19:31	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	16	19:34 (WEA 3)	21:33	21:58	19:29	29	19:45 (WEA 3)	19:29	18:22	16:31	16:24
25	08:25	07:30	06:26	06:17	05:26	05:13	05:42	06:31	07:22		08:14	08:08	08:41		
	17:06	18:04	18:53	20:46	8	19:30 (WEA 3)	21:34	21:58	19:26	30	19:45 (WEA 3)	19:26	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		08:16	08:10	08:41		
	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	32	19:46 (WEA 3)	19:24	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	08:12	08:41		
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22		08:18	08:13	08:42		
28	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27		08:19	08:13	08:41		
	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	33	19:46 (WEA 3)	19:19	17:14	16:28	16:27
29	08:19	07:17	06:09	06:02	05:22	05:15	05:48	06:38	07:29		08:21	08:15	08:42		
	17:14	18:11	19:00	20:53	21:39	21:57	21:29	20:29	19:17	33	19:45 (WEA 3)	19:17	17:12	16:27	16:28
30	08:18	07:15	06:07	06:00	05:21	05:15	05:50	06:40	07:31		08:22	08:16	08:42		
	17:15	18:12	19:01	20:55	21:40	21:57	21:28	20:27	19:15	33	19:45 (WEA 3)	19:15	17:10	16:26	16:29
31	08:16	07:12	06:04	06:00	05:20	05:14	05:51	06:41	07:32		08:23	08:17	08:42		
	17:17	18:14	19:03	20:04	21:42	21:59	21:26	20:25	19:12 (WEA 3)	33	19:45 (WEA 3)	19:12	17:08	16:25	16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	378	213	381	331	266	243	
astr.max.mögl.Beschattung				585											

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	32	18:56 (WEA 3) 19:28 (WEA 3)	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	32	18:55 (WEA 3) 19:27 (WEA 3)	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	32	18:55 (WEA 3) 19:27 (WEA 3)	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	32	18:55 (WEA 3) 19:27 (WEA 3)	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	31	18:54 (WEA 3) 19:25 (WEA 3)	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	30	18:55 (WEA 3) 19:25 (WEA 3)	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	29	18:55 (WEA 3) 19:24 (WEA 3)	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	27	18:56 (WEA 3) 19:23 (WEA 3)	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	25	18:56 (WEA 3) 19:21 (WEA 3)	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	23	18:57 (WEA 3) 19:20 (WEA 3)	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	19	18:59 (WEA 3) 19:18 (WEA 3)	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	15	19:01 (WEA 3) 19:16 (WEA 3)	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	7	19:05 (WEA 3) 19:12 (WEA 3)	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			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			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 21:22	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	11	06:19 18:08 (WEA 3) 18:19 (WEA 3)			05:28 21:33	05:13 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	18	06:17 18:05 (WEA 3) 18:23 (WEA 3)			05:26 21:34	05:13 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	22	06:15 18:02 (WEA 3) 18:24 (WEA 3)			05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	06:22 18:57	24	06:13 18:01 (WEA 3) 18:25 (WEA 3)			05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	06:19 18:58	27	06:11 17:59 (WEA 3) 18:26 (WEA 3)			05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	29	06:09 18:58 (WEA 3) 19:27 (WEA 3)			05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	30	06:07 18:57 (WEA 3) 19:27 (WEA 3)			05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04	31	06:07 18:56 (WEA 3) 19:27 (WEA 3)			05:20 21:42	
Sonnenscheinstunden	258	277	367		416		486	500	
astr.max.mögl.Beschattung			192		334				

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	18:58 (WEA 3) 19:17 (WEA 3)	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	18:56 (WEA 3) 19:19 (WEA 3)	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	18:54 (WEA 3) 19:19 (WEA 3)	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	18:53 (WEA 3) 19:20 (WEA 3)	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	18:51 (WEA 3) 19:20 (WEA 3)	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	18:51 (WEA 3) 19:21 (WEA 3)	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	18:50 (WEA 3) 19:21 (WEA 3)	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	18:49 (WEA 3) 19:21 (WEA 3)	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	18:49 (WEA 3) 19:21 (WEA 3)	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	18:48 (WEA 3) 19:20 (WEA 3)	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	18:48 (WEA 3) 19:20 (WEA 3)	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	18:48 (WEA 3) 19:19 (WEA 3)	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	18:48 (WEA 3) 19:18 (WEA 3)	07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52	18:49 (WEA 3) 19:18 (WEA 3)	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	18:49 (WEA 3) 19:16 (WEA 3)	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	18:50 (WEA 3) 19:15 (WEA 3)	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	18:50 (WEA 3) 19:12 (WEA 3)	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	18:52 (WEA 3) 19:10 (WEA 3)	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	18:55 (WEA 3) 19:08 (WEA 3)	08:03 18:32	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	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		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	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	19:05 (WEA 3) 19:12 (WEA 3)	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	19:01 (WEA 3) 19:16 (WEA 3)		07:25 17:08		08:42 16:30
Sonnenscheinstunden	503	454	381		331	266	243
astr.max.mögl.Beschattung		22	507				

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	18:59 (WEA 3) 19:30 (WEA 3)	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	18:58 (WEA 3) 19:29 (WEA 3)	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	18:57 (WEA 3) 19:29 (WEA 3)	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	18:57 (WEA 3) 19:29 (WEA 3)	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	18:56 (WEA 3) 19:28 (WEA 3)	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	18:57 (WEA 3) 19:28 (WEA 3)	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	18:57 (WEA 3) 19:27 (WEA 3)	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	18:58 (WEA 3) 19:27 (WEA 3)	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	18:57 (WEA 3) 19:25 (WEA 3)	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	18:58 (WEA 3) 19:24 (WEA 3)	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	18:59 (WEA 3) 19:23 (WEA 3)	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	19:01 (WEA 3) 19:21 (WEA 3)	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	19:03 (WEA 3) 19:19 (WEA 3)	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	19:06 (WEA 3) 19:14 (WEA 3)	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		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	08:33 16:53	07:46 17:49	06:45 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	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	07:30 18:04	06:26 18:53	06:17 20:46	18:11 (WEA 3)	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	18:21 (WEA 3) 18:07 (WEA 3) 18:24 (WEA 3)	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	18:05 (WEA 3) 18:26 (WEA 3)	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	18:03 (WEA 3) 18:27 (WEA 3)	05:23 21:38	05:14 21:57
29	08:19 17:14		07:17 20:00	06:09 20:53	19:02 (WEA 3) 19:29 (WEA 3)	05:22 21:39	05:15 21:57
30	08:18 17:15		07:15 20:02	06:07 20:55	19:00 (WEA 3) 19:29 (WEA 3)	05:21 21:40	05:15 21:57
31	08:16 17:17		07:12 20:04		18:59 (WEA 3) 19:29 (WEA 3)	05:20 21:42	
Sonnenscheinstunden	258	277	367	416		486	500
astr.max.mögl.Beschattung			158	370			

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	18:58 (WEA 3) 19:22 (WEA 3)	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	18:57 (WEA 3) 19:23 (WEA 3)	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	18:55 (WEA 3) 19:23 (WEA 3)	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	18:55 (WEA 3) 19:24 (WEA 3)	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	18:53 (WEA 3) 19:23 (WEA 3)	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	18:53 (WEA 3) 19:24 (WEA 3)	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	18:53 (WEA 3) 19:24 (WEA 3)	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	18:51 (WEA 3) 19:23 (WEA 3)	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	18:52 (WEA 3) 19:23 (WEA 3)	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	18:51 (WEA 3) 19:22 (WEA 3)	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	18:51 (WEA 3) 19:22 (WEA 3)	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	18:51 (WEA 3) 19:21 (WEA 3)	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	18:51 (WEA 3) 19:20 (WEA 3)	07:53 18:45	07:48 16:46	08:32 16:21
14	05:28 21:49	06:13 21:01	07:04 19:52	18:52 (WEA 3) 19:19 (WEA 3)	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	18:52 (WEA 3) 19:17 (WEA 3)	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	18:54 (WEA 3) 19:16 (WEA 3)	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	18:55 (WEA 3) 19:13 (WEA 3)	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	18:58 (WEA 3) 19:10 (WEA 3)	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	07:58	07:58	08:37
20	05:36 21:42	06:23 20:49	07:14 19:38	08:05	08:00	16:37	08:38
21	05:37 21:41	06:25 20:46	07:16 19:36	18:30	08:02	16:36	16:22
22	05:38 21:40	06:27 20:44	07:17 19:34	08:07	08:08	16:35	08:39
23	05:40 21:38	06:28 20:42	07:19 19:31	18:26	08:10	16:34	16:23
24	05:41 21:37	06:30 20:40	07:21 19:29	08:12	08:12	16:33	16:23
25	05:42 21:35	06:31 20:38	07:22 19:26	08:14	08:07	16:31	16:24
26	05:44 21:34	06:33 20:36	07:24 19:24	08:16	08:08	16:30	16:25
27	05:45 21:33	06:35 20:33	07:26 19:22	17:18	08:12	16:29	16:25
28	05:47 21:31	06:36 20:31	07:27 19:19	17:16	08:13	16:29	16:26
29	05:48 21:29	06:38 20:29	19:06 (WEA 3) 19:15 (WEA 3)	07:21 17:14	08:15	16:28	16:27
30	05:50 21:28	06:40 20:27	19:03 (WEA 3) 19:19 (WEA 3)	07:31 17:10	08:16	16:27	16:28
31	05:51 21:26	06:41 20:25	19:01 (WEA 3) 19:21 (WEA 3)	07:25 17:08	08:16	16:26	16:29
Sonnenscheinstunden	503	454	381	331	266	243	
astr.max.mögl.Beschattung		45	487				

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	21	17:18 (WEA 3) 20:05	06:05 20:57	05:19 21:43
2	08:42 16:32	08:13 17:21	07:19 18:13	24	17:17 (WEA 3) 20:07	06:03 20:58	05:18 21:44
3	08:41 16:33	08:11 17:23	07:16 18:15	26	17:16 (WEA 3) 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	28	17:15 (WEA 3) 20:10	05:59 21:02	05:17 21:46
5	08:41 16:35	08:08 17:26	07:12 18:18	29	17:14 (WEA 3) 20:12	05:57 21:03	05:16 21:47
6	08:41 16:37	08:06 17:28	07:10 18:20	30	17:13 (WEA 3) 20:14	06:58 21:05	05:15 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	31	17:13 (WEA 3) 20:16	05:54 21:07	05:15 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	31	17:12 (WEA 3) 20:17	05:52 21:08	05:14 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	31	17:12 (WEA 3) 20:19	06:52 21:10	05:14 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	30	17:13 (WEA 3) 20:21	06:49 21:12	05:13 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	29	17:13 (WEA 3) 20:22	06:47 21:13	05:13 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	28	17:13 (WEA 3) 20:24	06:45 21:15	05:13 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	26	17:14 (WEA 3) 20:26	06:43 21:16	05:12 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	24	17:15 (WEA 3) 20:28	06:40 21:18	05:12 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	22	17:15 (WEA 3) 20:29	06:38 21:19	05:12 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	18	17:17 (WEA 3) 20:31	06:36 21:21	05:12 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	13	17:20 (WEA 3) 20:33	06:34 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	08:31 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		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		06:15 20:48	05:25 21:35	05:13 21:58
27	08:22 17:10	07:25 18:07	17:24 (WEA 3) 18:57	12	06:13 20:50	05:24 21:37	05:14 21:58
28	08:21 17:12	07:23 18:09	17:21 (WEA 3) 18:58	17	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		29	441				

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---



## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	July	August	September		Oktober		November	Dezember	
1	05:16 21:57	05:53 21:25	06:43 20:22		07:32 19:12	27	17:52 (WEA 3) 18:19 (WEA 3)	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	29	17:51 (WEA 3) 18:20 (WEA 3)	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	29	17:51 (WEA 3) 18:20 (WEA 3)	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	31	17:50 (WEA 3) 18:21 (WEA 3)	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	31	17:49 (WEA 3) 18:20 (WEA 3)	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	31	17:49 (WEA 3) 18:20 (WEA 3)	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	30	17:49 (WEA 3) 18:19 (WEA 3)	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	17:49 (WEA 3) 18:19 (WEA 3)	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	28	17:49 (WEA 3) 18:17 (WEA 3)	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	27	17:50 (WEA 3) 18:17 (WEA 3)	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	25	17:51 (WEA 3) 18:16 (WEA 3)	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	22	17:52 (WEA 3) 18:14 (WEA 3)	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	20	17:52 (WEA 3) 18:12 (WEA 3)	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	16	17:54 (WEA 3) 18:10 (WEA 3)	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	8	17:58 (WEA 3) 18:06 (WEA 3)	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		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 21:40	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	10	18:03 (WEA 3) 18:13 (WEA 3)	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	16	18:00 (WEA 3) 18:16 (WEA 3)	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	20	17:57 (WEA 3) 18:17 (WEA 3)	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	24	17:55 (WEA 3) 18:19 (WEA 3)	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	26	17:54 (WEA 3) 18:20 (WEA 3)	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			96		384				

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	17:21 (WEA 3) 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 3) 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 3) 20:09	06:01 21:00	05:18 21:45
4	08:41 16:34	08:10 17:25	07:14 18:16	17:17 (WEA 3) 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 3) 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 3) 20:14	06:58 21:05	05:55 21:48
7	08:40 16:38	08:05 17:30	07:08 18:22	17:15 (WEA 3) 20:16	06:56 21:07	05:54 21:49
8	08:40 16:39	08:03 17:32	07:05 18:24	17:14 (WEA 3) 20:17	06:54 21:08	05:52 21:50
9	08:39 16:41	08:01 17:34	07:03 18:25	17:14 (WEA 3) 20:19	06:52 21:10	05:50 21:51
10	08:39 16:42	07:59 17:36	07:01 18:27	17:14 (WEA 3) 20:21	06:49 21:12	05:48 21:51
11	08:38 16:43	07:58 17:38	06:59 18:29	17:14 (WEA 3) 20:22	06:47 21:13	05:47 21:52
12	08:38 16:45	07:56 17:40	06:56 18:31	17:14 (WEA 3) 20:24	06:45 21:15	05:45 21:53
13	08:37 16:46	07:54 17:41	06:54 18:32	17:14 (WEA 3) 20:26	06:43 21:16	05:43 21:54
14	08:36 16:48	07:52 17:43	06:52 18:34	17:15 (WEA 3) 20:28	06:40 21:18	05:42 21:54
15	08:35 16:49	07:50 17:45	06:49 18:36	17:16 (WEA 3) 20:29	06:38 21:19	05:40 21:55
16	08:34 16:51	07:48 17:47	06:47 18:38	17:17 (WEA 3) 20:31	06:36 21:21	05:39 21:55
17	08:34 16:53	07:46 17:49	06:45 18:39	17:19 (WEA 3) 20:33	06:34 21:23	05:37 21:56
18	08:33 16:54	07:44 17:51	06:42 18:41	17:22 (WEA 3) 20:34	06:32 21:24	05:36 21:56
19	08:32 16:56	07:42 17:53	06:40 18:43	17:31 (WEA 3) 20:36	06:29 21:26	05:34 21:56
20	08:31 16:58	07:40 17:54	06:38 18:45	06:27 20:38	06:27 21:27	05:33 21:57
21	08:29 16:59	07:38 17:56	06:35 18:46	06:25 20:40	06:25 21:28	05:31 21:57
22	08:28 17:01	07:36 17:58	06:33 18:48	06:23 20:41	06:23 21:30	05:30 21:57
23	08:27 17:03	07:34 18:00	06:31 18:50	06:21 20:43	06:21 21:31	05:29 21:57
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	06:19 21:33	05:28 21:58
25	08:25 17:06	07:30 18:04	06:26 18:53	06:17 20:46	06:17 21:34	05:26 21:58
26	08:23 17:08	07:27 18:06	06:24 18:55	06:15 20:48	06:15 21:35	05:25 21:58
27	08:22 17:10	07:25 18:07	17:29 (WEA 3) 18:57	06:13 20:50	06:13 21:37	05:24 21:58
28	08:21 17:12	07:23 18:09	17:33 (WEA 3) 17:24 (WEA 3) 18:58	06:11 20:52	06:11 21:38	05:23 21:57
29	08:19 17:13		07:17 20:00	06:09 20:53	06:09 21:39	05:22 21:57
30	08:18 17:15		07:15 20:02	06:07 20:55	06:07 21:40	05:21 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		18	454			

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	17:53 (WEA 3) 18:21 (WEA 3)	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 3) 18:22 (WEA 3)	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 3) 18:22 (WEA 3)	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	17:52 (WEA 3) 18:22 (WEA 3)	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 3) 18:21 (WEA 3)	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	17:51 (WEA 3) 18:21 (WEA 3)	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	17:51 (WEA 3) 18:21 (WEA 3)	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 3) 18:20 (WEA 3)	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	17:51 (WEA 3) 18:18 (WEA 3)	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	17:52 (WEA 3) 18:17 (WEA 3)	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	17:53 (WEA 3) 18:16 (WEA 3)	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 3) 18:15 (WEA 3)	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	17:55 (WEA 3) 18:12 (WEA 3)	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	17:58 (WEA 3) 18:09 (WEA 3)	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	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	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	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	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	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	08:00 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	08:02 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	08:04 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	08:05 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	08:07 16:31	08:40 16:24
25	05:42 21:35	06:31 20:38	07:22 19:26	18:07 (WEA 3) 18:12 (WEA 3)	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	18:02 (WEA 3) 18:16 (WEA 3)	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	18:00 (WEA 3) 18:19 (WEA 3)	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	17:57 (WEA 3) 18:19 (WEA 3)	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	17:56 (WEA 3) 18:20 (WEA 3)	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	17:55 (WEA 3) 18:21 (WEA 3)	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			110	362			

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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		07:26 16:25	
2	08:42 16:32	08:13 17:21	07:19 18:13	17:28 (WEA 3)	07:08 20:07	06:03 20:58	05:18 21:44	05:17 21:56	05:54 21:23	06:45 20:20		07:26 16:25	
3	08:41 16:33	08:11 17:23	07:16 18:15	19:17 (WEA 3)	07:05 20:09	06:01 21:00	05:18 21:45	05:17 21:56	05:56 21:21	06:46 20:18	19:08	07:30 16:24	
4	08:41 16:34	08:10 17:25	07:14 18:16	21:17 (WEA 3)	07:03 20:10	05:59 21:02	05:17 21:46	05:18 21:56	05:57 21:20	06:48 20:15	19:06	07:32 16:23	
5	08:41 16:35	08:08 17:26	07:12 18:18	24:17 (WEA 3)	07:01 20:12	05:57 21:03	05:16 21:47	05:19 21:55	05:59 21:18	06:49 20:13	19:03	07:34 16:23	
6	08:41 16:37	08:06 17:28	07:10 18:20	26:17 (WEA 3)	06:58 20:14	05:55 21:05	05:15 21:48	05:20 21:55	06:01 21:16	06:51 20:11	19:01	07:35 16:22	
7	08:40 16:38	08:05 17:30	07:08 18:22	28:17 (WEA 3)	06:56 20:16	05:54 21:07	05:15 21:49	05:21 21:54	06:02 21:14	06:53 20:09	18:59	07:37 16:22	
8	08:40 16:39	08:03 17:32	07:05 18:24	30:17 (WEA 3)	06:54 20:17	05:52 21:08	05:14 21:50	05:22 21:53	06:04 21:12	06:54 20:06	18:56	07:39 16:22	
9	08:39 16:41	08:01 17:34	07:03 18:25	31:17 (WEA 3)	06:52 20:19	05:50 21:10	05:14 21:51	05:23 21:53	06:05 21:11	06:56 20:04	18:54	07:41 16:21	
10	08:39 16:42	07:59 17:36	07:01 18:27	31:17 (WEA 3)	06:49 20:21	05:48 21:12	05:13 21:51	05:24 21:52	06:07 21:09	06:58 20:02	18:52	07:43 16:21	
11	08:38 16:43	07:58 17:38	06:59 18:29	31:17 (WEA 3)	06:47 20:22	05:47 21:13	05:13 21:52	05:25 21:51	06:09 21:07	06:59 19:59	18:50	07:44 16:21	
12	08:38 16:45	07:56 17:40	06:56 18:31	31:17 (WEA 3)	06:45 20:24	05:45 21:15	05:13 21:53	05:26 21:50	06:10 21:05	07:01 19:57	18:51	07:46 16:21	
13	08:37 16:46	07:54 17:41	06:54 18:32	31:17 (WEA 3)	06:43 20:26	05:43 21:16	05:12 21:54	05:27 21:49	06:12 21:03	07:03 19:55	18:50	07:48 16:21	
14	08:36 16:48	07:52 17:43	06:52 18:34	31:17 (WEA 3)	06:40 20:28	05:42 21:18	05:12 21:54	05:28 21:49	06:13 21:01	07:04 19:52	18:49	07:50 16:21	
15	08:35 16:49	07:50 17:45	06:49 18:36	31:17 (WEA 3)	06:38 20:29	05:40 21:19	05:12 21:55	05:29 21:48	06:15 20:59	07:06 19:50	18:48	07:52 16:21	
16	08:34 16:51	07:48 17:47	06:47 18:38	28:17 (WEA 3)	06:36 20:31	05:39 21:21	05:12 21:55	05:30 21:47	06:17 20:57	07:07 19:48	18:47	07:53 16:21	
17	08:34 16:53	07:46 17:49	06:45 18:39	27:17 (WEA 3)	06:34 20:33	05:37 21:23	05:12 21:56	05:32 21:45	06:18 20:55	07:09 19:45	18:39	07:55 16:21	
18	08:33 16:54	07:44 17:51	06:42 18:41	25:17 (WEA 3)	06:32 20:34	05:36 21:24	05:12 21:56	05:33 21:44	06:20 20:53	07:11 19:43	18:36	07:57 16:21	
19	08:32 16:56	07:42 17:53	06:40 18:43	22:17 (WEA 3)	06:29 20:36	05:34 21:26	05:12 21:56	05:34 21:43	06:22 20:51	07:12 19:41	18:34	07:58 16:22	
20	08:30 16:58	07:40 17:54	06:38 18:45	19:17 (WEA 3)	06:27 20:38	05:33 21:27	05:12 21:57	05:36 21:42	06:23 20:49	07:14 19:38	18:32	08:00 16:22	
21	08:29 16:59	07:38 17:56	06:35 18:46	13:17 (WEA 3)	06:25 20:40	05:31 21:28	05:12 21:57	05:37 21:41	06:25 20:46	07:16 19:36	18:30	08:02 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 21:40	06:27 20:44	07:17 19:34	18:28	08:04 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	18:26	08:05 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	18:24	08:07 16:24	
25	08:25 17:06	07:30 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	18:23	08:08 16:25	
26	08:23 17:08	07:27 18:06	06:24 18:54		06:15 20:48	05:25 21:35	05:13 21:58	05:44 21:34	06:33 20:36	07:24 19:24	18:21	08:10 16:25	
27	08:22 17:10	07:25 18:07	06:22 18:57		06:13 20:50	05:24 21:37	05:14 21:58	05:45 21:33	06:35 20:33	07:26 19:22	18:20	08:12 16:26	
28	08:21 17:12	07:23 18:09	06:19 18:58		06:11 20:52	05:23 21:38	05:14 21:57	05:47 21:31	06:36 20:31	07:27 19:19	18:19	08:13 16:27	
29	08:19 17:14	07:17 18:00	06:17 18:57		06:09 20:53	05:22 21:39	05:15 21:57	05:48 21:29	06:38 20:29	07:29 19:17	18:18	08:15 16:28	
30	08:18 17:15	07:15 18:02	06:15 18:57		06:07 20:55	05:21 21:40	05:15 21:57	05:50 21:28	06:40 20:27	07:31 19:15	18:17	08:16 16:29	
31	08:16 17:17	07:12 18:04	06:12 18:54		06:05 21:42	05:20 21:42	05:15 21:57	05:51 21:26	06:41 20:25	07:32 17:08	18:16	08:42 16:30	
	Sonnenscheinstunden	258	277	367	478	416	486	500	503	454	381	187	305
	astr.max.mögl.Beschattung												

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schatteneende	(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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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

	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	17:56 (WEA 3) 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 18:27 (WEA 3) 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 3) 07:28 08:19
	16:32	17:21	18:13	10	17:40 (WEA 3) 20:07	20:58	21:44	21:56	21:23	20:20	19:10	31 18:27 (WEA 3) 17:04 16:25
3	08:41	08:11	07:16		17:26 (WEA 3) 07:05	06:01	05:18	05:17	05:56	06:46	07:36	17:56 (WEA 3) 07:30 08:21
	16:33	17:23	18:15	17	17:43 (WEA 3) 20:09	21:00	21:45	21:56	21:21	20:18	19:08	31 18:27 (WEA 3) 17:02 16:24
4	08:41	08:10	07:14		17:25 (WEA 3) 07:03	05:59	05:17	05:18	05:57	06:48	07:37	17:56 (WEA 3) 07:32 08:22
	16:34	17:25	18:16	21	17:46 (WEA 3) 20:10	21:02	21:46	21:56	21:20	20:15	19:06	31 18:27 (WEA 3) 17:00 16:23
5	08:41	08:08	07:12		17:22 (WEA 3) 07:01	05:57	05:16	05:19	05:59	06:49	07:39	17:55 (WEA 3) 07:34 08:23
	16:35	17:26	18:18	24	17:46 (WEA 3) 20:12	21:03	21:47	21:55	21:18	20:13	19:03	30 18:25 (WEA 3) 16:59 16:23
6	08:41	08:06	07:10		17:21 (WEA 3) 06:58	05:55	05:15	05:20	06:01	06:51	07:41	17:56 (WEA 3) 07:35 08:25
	16:37	17:28	18:20	26	17:47 (WEA 3) 20:14	21:05	21:48	21:55	21:16	20:11	19:01	29 18:25 (WEA 3) 16:57 16:22
7	08:40	08:05	07:08		17:20 (WEA 3) 06:56	05:54	05:15	05:21	06:02	06:53	07:42	17:57 (WEA 3) 07:37 08:26
	16:38	17:30	18:22	28	17:48 (WEA 3) 20:16	21:07	21:49	21:54	21:14	20:09	18:59	27 18:24 (WEA 3) 16:55 16:22
8	08:40	08:03	07:05		17:19 (WEA 3) 06:54	05:52	05:14	05:22	06:04	06:54	07:44	17:58 (WEA 3) 07:39 08:27
	16:39	17:32	18:24	29	17:48 (WEA 3) 20:17	21:08	21:50	21:53	21:12	20:06	18:56	25 18:23 (WEA 3) 16:54 16:22
9	08:39	08:01	07:03		17:18 (WEA 3) 06:52	05:50	05:14	05:23	06:05	06:56	07:46	17:58 (WEA 3) 07:41 08:28
	16:41	17:34	18:25	31	17:49 (WEA 3) 20:19	21:10	21:51	21:53	21:11	20:04	18:54	22 18:20 (WEA 3) 16:52 16:21
10	08:39	07:59	07:01		17:18 (WEA 3) 06:49	05:48	05:13	05:24	06:07	06:58	07:48	17:59 (WEA 3) 07:43 08:29
	16:42	17:36	18:27	31	17:49 (WEA 3) 20:21	21:12	21:51	21:52	21:09	20:02	18:52	20 18:19 (WEA 3) 16:50 16:21
11	08:38	07:58	06:59		17:18 (WEA 3) 06:47	05:47	05:13	05:25	06:09	06:59	07:49	18:02 (WEA 3) 07:44 08:30
	16:43	17:38	18:29	31	17:49 (WEA 3) 20:22	21:13	21:52	21:51	21:07	19:59	18:50	14 18:16 (WEA 3) 16:49 16:21
12	08:38	07:56	06:56		17:17 (WEA 3) 06:45	05:45	05:13	05:26	06:10	07:01	07:51	18:06 (WEA 3) 07:46 08:32
	16:45	17:40	18:31	31	17:48 (WEA 3) 20:24	21:15	21:53	21:50	21:05	19:57	18:47	6 18:12 (WEA 3) 16:47 16:21
13	08:37	07:54	06:54		17:17 (WEA 3) 06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48 08:33
	16:46	17:41	18:32	31	17:48 (WEA 3) 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		17:18 (WEA 3) 06:40	05:42	05:12	05:28	06:13	07:04	07:54	07:50 08:33
	16:48	17:43	18:34	30	17:48 (WEA 3) 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		17:17 (WEA 3) 06:38	05:40	05:12	05:29	06:15	07:06	07:52	08:34
	16:49	17:45	18:36	29	17:46 (WEA 3) 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		17:18 (WEA 3) 06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53 08:35
	16:51	17:47	18:38	28	17:46 (WEA 3) 20:31	21:21	21:55	21:47	20:57	19:48	18:39	16:41 16:21
17	08:34	07:46	06:45		17:19 (WEA 3) 06:34	05:37	05:12	05:32	06:18	07:09	08:00	07:55 08:36
	16:53	17:49	18:39	26	17:45 (WEA 3) 20:33	21:23	21:56	21:45	20:55	19:45	18:36	16:40 16:21
18	08:33	07:44	06:42		17:20 (WEA 3) 06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57 08:37
	16:54	17:51	18:41	23	17:43 (WEA 3) 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		17:21 (WEA 3) 06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:58 08:38
	16:56	17:53	18:43	20	17:41 (WEA 3) 20:36	21:26	21:56	21:43	20:51	19:41	18:32	16:37 16:22
20	08:30	07:40	06:38		17:24 (WEA 3) 06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00 08:38
	16:58	17:54	18:45	15	17:39 (WEA 3) 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		17:27 (WEA 3) 06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02 08:39
	16:59	17:56	18:46	7	17:34 (WEA 3) 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	08:08	08:04 08:39
	17:01	17:58	18:31		20:41	21:30	21:57	21:40	20:44	19:34	2	18:17 (WEA 3) 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	18:08 (WEA 3) 08:10	08:05 08:40
	17:03	18:00	18:50		20:43	21:31	21:57	21:38	20:42	19:31	14	18:22 (WEA 3) 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	18:06 (WEA 3) 08:12	08:07 08:40
	17:05	18:02	18:52		20:45	21:33	21:58	21:37	20:40	19:29	18	18:24 (WEA 3) 18:22 16:31 16:24
25	08:25	07:30	06:26		06:17	05:26	05:13	05:42	06:31	07:22	18:03 (WEA 3) 07:14	08:08 08:41
	17:06	18:04	18:53		20:46	21:34	21:58	21:35	20:38	19:26	22	18:25 (WEA 3) 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	18:01 (WEA 3) 07:16	08:10 08:41
	17:08	18:06	18:55		20:48	21:35	21:58	21:34	20:36	19:24	25	18:26 (WEA 3) 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	18:00 (WEA 3) 07:17	08:12 08:41
	17:10	18:07	18:57		20:50	21:37	21:58	21:33	20:33	19:22	27	18:27 (WEA 3) 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	17:58 (WEA 3) 07:19	08:13 08:41
	17:12	18:09	18:58		20:52	21:38	21:57	21:31	20:31	19:19	29	18:27 (WEA 3) 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	17:58 (WEA 3) 07:21	08:15 08:42
	17:14		20:00		20:53	21:39	21:57	21:29	20:29	19:17	30	18:28 (WEA 3) 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	17:57 (WEA 3) 07:23	08:16 08:42
	17:15		20:02		20:55	21:40	21:57	21:28	20:27	19:15	31	18:28 (WEA 3) 17:10 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	198	331 266 243
astr.max.mögl.Beschattung			488									297

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	18:13 (WEA 3)	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	18:39 (WEA 3)	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		18:14 (WEA 3)	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	18:38 (WEA 3)	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		18:15 (WEA 3)	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	18:37 (WEA 3)	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		18:17 (WEA 3)	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	18:35 (WEA 3)	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		18:18 (WEA 3)	07:34	08:23		
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	14	18:32 (WEA 3)	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		18:22 (WEA 3)	07:35	08:25		
	16:37	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	6	18:22 (WEA 3)	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	17:42 (WEA 3)	06:54	05:52	05:14	05:22	06:04	06:54			07:39	08:27		
	16:39	17:32	18:24	11	17:53 (WEA 3)	20:17	21:08	21:50	21:53	21:12			18:56	16:22		
9	08:39	08:01	07:03	17:40 (WEA 3)	06:52	05:50	05:14	05:23	06:05	06:56			07:46	08:28		
	16:41	17:34	18:25	16	17:56 (WEA 3)	20:19	21:10	21:51	21:53	21:11			18:54	16:21		
10	08:39	07:59	07:01	17:38 (WEA 3)	06:49	05:48	05:13	05:24	06:07	06:58			07:48	08:29		
	16:42	17:36	18:27	20	17:58 (WEA 3)	20:21	21:11	21:51	21:52	21:09			18:52	16:21		
11	08:38	07:58	06:59	17:37 (WEA 3)	06:47	05:47	05:13	05:25	06:09	06:59			07:49	08:30		
	16:43	17:38	18:29	23	18:00 (WEA 3)	20:22	21:13	21:52	21:51	21:07			18:50	16:21		
12	08:38	07:56	06:56	17:35 (WEA 3)	06:45	05:45	05:13	05:26	06:10	07:01			07:51	08:31		
	16:45	17:40	18:31	25	18:00 (WEA 3)	20:24	21:15	21:53	21:50	21:05			18:47	16:21		
13	08:37	07:54	06:54	17:34 (WEA 3)	06:43	05:43	05:12	05:27	06:12	07:03			07:53	08:32		
	16:46	17:41	18:32	26	18:00 (WEA 3)	20:26	21:16	21:54	21:49	21:03			18:45	16:21		
14	08:36	07:52	06:52	17:33 (WEA 3)	06:40	05:42	05:12	05:28	06:13	07:04			07:54	08:33		
	16:48	17:43	18:34	28	18:01 (WEA 3)	20:28	21:18	21:54	21:49	21:01			18:43	16:21		
15	08:35	07:50	06:49	17:32 (WEA 3)	06:38	05:40	05:12	05:29	06:15	07:06			07:56	08:34		
	16:49	17:45	18:36	28	18:00 (WEA 3)	20:29	21:19	21:55	21:48	20:59			18:41	16:21		
16	08:34	07:48	06:47	17:32 (WEA 3)	06:36	05:39	05:12	05:30	06:17	07:07			07:58	08:35		
	16:51	17:47	18:38	29	18:01 (WEA 3)	20:31	21:21	21:55	21:47	20:57			18:39	16:21		
17	08:34	07:46	06:45	17:32 (WEA 3)	06:34	05:37	05:12	05:32	06:18	07:09			08:00	08:36		
	16:53	17:49	18:39	29	18:01 (WEA 3)	20:33	21:22	21:56	21:45	20:55			18:36	16:21		
18	08:33	07:44	06:42	17:32 (WEA 3)	06:32	05:36	05:12	05:33	06:20	07:11	18:30 (WEA 3)	08:01	07:57	08:37		
	16:54	17:51	18:41	27	17:59 (WEA 3)	20:34	21:24	21:56	21:44	20:53	19:43	3	18:33 (WEA 3)	18:34	16:39	16:21
19	08:32	07:42	06:40	17:32 (WEA 3)	06:29	05:34	05:12	05:34	06:22	07:12	18:25 (WEA 3)	08:03	07:58	08:38		
	16:56	17:53	18:43	27	17:59 (WEA 3)	20:36	21:25	21:56	21:43	20:51	19:41	13	18:38 (WEA 3)	18:32	16:37	16:22
20	08:30	07:40	06:38	17:33 (WEA 3)	06:27	05:33	05:12	05:36	06:23	07:14	18:21 (WEA 3)	08:05	08:00	08:38		
	16:58	17:54	18:45	26	17:59 (WEA 3)	20:38	21:27	21:57	21:42	20:49	19:38	18	18:39 (WEA 3)	18:30	16:36	16:22
21	08:29	07:38	06:35	17:33 (WEA 3)	06:25	05:31	05:12	05:37	06:25	07:16	18:20 (WEA 3)	08:07	08:02	08:39		
	16:59	17:56	18:46	24	17:57 (WEA 3)	20:40	21:28	21:57	21:41	20:46	19:36	21	18:41 (WEA 3)	18:28	16:35	16:22
22	08:28	07:36	06:33	17:34 (WEA 3)	06:23	05:30	05:12	05:38	06:27	07:17	18:19 (WEA 3)	08:08	08:04	08:39		
	17:01	17:58	18:48	22	17:56 (WEA 3)	20:41	21:30	21:57	21:40	20:44	19:33	23	18:42 (WEA 3)	18:26	16:34	16:23
23	08:27	07:34	06:31	17:34 (WEA 3)	06:21	05:29	05:12	05:40	06:28	07:19	18:17 (WEA 3)	08:10	08:05	08:40		
	17:03	18:00	18:50	19	17:53 (WEA 3)	20:43	21:31	21:57	21:38	20:42	19:31	25	18:42 (WEA 3)	18:24	16:33	16:23
24	08:26	07:32	06:28	17:37 (WEA 3)	06:19	05:28	05:13	05:41	06:30	07:21	18:16 (WEA 3)	08:12	08:07	08:40		
	17:05	18:02	18:52	14	17:51 (WEA 3)	20:45	21:33	21:58	21:37	20:40	19:29	27	18:43 (WEA 3)	18:22	16:31	16:24
25	08:25	07:30	06:26	17:40 (WEA 3)	06:17	05:26	05:13	05:42	06:31	07:22	18:14 (WEA 3)	08:14	08:08	08:41		
	17:06	18:04	18:53	7	17:47 (WEA 3)	20:46	21:34	21:58	21:35	20:38	19:26	28	18:42 (WEA 3)	18:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	18:14 (WEA 3)	08:16	08:10	08:10	08:41		
	17:08	18:06	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:42 (WEA 3)	17:18	16:29	16:25	16:25		
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	06:35	07:26	18:14 (WEA 3)	07:17	08:12	08:12	08:41		
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:42 (WEA 3)	17:16	16:29	16:26	16:26		
28	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	18:13 (WEA 3)	07:19	08:13	08:13	08:41		
	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:41 (WEA 3)	17:14	16:28	16:27	16:27		
29	08:19	07:17	06:13	06:09	05:22	05:15	05:48	06:38	07:29	18:13 (WEA 3)	07:21	08:15	08:15	08:42		
	17:13	18:10	19:00	20:53	21:39	21:57	21:29	20:29	19:17	18:41 (WEA 3)	17:12	16:27	16:28	16:28		
30	08:18	07:15	06:11	06:07	05:21	05:15	05:50	06:40	07:31	18:14 (WEA 3)	07:23	08:16	08:16	08:42		
	17:15	18:12	19:02	20:55	21:40	21:57	21:28	20:27	19:15	26	18:40 (WEA 3)	17:10	16:26	16:29	16:29	
31	08:16	07:12	06:08	06:03	05:17	05:11	05:51	06:41	07:32	18:14 (WEA 3)	07:25	08:16	08:16	08:42		
	17:17	18:14	19:04	21:42	21:26	20:25	21:26	20:25	19:15	17:08	17:08	16:26	16:30	16:30	16:30	
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	296	331	266	243	243	243	243
astr.max.mögl.Beschattung			401								110					

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------	---------------------------------	----------------------------



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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinfallrichtung
- 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	06:05 20:57	05:19 21:43	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:12	18:15 (WEA 3) 18:40 (WEA 3)	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	07:34 19:10	18:16 (WEA 3) 18:39 (WEA 3)	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	07:36 19:08	18:18 (WEA 3) 18:37 (WEA 3)	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	07:37 19:06	18:20 (WEA 3) 18:35 (WEA 3)	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	07:39 19:09	18:22 (WEA 3) 18:31 (WEA 3)	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	07:41 19:01	18:22 (WEA 3) 18:31 (WEA 3)	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	07:42 18:59	18:22 (WEA 3) 18:31 (WEA 3)	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	07:44 18:56	18:22 (WEA 3) 18:31 (WEA 3)	07:39 16:54	08:27 16:22
9	08:39 16:41	08:01 17:34	07:03 18:25	17:43 (WEA 3) 06:52	05:50 20:19	05:14 21:51	05:23 21:53	06:05 21:11	06:56 20:04	07:46 18:54	18:22 (WEA 3) 18:31 (WEA 3)	07:41 16:52	08:28 16:21
10	08:39 16:42	07:59 17:36	07:01 18:27	17:41 (WEA 3) 06:49	05:48 20:21	05:13 21:11	05:24 21:52	06:07 21:09	06:58 20:02	07:48 18:52	18:22 (WEA 3) 18:31 (WEA 3)	07:43 16:50	08:29 16:21
11	08:38 16:43	07:58 17:38	06:59 18:29	17:39 (WEA 3) 06:47	05:47 20:22	05:13 21:13	05:25 21:52	06:09 21:07	06:59 19:59	07:49 18:50	18:22 (WEA 3) 18:31 (WEA 3)	07:44 16:49	08:30 16:21
12	08:38 16:45	07:56 17:40	06:56 18:31	17:37 (WEA 3) 06:45	05:45 20:24	05:13 21:15	05:26 21:53	06:10 21:05	07:01 19:57	07:51 18:47	18:22 (WEA 3) 18:31 (WEA 3)	07:46 16:46	08:31 16:21
13	08:37 16:46	07:54 17:41	06:54 18:32	17:36 (WEA 3) 06:43	05:43 20:26	05:12 21:16	05:27 21:54	06:12 21:49	07:03 19:55	07:53 18:45	18:22 (WEA 3) 18:31 (WEA 3)	07:48 16:46	08:32 16:21
14	08:36 16:48	07:52 17:43	06:52 18:34	17:35 (WEA 3) 06:40	05:42 20:28	05:12 21:18	05:28 21:54	06:13 21:49	07:04 19:52	07:54 18:43	18:22 (WEA 3) 18:31 (WEA 3)	07:50 16:44	08:33 16:21
15	08:35 16:49	07:50 17:45	06:49 18:36	18:02 (WEA 3) 06:38	05:40 20:29	05:12 21:19	05:29 21:55	06:15 21:48	07:06 19:50	07:56 18:41	18:22 (WEA 3) 18:31 (WEA 3)	07:52 16:43	08:34 16:21
16	08:34 16:51	07:48 17:47	06:47 18:38	17:34 (WEA 3) 06:36	05:39 20:31	05:12 21:21	05:30 21:55	06:17 20:57	07:07 19:48	07:58 18:39	18:22 (WEA 3) 18:31 (WEA 3)	07:53 16:41	08:35 16:21
17	08:34 16:53	07:46 17:49	06:45 18:39	17:34 (WEA 3) 06:34	05:37 20:33	05:12 21:22	05:32 21:56	06:18 20:55	07:09 19:45	08:00 18:36	18:22 (WEA 3) 18:31 (WEA 3)	07:55 16:40	08:36 16:21
18	08:33 16:54	07:44 17:51	06:42 18:41	17:33 (WEA 3) 06:32	05:36 20:34	05:12 21:24	05:33 21:56	06:20 20:53	07:11 19:43	08:01 18:34	18:22 (WEA 3) 18:31 (WEA 3)	07:57 16:39	08:37 16:21
19	08:32 16:56	07:42 17:53	06:40 18:43	17:33 (WEA 3) 06:29	05:34 20:36	05:12 21:25	05:34 21:56	06:22 20:51	07:12 19:41	08:03 18:32	18:22 (WEA 3) 18:31 (WEA 3)	07:58 16:37	08:37 16:22
20	08:30 16:58	07:40 17:54	06:38 18:45	17:34 (WEA 3) 06:27	05:33 20:38	05:12 21:27	05:36 21:57	06:23 20:49	07:14 19:38	08:05 18:30	18:22 (WEA 3) 18:31 (WEA 3)	08:00 16:36	08:38 16:22
21	08:29 16:59	07:38 17:56	06:35 18:46	17:33 (WEA 3) 06:25	05:31 20:40	05:12 21:28	05:37 21:57	06:25 20:46	07:16 19:36	08:07 18:28	18:22 (WEA 3) 18:31 (WEA 3)	08:02 16:35	08:39 16:22
22	08:28 17:01	07:36 17:58	06:33 18:48	17:34 (WEA 3) 06:23	05:30 20:43	05:12 21:30	05:38 21:57	06:27 20:44	07:17 19:33	08:08 18:26	18:22 (WEA 3) 18:31 (WEA 3)	08:04 16:34	08:39 16:23
23	08:27 17:03	07:34 18:00	06:31 18:50	17:35 (WEA 3) 06:21	05:29 20:43	05:12 21:31	05:40 21:57	06:28 20:42	07:19 19:31	08:10 18:24	18:22 (WEA 3) 18:31 (WEA 3)	08:05 16:33	08:40 16:23
24	08:26 17:05	07:32 18:02	06:28 18:52	17:36 (WEA 3) 06:19	05:28 20:45	05:13 21:33	05:41 21:58	06:30 20:40	07:21 19:29	08:12 18:22	18:22 (WEA 3) 18:31 (WEA 3)	08:07 16:31	08:40 16:24
25	08:25 17:06	07:30 18:04	06:26 18:53	17:39 (WEA 3) 06:17	05:26 20:46	05:13 21:34	05:42 21:58	06:31 20:38	07:22 19:26	08:14 18:20	18:22 (WEA 3) 18:31 (WEA 3)	08:08 16:30	08:41 16:25
26	08:23 17:08	07:27 18:06	06:24 18:55	17:52 (WEA 3) 06:15	05:25 20:48	05:13 21:35	05:44 21:58	06:33 20:36	07:24 19:24	08:16 18:18	18:22 (WEA 3) 18:31 (WEA 3)	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 21:58	05:45 21:33	06:35 20:33	07:26 19:22	08:17 18:44	18:22 (WEA 3) 18:31 (WEA 3)	08:12 16:29	08:41 16:26
28	08:21 17:12	07:23 18:09	06:19 18:58	06:11 20:52	05:23 21:38	05:14 21:57	05:47 21:31	06:36 20:31	07:27 19:19	08:19 18:43	18:22 (WEA 3) 18:31 (WEA 3)	08:13 16:28	08:41 16:27
29	08:19 17:13	07:17 18:09	06:17 18:58	06:09 20:53	05:22 21:39	05:15 21:57	05:48 21:29	06:38 20:29	07:29 19:17	08:21 18:42	18:22 (WEA 3) 18:31 (WEA 3)	08:15 16:27	08:42 16:28
30	08:18 17:15	07:15 18:02	06:15 18:50	06:07 20:55	05:21 21:40	05:15 21:57	05:50 21:28	06:40 20:27	07:31 19:15	08:23 18:42	18:22 (WEA 3) 18:31 (WEA 3)	08:16 16:26	08:42 16:29
31	08:16 17:17	07:12 18:04	06:12 19:04	06:05 21:42	05:20 21:42	05:14 21:57	05:51 21:26	06:41 20:25	07:32 19:08	08:25 17:08	18:22 (WEA 3) 18:31 (WEA 3)	08:17 16:26	08:42 16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	317	266	243	
astr.max.mögl.Beschattung			394							91			

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

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	18:17 (WEA 3)	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	23	18:40 (WEA 3)	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		18:17 (WEA 3)	07:28	08:19
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	23	18:40 (WEA 3)	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		18:18 (WEA 3)	07:30	08:21
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	21	18:39 (WEA 3)	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		18:19 (WEA 3)	07:32	08:22
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	19:06	19	18:38 (WEA 3)	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		18:19 (WEA 3)	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	18:38 (WEA 3)	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		18:22 (WEA 3)	07:35	08:25
	16:37	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	11	18:33 (WEA 3)	16:57	16:22
7	08:40	08:05	07:08	17:47 (WEA 3)	06:56	05:54	05:15	05:21	06:02	06:53		07:42	07:37	08:26
	16:38	17:30	18:22	8	17:55 (WEA 3)	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	17:43 (WEA 3)	06:54	05:52	05:14	05:22	06:04	06:54		07:44	07:39	08:27
	16:39	17:32	18:24	14	17:57 (WEA 3)	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	17:42 (WEA 3)	06:52	05:50	05:14	05:23	06:05	06:56		07:46	07:41	08:28
	16:41	17:34	18:25	17	17:59 (WEA 3)	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	17:40 (WEA 3)	06:49	05:48	05:13	05:24	06:07	06:58		07:47	07:43	08:29
	16:42	17:36	18:27	21	18:01 (WEA 3)	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	17:40 (WEA 3)	06:47	05:47	05:13	05:25	06:09	06:59		07:49	07:44	08:30
	16:43	17:38	18:29	22	18:02 (WEA 3)	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	17:38 (WEA 3)	06:45	05:45	05:13	05:26	06:10	07:01		07:51	07:46	08:31
	16:45	17:40	18:31	23	18:01 (WEA 3)	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	17:38 (WEA 3)	06:43	05:43	05:12	05:27	06:12	07:03		07:53	07:48	08:32
	16:46	17:41	18:32	24	18:02 (WEA 3)	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	17:38 (WEA 3)	06:40	05:42	05:12	05:28	06:13	07:04		07:54	07:50	08:33
	16:48	17:43	18:34	24	18:02 (WEA 3)	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	17:37 (WEA 3)	06:38	05:40	05:12	05:29	06:15	07:06		07:56	07:52	08:34
	16:49	17:45	18:36	24	18:01 (WEA 3)	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	17:37 (WEA 3)	06:36	05:39	05:12	05:30	06:17	07:07		07:58	07:53	08:35
	16:51	17:47	18:38	24	18:01 (WEA 3)	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	17:37 (WEA 3)	06:34	05:37	05:12	05:32	06:18	07:09		08:00	07:55	08:36
	16:53	17:49	18:39	23	18:00 (WEA 3)	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	17:37 (WEA 3)	06:32	05:36	05:12	05:33	06:20	07:11		08:01	07:57	08:37
	16:54	17:51	18:41	22	17:59 (WEA 3)	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	17:38 (WEA 3)	06:29	05:34	05:12	05:34	06:22	07:12		08:03	07:58	08:37
	16:56	17:53	18:43	20	17:58 (WEA 3)	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	17:39 (WEA 3)	06:27	05:33	05:12	05:36	06:23	07:14		08:05	08:00	08:38
	16:58	17:54	18:45	16	17:55 (WEA 3)	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	17:41 (WEA 3)	06:25	05:31	05:12	05:37	06:25	07:16		18:07	08:02	08:39
	16:59	17:56	18:46	12	17:53 (WEA 3)	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	17:45 (WEA 3)	06:23	05:30	05:12	05:38	06:27	07:17	18:27 (WEA 3)	08:08	08:04	08:39
	17:01	17:58	18:48	4	17:49 (WEA 3)	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		11	18:38 (WEA 3)	18:20	16:23
	17:03	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	16	18:40 (WEA 3)	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		16	18:22 (WEA 3)	18:12	16:23
	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	19	18:41 (WEA 3)	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		19	18:20 (WEA 3)	18:14	16:24
	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26	21	18:41 (WEA 3)	18:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24		21	18:19 (WEA 3)	18:10	16:24
	17:08	18:05	18:55	20:48	21:35	21:58	21:34	20:36	19:24	23	18:42 (WEA 3)	18:18	16:29	16:25
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	06:35	07:26		23	18:19 (WEA 3)	18:12	16:24
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	23	18:42 (WEA 3)	18:16	16:29	16:26
28	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27		23	18:17 (WEA 3)	18:13	16:24
	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	25	18:42 (WEA 3)	18:14	16:28	16:27
29	08:19	07:17	06:13	06:09	05:22	05:15	05:48	06:38	07:29		25	18:17 (WEA 3)	18:15	16:24
	17:13	18:10	19:00	20:53	21:39	21:57	21:29	20:29	19:17	25	18:42 (WEA 3)	18:12	16:27	16:28
30	08:18	07:15	06:11	06:07	05:21	05:15	05:50	06:40	07:31		25	18:17 (WEA 3)	18:16	16:24
	17:15	18:12	19:02	20:55	21:40	21:57	21:28	20:27	19:15	25	18:42 (WEA 3)	18:10	16:26	16:29
31	08:16	07:12	06:08	06:05	05:20	05:14	05:51	06:41	07:32			18:16	16:26	16:29
	17:17	18:14	19:04	21:42	21:57	22:00	21:26	20:25	19:15			17:08	16:30	16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	188	331	266	243	243
astr.max.mögl.Beschattung			298								113			

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	18:17 (WEA 3)	07:26	08:18			
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	24	18:41 (WEA 3)	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		18:18 (WEA 3)	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	22	18:40 (WEA 3)	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		18:19 (WEA 3)	07:30	08:21		
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	20	18:39 (WEA 3)	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		18:20 (WEA 3)	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	18:38 (WEA 3)	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		18:21 (WEA 3)	07:34	08:23		
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	14	18:35 (WEA 3)	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		18:23 (WEA 3)	07:35	08:25		
	16:37	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	9	18:32 (WEA 3)	16:57	16:22		
7	08:40	08:05	07:08	17:50 (WEA 3)	06:56	05:54	05:15	05:21	06:02	06:53		07:42	07:37	08:26		
	16:38	17:30	18:22	4	17:54 (WEA 3)	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	17:45 (WEA 3)	06:54	05:52	05:14	05:22	06:04	06:54		07:44	07:39	08:27		
	16:39	17:32	18:24	12	17:57 (WEA 3)	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	17:43 (WEA 3)	06:52	05:50	05:14	05:23	06:05	06:56		07:46	07:41	08:28		
	16:41	17:34	18:25	16	17:59 (WEA 3)	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	17:41 (WEA 3)	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	18:01 (WEA 3)	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	17:40 (WEA 3)	06:47	05:47	05:13	05:25	06:09	06:59		07:49	07:44	08:30		
	16:43	17:38	18:29	22	18:02 (WEA 3)	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	17:39 (WEA 3)	06:45	05:45	05:13	05:26	06:10	07:01		07:51	07:46	08:31		
	16:45	17:40	18:31	23	18:02 (WEA 3)	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	17:38 (WEA 3)	06:43	05:43	05:12	05:27	06:12	07:03		07:53	07:48	08:32		
	16:46	17:41	18:32	24	18:02 (WEA 3)	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	17:38 (WEA 3)	06:40	05:42	05:12	05:28	06:13	07:04		07:54	07:50	08:33		
	16:48	17:43	18:34	25	18:03 (WEA 3)	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	17:37 (WEA 3)	06:38	05:40	05:12	05:29	06:15	07:06		07:56	07:52	08:34		
	16:49	17:45	18:36	25	18:02 (WEA 3)	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	17:37 (WEA 3)	06:36	05:39	05:12	05:30	06:17	07:07		07:58	07:53	08:35		
	16:51	17:47	18:38	25	18:02 (WEA 3)	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	17:38 (WEA 3)	06:34	05:37	05:12	05:32	06:18	07:09		08:00	07:55	08:36		
	16:53	17:49	18:39	23	18:01 (WEA 3)	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	17:37 (WEA 3)	06:32	05:36	05:12	05:33	06:20	07:11		08:01	07:57	08:37		
	16:54	17:51	18:41	23	18:00 (WEA 3)	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	17:38 (WEA 3)	06:29	05:34	05:12	05:34	06:22	07:12		08:03	07:58	08:37		
	16:56	17:53	18:43	21	17:59 (WEA 3)	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	17:39 (WEA 3)	06:27	05:33	05:12	05:36	06:23	07:14		08:05	08:00	08:38		
	16:58	17:54	18:45	18	17:57 (WEA 3)	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	17:41 (WEA 3)	06:25	05:31	05:12	05:37	06:25	07:16		18:30 (WEA 3)	08:07	08:39		
	16:59	17:56	18:46	14	17:55 (WEA 3)	20:40	21:28	21:57	21:41	20:46	19:36	7	18:37 (WEA 3)	18:28	16:35	16:22
22	08:28	07:36	06:33	17:43 (WEA 3)	06:23	05:30	05:12	05:38	06:27	07:17		18:27 (WEA 3)	08:08	08:04	08:39	
	17:01	17:58	18:48	9	17:52 (WEA 3)	20:41	21:30	21:57	21:39	20:44	19:33	13	18:40 (WEA 3)	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			18:24 (WEA 3)	08:10	08:05	08:40	
	17:03	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	17	18:41 (WEA 3)	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			18:22 (WEA 3)	08:12	08:07	08:40	
	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	20	18:42 (WEA 3)	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			18:20 (WEA 3)	07:14	08:08	08:41	
	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26	22	18:42 (WEA 3)	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			18:20 (WEA 3)	07:16	08:10	08:41	
	17:08	18:05	18:55	20:48	21:35	21:58	21:34	20:36	19:24	23	18:43 (WEA 3)	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			18:19 (WEA 3)	07:17	08:12	08:41	
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	24	18:43 (WEA 3)	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			18:18 (WEA 3)	07:19	08:13	08:41	
	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	24	18:42 (WEA 3)	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			18:18 (WEA 3)	07:21	08:15	08:42	
	17:13	18:10	19:00	20:53	21:39	21:57	21:29	20:29	19:17	24	18:42 (WEA 3)	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			18:18 (WEA 3)	07:23	08:16	08:42	
	17:15	18:12	19:02	20:55	21:40	21:57	21:28	20:27	19:15	24	18:42 (WEA 3)	17:10	16:26	16:29		
31	08:16	07:12	06:10	06:01	05:16	05:10	05:51	06:41				07:25	08:16	08:42		
	17:17	18:14	19:04	20:57	21:42	21:59	21:26	20:25				17:08	16:26	16:30		
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	198	107	266	243			
astr.max.mögl.Beschattung			304													

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------	---------------------------------	----------------------------

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	18:10 (WEA 3)	07:26	08:18		
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	21	18:31 (WEA 3)	17:06	16:25	
2	08:42	08:13	07:19	17:42 (WEA 3)	07:08	06:03	05:18	05:17	05:54	06:45	07:34	18:09 (WEA 3)	07:28	08:19	
	16:32	17:21	18:13	17:46 (WEA 3)	20:07	20:58	21:44	21:56	21:23	20:20	19:10	22	18:31 (WEA 3)	17:04	16:25
3	08:41	08:11	07:16	17:38 (WEA 3)	07:05	06:01	05:17	05:17	05:56	06:46	07:36	18:09 (WEA 3)	07:30	08:21	
	16:33	17:23	18:15	17:49 (WEA 3)	20:09	21:00	21:45	21:56	21:21	20:18	19:08	23	18:32 (WEA 3)	17:02	16:24
4	08:41	08:10	07:14	17:36 (WEA 3)	07:03	05:59	05:17	05:18	05:57	06:48	07:37	23	18:09 (WEA 3)	07:32	08:22
	16:34	17:25	18:16	17:51 (WEA 3)	20:10	21:02	21:46	21:56	21:20	20:15	19:06	23	18:32 (WEA 3)	17:00	16:23
5	08:41	08:08	07:12	17:34 (WEA 3)	07:01	05:57	05:16	05:19	05:59	06:49	07:39	23	18:08 (WEA 3)	07:34	08:23
	16:35	17:26	18:18	17:52 (WEA 3)	20:12	21:03	21:47	21:55	21:18	20:13	19:03	23	18:31 (WEA 3)	16:59	16:23
6	08:41	08:06	07:10	17:33 (WEA 3)	06:58	05:55	05:15	05:20	06:01	06:51	07:41	22	18:08 (WEA 3)	07:35	08:25
	16:37	17:28	18:20	17:53 (WEA 3)	20:14	21:05	21:48	21:55	21:16	20:11	19:01	22	18:30 (WEA 3)	16:57	16:22
7	08:40	08:05	07:08	17:32 (WEA 3)	06:56	05:54	05:15	05:21	06:02	06:53	07:42	22	18:08 (WEA 3)	07:37	08:26
	16:38	17:30	18:22	17:54 (WEA 3)	20:16	21:07	21:49	21:54	21:14	20:09	18:59	22	18:30 (WEA 3)	16:55	16:22
8	08:40	08:03	07:05	17:31 (WEA 3)	06:54	05:52	05:14	05:22	06:04	06:54	07:44	21	18:09 (WEA 3)	07:39	08:27
	16:39	17:32	18:24	17:53 (WEA 3)	20:17	21:08	21:50	21:53	21:12	20:06	18:56	20	18:24 (WEA 3)	16:54	16:22
9	08:39	08:01	07:03	17:31 (WEA 3)	06:52	05:50	05:14	05:23	06:05	06:56	07:46	20	18:09 (WEA 3)	07:41	08:28
	16:41	17:34	18:25	17:54 (WEA 3)	20:19	21:10	21:51	21:53	21:11	20:04	18:54	17	18:26 (WEA 3)	16:52	16:21
10	08:39	07:59	07:01	17:31 (WEA 3)	06:49	05:48	05:13	05:24	06:07	06:58	07:47	20	18:11 (WEA 3)	07:43	08:29
	16:42	17:36	18:27	17:54 (WEA 3)	20:21	21:11	21:51	21:52	21:09	20:02	18:52	13	18:24 (WEA 3)	16:50	16:21
11	08:38	07:58	06:59	17:31 (WEA 3)	06:47	05:47	05:13	05:25	06:09	06:59	07:49	9	18:13 (WEA 3)	07:44	08:30
	16:43	17:38	18:29	17:54 (WEA 3)	20:22	21:13	21:52	21:51	21:07	19:59	18:50	9	18:22 (WEA 3)	16:49	16:21
12	08:38	07:56	06:56	17:31 (WEA 3)	06:45	05:45	05:13	05:26	06:10	07:01	07:51	9	18:13 (WEA 3)	07:46	08:31
	16:45	17:40	18:31	17:52 (WEA 3)	20:24	21:15	21:53	21:50	21:05	19:57	18:47	9	18:22 (WEA 3)	16:47	16:21
13	08:37	07:54	06:54	17:32 (WEA 3)	06:43	05:43	05:12	05:27	06:12	07:03	07:53	9	18:13 (WEA 3)	07:48	08:32
	16:46	17:41	18:32	17:51 (WEA 3)	20:26	21:16	21:54	21:49	21:03	19:55	18:45	9	18:26 (WEA 3)	16:46	16:21
14	08:36	07:52	06:52	17:33 (WEA 3)	06:40	05:42	05:12	05:28	06:13	07:04	07:54	9	18:13 (WEA 3)	07:50	08:33
	16:48	17:43	18:34	17:50 (WEA 3)	20:28	21:18	21:54	21:49	21:01	19:52	18:43	9	18:26 (WEA 3)	16:44	16:21
15	08:35	07:50	06:49	17:34 (WEA 3)	06:38	05:40	05:12	05:29	06:15	07:06	07:56	9	18:13 (WEA 3)	07:52	08:34
	16:49	17:45	18:36	17:48 (WEA 3)	20:29	21:19	21:55	21:48	20:59	19:50	18:41	9	18:26 (WEA 3)	16:43	16:21
16	08:34	07:48	06:47	17:36 (WEA 3)	06:36	05:39	05:12	05:30	06:17	07:07	07:58	9	18:13 (WEA 3)	07:53	08:35
	16:51	17:47	18:38	17:45 (WEA 3)	20:31	21:21	21:55	21:47	20:57	19:48	18:39	9	18:26 (WEA 3)	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	08:00	9	18:13 (WEA 3)	07:55	08:36
	16:53	17:49	18:39	20:33	21:22	21:56	21:45	20:55	19:45	18:36	18:01	9	18:26 (WEA 3)	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	08:01	9	18:13 (WEA 3)	07:57	08:37
	16:54	17:51	18:41	20:34	21:24	21:56	21:44	20:53	19:43	18:34	18:03	9	18:26 (WEA 3)	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	08:03	9	18:13 (WEA 3)	07:58	08:37
	16:56	17:53	18:43	20:36	21:25	21:56	21:43	20:51	19:41	18:32	18:02	9	18:26 (WEA 3)	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	08:05	9	18:13 (WEA 3)	07:59	08:38
	16:58	17:54	18:45	20:38	21:27	21:57	21:42	20:49	19:38	18:30	18:00	9	18:26 (WEA 3)	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	08:07	9	18:13 (WEA 3)	08:02	08:39
	16:59	17:56	18:46	20:40	21:28	21:57	21:41	20:46	19:36	18:28	18:00	9	18:26 (WEA 3)	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	08:08	9	18:13 (WEA 3)	08:04	08:39
	17:01	17:58	18:48	20:41	21:30	21:57	21:39	20:44	19:33	18:26	18:00	9	18:26 (WEA 3)	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	08:10	9	18:13 (WEA 3)	08:05	08:40
	17:03	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	18:24	18:00	9	18:26 (WEA 3)	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	08:12	9	18:13 (WEA 3)	08:07	08:40
	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	18:00	9	18:26 (WEA 3)	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	08:13	9	18:13 (WEA 3)	08:08	08:41
	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26	18:20	18:00	9	18:26 (WEA 3)	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:16	9	18:13 (WEA 3)	08:10	08:41
	17:08	18:05	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:18	18:00	9	18:26 (WEA 3)	16:29	16:25
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	06:35	07:26	08:17	08:17	9	18:13 (WEA 3)	08:12	08:41
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:16	18:00	9	18:26 (WEA 3)	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	08:19	9	18:13 (WEA 3)	08:13	08:41
	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:14	18:00	9	18:26 (WEA 3)	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	08:21	9	18:13 (WEA 3)	08:15	08:42
	17:13	07:00	06:00	20:53	21:39	21:57	21:29	20:29	19:17	18:12	18:00	9	18:26 (WEA 3)	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	08:23	9	18:13 (WEA 3)	08:16	08:42
	17:15	07:02	06:02	20:55	21:40	21:57	21:28	20:27	19:15	18:11	18:00	9	18:26 (WEA 3)	16:26	16:29
31	08:16	07:12	06:08	06:03	05:17	05:11	05:51	06:41	07:32	08:24	08:24	9	18:13 (WEA 3)	08:17	08:42
	17:17	07:04	06:04	21:42	21:26	21:42	21:26	20:25	19:15	18:11	18:00	9	18:26 (WEA 3)	16:25	16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	311	266	243			
astr.max.mögl.Beschattung			261						54	215					

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	---------------------------	----------------------------

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinflussrichtung  
Die Windenergieanlage/n ist/sind immer in Betrieb

	Januar	Februar	Marz	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember		
1	08:42 16:31 08:42	08:15 17:19 08:13	07:21 18:11 07:19	17:32 (WEA 3) 20:05 07:08	07:10 20:57 06:03	06:05 21:43 05:18	05:19 21:57 05:17	05:16 21:57 05:17	05:53 21:25 05:54	06:43 20:22 06:45	07:32 19:12 07:34	18:11 (WEA 3) 18:21 (WEA 3) 18:09 (WEA 3)	07:26 17:06 07:28	08:18 16:25 08:19
2	16:32 08:41 16:33	17:21 08:11 17:23	18:13 07:16 18:15	17:46 (WEA 3) 17:30 (WEA 3) 17:49 (WEA 3)	20:07 07:05 20:09	20:58 06:01 21:00	21:44 05:17 21:45	21:56 05:17 21:56	21:23 05:56 21:21	20:20 06:46 20:18	19:10 07:36 19:08	18:23 (WEA 3) 18:07 (WEA 3) 18:25 (WEA 3)	17:04 07:30 17:02	16:25 08:21 16:24
3	08:41 16:34 08:41	08:10 17:25 08:08	07:14 18:16 07:12	17:29 (WEA 3) 17:50 (WEA 3) 17:28 (WEA 3)	07:03 20:10 07:01	05:59 21:02 05:57	05:17 21:46 05:16	05:18 21:56 05:19	05:57 21:20 05:59	06:48 20:15 06:49	07:37 19:06 07:39	18:06 (WEA 3) 18:25 (WEA 3) 18:05 (WEA 3)	07:32 17:00 07:34	08:22 16:23 08:23
4	16:35 08:41 16:37	17:26 08:06 17:28	18:18 07:10 18:20	17:49 (WEA 3) 17:28 (WEA 3) 17:50 (WEA 3)	20:12 06:58 20:14	21:03 05:55 21:05	21:47 05:15 21:48	21:55 05:20 21:55	21:18 06:01 21:16	20:13 06:51 20:11	19:03 07:41 19:01	18:04 (WEA 3) 18:25 (WEA 3) 18:04 (WEA 3)	07:34 16:59 07:35	08:23 16:23 08:25
5	08:40 16:38 08:40	08:05 17:30 08:03	07:08 18:22 07:05	17:28 (WEA 3) 17:50 (WEA 3) 17:27 (WEA 3)	06:56 20:16 06:54	05:54 21:07 05:52	05:15 21:49 05:14	05:21 21:54 05:22	06:02 21:14 06:04	06:53 20:09 06:54	07:42 18:59 07:44	18:04 (WEA 3) 18:26 (WEA 3) 18:04 (WEA 3)	07:37 16:55 07:39	08:26 16:22 08:27
6	16:39 08:39 16:41	17:32 08:01 17:34	18:24 07:03 18:25	17:48 (WEA 3) 17:28 (WEA 3) 17:48 (WEA 3)	20:17 06:52 20:19	21:08 05:50 21:10	21:51 05:14 21:51	21:53 05:23 21:53	21:09 06:05 21:11	20:02 06:56 20:04	18:52 07:46 18:54	18:26 (WEA 3) 18:03 (WEA 3) 18:24 (WEA 3)	16:54 07:41 16:52	16:22 08:28 16:21
7	08:39 16:42 08:38	07:59 17:36 07:58	07:01 18:27 06:58	17:29 (WEA 3) 17:47 (WEA 3) 17:30 (WEA 3)	06:49 20:21 06:47	05:48 21:11 05:47	05:13 21:51 05:13	05:24 21:52 05:25	06:07 21:09 06:09	06:58 20:02 06:59	07:47 18:52 07:49	18:04 (WEA 3) 18:26 (WEA 3) 18:04 (WEA 3)	07:43 16:50 07:44	08:29 16:21 08:30
8	16:43 08:38 16:45	17:38 07:58 17:40	18:29 06:56 18:31	17:46 (WEA 3) 17:31 (WEA 3) 17:43 (WEA 3)	20:22 06:45 20:24	21:13 05:45 21:15	21:52 05:13 21:53	21:51 05:26 21:50	21:07 06:10 21:05	19:59 07:01 19:57	18:50 07:51 18:47	18:22 (WEA 3) 18:05 (WEA 3) 18:20 (WEA 3)	16:49 07:46 16:47	16:21 08:31 16:21
9	08:37 16:46 08:36	07:54 17:41 07:52	06:54 18:32 06:52	17:36 (WEA 3) 17:39 (WEA 3) 17:34	06:43 20:26 06:40	05:43 21:16 05:42	05:12 21:54 05:12	05:27 21:49 05:28	06:12 21:03 06:13	07:03 19:55 07:04	07:53 18:45 07:54	18:06 (WEA 3) 18:24 (WEA 3) 18:09 (WEA 3)	07:48 16:46 07:50	08:32 16:21 08:33
10	16:48 08:35 16:49	17:43 07:50 17:45	18:34 06:49 18:36	17:43 17:50 18:36	20:28 06:38 20:29	21:18 05:40 21:19	21:54 05:12 21:55	21:49 05:29 21:48	21:01 06:15 20:59	19:52 07:06 19:50	18:43 07:56 18:41	18:14 (WEA 3) 18:09 (WEA 3) 18:14 (WEA 3)	16:44 07:52 16:43	16:21 08:34 16:21
11	08:34 16:51 08:33	07:48 17:47 07:46	06:47 18:38 06:45	17:48 (WEA 3) 18:38 18:33	06:47 20:31 06:34	05:39 21:21 05:37	05:12 21:55 05:12	05:30 21:47 05:32	06:17 20:57 06:18	07:07 19:48 07:09	07:58 18:39 08:00	18:06 (WEA 3) 18:26 (WEA 3) 18:06 (WEA 3)	07:49 16:41 07:55	08:35 16:21 08:36
12	16:53 08:33 16:54	17:49 07:44 17:51	06:42 18:41 06:40	17:44 17:44 18:41	20:33 06:42 20:34	21:22 05:36 21:24	21:56 05:12 21:56	21:45 05:33 21:44	20:55 06:20 20:53	19:45 07:11 19:43	18:36 08:01 18:34	18:06 (WEA 3) 18:26 (WEA 3) 18:06 (WEA 3)	16:40 07:57 16:40	16:21 08:37 16:21
13	08:32 16:56 08:30	07:42 17:53 07:40	06:40 18:43 06:38	17:42 18:43 18:38	06:40 20:36 06:27	05:34 21:25 05:33	05:12 21:56 05:12	05:40 21:43 05:35	06:22 20:51 06:23	07:12 19:41 07:14	08:03 18:32 08:05	18:06 (WEA 3) 18:26 (WEA 3) 18:06 (WEA 3)	16:37 08:00 16:36	08:37 16:22 08:38
14	08:29 16:59 08:28	07:38 17:56 07:36	06:35 18:46 06:33	17:48 (WEA 3) 18:46 18:48	06:35 20:40 06:23	05:31 21:28 05:30	05:12 21:57 05:12	05:37 21:41 05:38	06:25 20:46 06:27	07:16 19:36 07:17	08:07 18:28 08:08	18:06 (WEA 3) 18:26 (WEA 3) 18:06 (WEA 3)	16:35 08:04 16:34	08:39 16:22 08:40
15	08:27 17:03 08:26	07:34 18:00 07:32	06:31 18:50 06:28	17:34 18:50 18:28	06:31 20:43 06:19	05:29 21:31 05:28	05:12 21:57 05:13	05:40 21:38 05:41	06:28 20:42 06:30	07:19 19:31 07:21	08:10 18:24 08:12	18:06 (WEA 3) 18:26 (WEA 3) 18:06 (WEA 3)	16:33 08:07 16:31	16:23 08:40 16:24
16	08:25 17:06 08:23	07:29 18:04 07:27	06:26 18:53 06:24	17:29 18:53 18:55	06:17 20:46 06:15	05:26 21:34 05:25	05:18 21:58 05:13	05:42 21:35 05:44	06:31 20:38 06:33	07:22 19:26 07:24	07:14 17:20 07:16	18:08 (WEA 3) 18:28 (WEA 3) 18:08 (WEA 3)	16:30 08:10 16:30	08:41 16:25 08:41
17	08:22 17:10 08:21	07:25 18:07 07:23	06:21 18:57 06:19	17:25 18:57 18:58	06:13 20:50 06:11	05:24 21:37 05:23	05:14 21:58 05:14	05:45 21:33 05:47	06:35 20:33 06:36	07:26 19:22 07:27	07:17 17:16 07:19	18:12 (WEA 3) 18:32 (WEA 3) 18:12 (WEA 3)	16:28 16:26 16:28	08:41 16:26 08:41
18	17:12 08:19 17:13	18:09 8 17:13	17:43 (WEA 3) 07:17 20:00	18:58 07:17 20:00	18:58 06:09 20:53	21:38 05:22 21:39	21:57 05:15 21:57	21:31 05:48 21:29	20:31 06:38 20:29	19:19 07:29 19:17	17:14 07:21 17:12	18:14 (WEA 3) 18:34 (WEA 3) 18:14 (WEA 3)	16:28 16:27 16:28	16:27 08:42 16:28
19	08:18 17:15 08:16	17:15 20:02 07:12	07:15 20:02 07:12	17:15 20:02 17:12	06:07 20:55 06:07	05:21 21:40 05:20	05:15 21:57 05:15	05:50 21:28 05:51	06:40 20:27 06:41	07:31 19:15 07:31	07:23 17:10 07:25	18:06 (WEA 3) 18:26 (WEA 3) 18:06 (WEA 3)	16:26 08:42 16:26	16:29 08:42 16:30
20	17:17 Sonnenscheinstunden astr.max.mögl.Beschattung	258 277 8	367 222 8	416 486 500	486 500 503	500 503 454	503 454 381	503 454 331	454 381 236	381 236 266	236 266 243	266 243 243	243 243 243	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	Zeitpunkt (SS:MM) Schatteneende	(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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinflussrichtung
- 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	17:30 (WEA 3)	07:10	06:05	05:19	05:16	05:53	06:43	07:32	18:12 (WEA 3)	07:26	08:18
	16:31	17:19	18:11	14 17:44 (WEA 3)	20:05	20:57	21:43	21:57	21:25	20:22	19:12	6 18:18 (WEA 3)	17:06	16:25
2	08:42	08:13	07:19	17:29 (WEA 3)	07:08	06:03	05:18	05:17	05:54	06:45	07:34	18:09 (WEA 3)	07:28	08:19
	16:32	17:21	18:13	17 17:46 (WEA 3)	20:07	20:58	21:44	21:56	21:23	20:20	19:10	12 18:21 (WEA 3)	17:04	16:25
3	08:41	08:11	07:16	17:28 (WEA 3)	07:05	06:01	05:17	05:17	05:56	06:46	07:36	18:07 (WEA 3)	07:30	08:21
	16:33	17:23	18:15	20 17:48 (WEA 3)	20:09	21:00	21:45	21:56	21:21	20:18	19:08	16 18:23 (WEA 3)	17:02	16:24
4	08:41	08:10	07:14	17:28 (WEA 3)	07:03	05:59	05:17	05:18	05:57	06:48	07:37	18 18:06 (WEA 3)	07:32	08:22
	16:34	17:25	18:16	21 17:49 (WEA 3)	20:10	21:02	21:46	21:56	21:20	20:15	19:06	18 18:24 (WEA 3)	17:00	16:23
5	08:41	08:08	07:12	17:27 (WEA 3)	07:01	05:57	05:16	05:19	05:59	06:49	07:39	18 18:04 (WEA 3)	07:34	08:23
	16:35	17:26	18:18	21 17:48 (WEA 3)	20:12	21:03	21:47	21:55	21:18	20:13	19:03	20 18:24 (WEA 3)	16:59	16:23
6	08:41	08:06	07:10	17:27 (WEA 3)	06:58	05:55	05:15	05:20	06:01	06:51	07:41	21 18:03 (WEA 3)	07:35	08:25
	16:37	17:28	18:20	21 17:48 (WEA 3)	20:14	21:05	21:48	21:55	21:16	20:11	19:01	21 18:24 (WEA 3)	16:57	16:22
7	08:40	08:05	07:08	17:27 (WEA 3)	06:56	05:54	05:15	05:21	06:02	06:53	07:42	21 18:03 (WEA 3)	07:37	08:26
	16:38	17:30	18:22	21 17:48 (WEA 3)	20:16	21:07	21:49	21:54	21:14	20:09	18:59	21 18:24 (WEA 3)	16:55	16:22
8	08:40	08:03	07:05	17:26 (WEA 3)	06:54	05:52	05:14	05:22	06:04	06:54	07:44	21 18:03 (WEA 3)	07:39	08:27
	16:39	17:32	18:24	21 17:47 (WEA 3)	20:17	21:08	21:50	21:53	21:12	20:06	18:56	21 18:24 (WEA 3)	16:54	16:22
9	08:39	08:01	07:03	17:27 (WEA 3)	06:52	05:50	05:14	05:23	06:05	06:56	07:46	21 18:02 (WEA 3)	07:41	08:28
	16:41	17:34	18:25	19 17:46 (WEA 3)	20:19	21:10	21:51	21:53	21:11	20:04	18:54	21 18:23 (WEA 3)	16:52	16:21
10	08:39	07:59	07:01	17:28 (WEA 3)	06:49	05:48	05:13	05:24	06:07	06:58	07:47	21 18:02 (WEA 3)	07:43	08:29
	16:42	17:36	18:27	17 17:45 (WEA 3)	20:21	21:11	21:51	21:52	21:09	20:02	18:52	21 18:22 (WEA 3)	16:50	16:21
11	08:38	07:58	06:58	17:30 (WEA 3)	06:47	05:47	05:13	05:25	06:09	06:59	07:49	19 18:03 (WEA 3)	07:44	08:30
	16:43	17:38	18:29	14 17:44 (WEA 3)	20:22	21:13	21:52	21:51	21:07	19:59	18:50	19 18:22 (WEA 3)	16:49	16:21
12	08:38	07:56	06:56	17:32 (WEA 3)	06:45	05:45	05:13	05:26	06:10	07:01	07:51	16 18:04 (WEA 3)	07:46	08:31
	16:45	17:40	18:31	9 17:41 (WEA 3)	20:24	21:15	21:53	21:50	21:05	19:57	18:47	16 18:20 (WEA 3)	16:47	16:21
13	08:37	07:54	06:54	17:31 (WEA 3)	06:43	05:43	05:12	05:27	06:12	07:03	07:53	13 18:04 (WEA 3)	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	13 18:17 (WEA 3)	16:46	16:21
14	08:36	07:52	06:52	17:34	06:40	05:42	05:12	05:28	06:13	07:04	07:54	18 18:06 (WEA 3)	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	8 18:14 (WEA 3)	16:44	16:21
15	08:35	07:50	06:49	17:35	06:38	05:40	05:12	05:29	06:15	07:06	07:56	18 18:04 (WEA 3)	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	16 18:14	16:43	16:21
16	08:34	07:48	06:47	17:36	06:36	05:39	05:12	05:30	06:17	07:07	07:58	17 18:03 (WEA 3)	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	16 18:14	16:41	16:21
17	08:33	07:46	06:45	17:37	06:34	05:37	05:12	05:32	06:18	07:09	08:00	17 18:02 (WEA 3)	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	16 18:14	16:40	16:21
18	08:33	07:44	06:42	17:38	06:32	05:36	05:12	05:33	06:20	07:11	08:01	17 18:03 (WEA 3)	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	16 18:14	16:39	16:21
19	08:32	07:42	06:40	17:39	06:29	05:34	05:12	05:34	06:22	07:12	08:03	17 18:04 (WEA 3)	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	16 18:14	16:37	16:22
20	08:30	07:40	06:38	17:40	06:27	05:33	05:12	05:35	06:23	07:14	08:05	17 18:05 (WEA 3)	08:00	08:38
	16:58	17:54	18:45	20:38	21:27	21:57	21:42	21:42	20:49	19:38	18:30	16 18:14	16:36	16:22
21	08:29	07:38	06:35	17:41	06:25	05:31	05:12	05:37	06:25	07:16	08:07	17 18:06 (WEA 3)	08:02	08:39
	16:59	17:56	18:46	20:40	21:28	21:57	21:41	21:41	20:46	19:36	18:28	16 18:14	16:35	16:22
22	08:28	07:36	06:33	17:42	06:23	05:30	05:12	05:38	06:27	07:17	08:08	17 18:07 (WEA 3)	08:04	08:39
	17:01	17:58	18:48	20:41	21:30	21:57	21:39	21:39	20:44	19:33	18:26	16 18:14	16:34	16:23
23	08:27	07:34	06:31	17:43	06:21	05:29	05:12	05:40	06:28	07:19	08:10	17 18:08 (WEA 3)	08:05	08:40
	17:03	18:00	18:50	20:43	21:31	21:57	21:38	21:38	20:42	19:31	18:24	16 18:14	16:33	16:23
24	08:26	07:32	06:28	17:44	06:19	05:28	05:13	05:41	06:30	07:21	08:12	17 18:09 (WEA 3)	08:07	08:40
	17:05	18:02	18:52	20:45	21:33	21:58	21:37	21:37	20:40	19:29	18:22	16 18:14	16:31	16:24
25	08:25	07:29	06:26	17:45	06:17	05:26	05:13	05:42	06:31	07:22	08:14	17 18:08 (WEA 3)	08:08	08:41
	17:06	18:04	18:53	20:46	21:34	21:58	21:35	21:35	20:38	19:26	18:20	16 18:14	16:30	16:25
26	08:23	07:27	06:24	17:46	06:15	05:25	05:13	05:44	06:33	07:24	08:16	17 18:09 (WEA 3)	08:10	08:41
	17:08	18:05	18:55	20:48	21:35	21:58	21:34	21:34	20:36	19:24	18:18	16 18:14	16:29	16:25
27	08:22	07:25	17:36 (WEA 3)	06:21	06:13	05:24	05:14	05:45	06:35	07:26	08:17	17 18:10 (WEA 3)	08:12	08:41
	17:10	18:07	5 17:41 (WEA 3)	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:16	16 18:14	16:28	16:26
28	08:21	07:23	17:33 (WEA 3)	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	17 18:11 (WEA 3)	08:13	08:41
	17:12	18:09	10 17:43 (WEA 3)	18:58	20:52	21:38	21:57	21:31	20:31	19:19	18:14	16 18:14	16:28	16:27
29	08:19		07:17	17:47	06:09	05:22	05:15	05:48	06:38	07:29	08:21	17 18:12 (WEA 3)	08:15	08:42
	17:13		20:00	18:59	20:53	21:39	21:57	21:29	20:29	19:17	18:12	16 18:14	16:27	16:28
30	08:18		07:15	17:48	06:07	05:21	05:15	05:50	06:40	07:31	08:23	17 18:13 (WEA 3)	08:16	08:42
	17:15		20:02	19:00	20:55	21:40	21:57	21:28	20:27	19:15	18:10	16 18:14	16:26	16:29
31	08:16		07:12	17:49	06:05	05:20	05:14	05:49	06:41	07:32	08:24	17 18:14 (WEA 3)	08:17	08:42
	17:17		20:04	19:01	21:42	21:26	21:26	21:26	20:25	19:13	18:08	16 18:14	16:26	16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243		
astr.max.mögl.Beschattung		15		215							233			

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	---------------------------	----------------------------



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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	18:13 (WEA 3)	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	18:32 (WEA 3)	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 3)	07:28	08:19	
	16:32	17:21	18:13	20:07	20:58	21:44	21:56	21:23	20:20	19:10	20	18:33 (WEA 3)	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	18:12 (WEA 3)	07:30	08:21	
	16:33	17:23	18:15	7 17:42 (WEA 3)	20:09	21:00	21:45	21:56	21:21	19:08	21	18:33 (WEA 3)	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	18:12 (WEA 3)	07:32	08:22	
	16:34	17:25	18:16	11 17:51 (WEA 3)	20:10	21:02	21:46	21:56	21:20	19:06	22	18:34 (WEA 3)	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	18:11 (WEA 3)	07:34	08:23	
	16:35	17:26	18:18	15 17:52 (WEA 3)	20:12	21:03	21:47	21:55	21:18	19:03	21	18:32 (WEA 3)	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	18:11 (WEA 3)	07:35	08:25	
	16:37	17:28	18:20	18 17:54 (WEA 3)	20:14	21:05	21:48	21:55	21:16	19:01	21	18:32 (WEA 3)	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	18:12 (WEA 3)	07:37	08:26	
	16:38	17:30	18:22	20 17:56 (WEA 3)	20:16	21:07	21:49	21:54	21:14	18:59	19	18:31 (WEA 3)	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	18:13 (WEA 3)	07:39	08:27	
	16:39	17:32	18:24	21 17:55 (WEA 3)	20:17	21:08	21:50	21:53	21:12	18:56	16	18:29 (WEA 3)	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	18:13 (WEA 3)	07:41	08:28	
	16:41	17:34	18:25	22 17:56 (WEA 3)	20:19	21:10	21:51	21:53	21:11	18:54	13	18:26 (WEA 3)	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	9	18:15 (WEA 3)	07:43	08:29
	16:42	17:36	18:27	22 17:56 (WEA 3)	20:21	21:11	21:51	21:52	21:09	18:52	9	18:24 (WEA 3)	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	4	18:22 (WEA 3)	07:44	08:30
	16:43	17:38	18:29	20 17:55 (WEA 3)	20:22	21:13	21:52	21:51	21:07	18:50	4	18:22 (WEA 3)	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	20 17:54 (WEA 3)	20:24	21:15	21:53	21:50	21:05	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	18 17:53 (WEA 3)	20:26	21:16	21:54	21:49	21:03	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	16 17:52 (WEA 3)	20:28	21:18	21:54	21:49	21:01	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	12 17:49 (WEA 3)	20:29	21:19	21:55	21:48	20:59	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	4 17:45 (WEA 3)	20:31	21:21	21:55	21:47	20:57	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	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	06:32	05:36	05:12	05:33	06:20	07:11	08:01			07:57	08:37
	16:54	17:51	18:41	20:34	21:24	21:56	21:44	20:53	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	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	06:27	05:33	05:12	05:35	06:23	07:14	08:05			08:00	08:38
	16:58	17:54	18:45	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	08:07			08:02	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	08:08			08:04	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	08:10			08:05	08:40
	17:03	18:00	18:50	20:43	21:31	21:57	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	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	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	08:14			08:08	08:41
	17:06	18:04	18:53	20:46	21:34	21:58	21:35	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	06:33	07:24	08:16			08:10	08:41
	17:08	18:05	18:55	20:48	21:35	21:58	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	05:45	06:35	07:26	08:17			08:12	08:41
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	17:16			16:28	16:26
28	08:21	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	18:19 (WEA 3)			07:19	08:41
	17:12	18:09	18:58	20:52	21:38	21:57	21:31	20:31	19:19	10 18:29 (WEA 3)			17:14	16:28
29	08:19		07:17	06:09	05:22	05:15	05:48	06:38	07:29	18:17 (WEA 3)			07:21	08:42
	17:13		20:00	20:53	21:39	21:57	21:29	20:29	19:17	14 18:31 (WEA 3)			17:12	16:27
30	08:18		07:15	06:07	05:21	05:15	05:50	06:40	07:31	18:15 (WEA 3)			07:23	08:42
	17:15		20:02	20:55	21:40	21:57	21:28	20:27	19:15	18 18:33 (WEA 3)			17:10	16:26
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	42	331	266	243	
astr.max.mögl.Beschattung			226							185				

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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	18:24 (WEA 3)	07:26	08:18	
	16:31	17:19	18:11	20:05	20:57	21:43	21:57	21:25	20:22	19:12	20	18:44 (WEA 3)	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 3)	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	18:42 (WEA 3)	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	15	18:25 (WEA 3)	07:30	08:21
	16:33	17:23	18:15	20:09	21:00	21:45	21:56	21:21	20:18	19:08	12	18:40 (WEA 3)	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	15	18:26 (WEA 3)	07:32	08:22
	16:34	17:25	18:16	20:10	21:02	21:46	21:56	21:20	20:15	19:06	12	18:38 (WEA 3)	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	7	18:28 (WEA 3)	07:34	08:23
	16:35	17:26	18:18	20:12	21:03	21:47	21:55	21:18	20:13	19:03	7	18:35 (WEA 3)	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	7	18:35 (WEA 3)	07:35	08:25
	16:37	17:28	18:20	20:14	21:05	21:48	21:55	21:16	20:11	19:01	7	18:35 (WEA 3)	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	7	18:35 (WEA 3)	07:37	08:26
	16:38	17:30	18:22	20:16	21:07	21:49	21:54	21:14	20:09	18:59	7	18:35 (WEA 3)	16:55	16:22
8	08:40	08:03	07:05	5	17:52 (WEA 3)	06:54	05:52	05:14	05:22	06:04	06:54	07:44	07:39	08:27
	16:39	17:32	18:24	5	17:57 (WEA 3)	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	10	17:49 (WEA 3)	06:52	05:50	05:14	05:23	06:05	06:56	07:46	07:41	08:28
	16:41	17:34	18:25	10	17:59 (WEA 3)	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	14	17:48 (WEA 3)	06:49	05:48	05:13	05:24	06:07	06:58	07:47	07:43	08:29
	16:42	17:36	18:27	14	18:02 (WEA 3)	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	17:47 (WEA 3)	06:47	05:47	05:13	05:25	06:09	06:59	07:49	07:44	08:30
	16:43	17:38	18:29	17	18:04 (WEA 3)	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	17:45 (WEA 3)	06:45	05:45	05:13	05:26	06:10	07:01	07:51	07:46	08:31
	16:45	17:40	18:31	20	18:05 (WEA 3)	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	20	17:45 (WEA 3)	06:43	05:43	05:12	05:27	06:12	07:03	07:53	07:48	08:32
	16:46	17:41	18:32	20	18:05 (WEA 3)	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	22	17:44 (WEA 3)	06:40	05:42	05:12	05:28	06:13	07:04	07:54	07:50	08:33
	16:48	17:43	18:34	22	18:06 (WEA 3)	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	22	17:43 (WEA 3)	06:38	05:40	05:12	05:29	06:15	07:06	07:56	07:52	08:34
	16:49	17:45	18:36	22	18:05 (WEA 3)	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	20	17:44 (WEA 3)	06:36	05:39	05:12	05:30	06:17	07:07	07:58	07:53	08:35
	16:51	17:47	18:38	20	18:04 (WEA 3)	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	20	17:44 (WEA 3)	06:34	05:37	05:12	05:32	06:18	07:09	07:59	07:55	08:36
	16:53	17:49	18:39	20	18:04 (WEA 3)	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	18	17:44 (WEA 3)	06:32	05:36	05:12	05:33	06:20	07:11	08:01	07:57	08:37
	16:54	17:51	18:41	18	18:02 (WEA 3)	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	15	17:46 (WEA 3)	06:29	05:34	05:12	05:34	06:22	07:12	08:03	07:58	08:37
	16:56	17:53	18:43	15	18:01 (WEA 3)	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	11	17:47 (WEA 3)	06:27	05:33	05:12	05:36	06:23	07:14	08:05	08:00	08:38
	16:58	17:54	18:45	11	17:58 (WEA 3)	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	4	17:50 (WEA 3)	06:25	05:31	05:12	05:37	06:25	07:16	08:07	08:02	08:39
	16:59	17:56	18:46	4	17:54 (WEA 3)	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	08:08	08:04	08:04	08:04	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	16:23	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	08:04	08:04	08:40
	17:03	18:00	18:50	20:43	21:31	21:57	21:38	20:42	19:31	18:24	16:33	16:23	16:23	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	08:04	08:04	08:40
	17:05	18:02	18:52	20:45	21:33	21:58	21:37	20:40	19:29	18:22	16:31	16:24	16:24	16:24
25	08:25	07:29	06:26	06:17	05:26	05:13	05:42	06:31	07:22	08:14	08:08	08:04	08:04	08:41
	17:06	18:04	18:53	20:46	21:34	21:58	21:35	20:38	19:26	18:20	16:30	16:25	16:25	16:25
26	08:23	07:27	06:24	06:15	05:25	05:13	05:44	06:33	07:24	08:16	08:10	08:04	08:04	08:41
	17:08	18:05	18:55	20:48	21:35	21:58	21:34	20:36	19:24	18:18	16:29	16:25	16:25	16:25
27	08:22	07:25	06:21	06:13	05:24	05:14	05:45	06:35	07:26	08:18	08:12	08:04	08:04	08:41
	17:10	18:07	18:57	20:50	21:37	21:58	21:33	20:33	19:22	18:16	16:28	16:26	16:26	16:26
28	08:20	07:23	06:19	06:11	05:23	05:14	05:47	06:36	07:27	08:19	08:13	08:04	08:04	08:41
	17:12	18:09	18:58	20:51	21:38	21:57	21:31	20:31	19:19	18:14	16:28	16:27	16:27	16:27
29	08:19	07:17	06:15	06:09	05:22	05:15	05:48	06:38	07:29	08:21	08:15	08:04	08:04	08:42
	17:13	18:10	19:00	20:53	21:39	21:57	21:29	20:29	19:17	18:12	16:27	16:28	16:28	16:28
30	08:18	07:15	06:13	06:07	05:21	05:15	05:50	06:40	07:31	08:23	08:16	08:04	08:04	08:42
	17:15	18:12	19:02	20:55	21:40	21:57	21:28	20:27	19:15	18:10	16:26	16:29	16:29	16:29
31	08:16	07:12	06:10	06:05	05:20	05:14	05:51	06:41	07:32	08:24	08:16	08:04	08:04	08:42
	17:17	18:14	19:04	21:42	21:26	20:25	21:26	20:25	19:15	18:10	16:26	16:29	16:29	16:29
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	144	331	266	243	243
astr.max.mögl.Beschattung			218							72				

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

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

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 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	06:05 20:57	05:19 21:43	05:16 21:57	05:53 21:25	06:43 20:22	07:32 19:12	18:32 (WEA 3) 18:45 (WEA 3)	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	07:34 19:10	18:34 (WEA 3) 18:42 (WEA 3)	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	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	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	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	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	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	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	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 21:09	06:58 20:02	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	7 17:57 (WEA 3) 18:04 (WEA 3)	06:47 20:22	05:47 21:13	05:13 21:52	06:09 21:07	06:59 19:59	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	12 17:53 (WEA 3) 18:05 (WEA 3)	06:45 20:24	05:45 21:15	05:13 21:53	06:10 21:05	07:01 19:57	07:51 18:47		07:46 16:46	08:31 16:21
13	08:37 16:46	07:54 17:41	06:54 18:32	15 17:52 (WEA 3) 18:07 (WEA 3)	06:43 20:26	05:43 21:16	05:12 21:54	06:12 21:49	07:03 19:55	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	18 17:51 (WEA 3) 18:09 (WEA 3)	06:40 20:28	05:42 21:18	05:12 21:54	06:13 21:01	07:04 19:52	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	21 17:49 (WEA 3) 18:10 (WEA 3)	06:38 20:29	05:40 21:19	05:12 21:55	06:15 20:59	07:06 19:50	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	21 17:49 (WEA 3) 18:10 (WEA 3)	06:36 20:31	05:39 21:21	05:12 21:55	06:17 20:57	07:07 19:48	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	22 17:48 (WEA 3) 18:10 (WEA 3)	06:34 20:33	05:37 21:22	05:12 21:56	06:18 20:55	07:09 19:45	07:59 18:36		07:55 16:40	08:36 16:21
18	08:33 16:54	07:44 17:51	06:42 18:41	22 17:47 (WEA 3) 18:09 (WEA 3)	06:32 20:34	05:36 21:24	05:12 21:56	06:20 20:53	07:11 19:43	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	21 17:48 (WEA 3) 18:09 (WEA 3)	06:29 20:36	05:34 21:25	05:12 21:56	06:22 20:51	07:12 19:41	08:03 18:32	18:41 (WEA 3) 18:48 (WEA 3)	08:03 18:32	07:58 16:37
20	08:30 16:58	07:40 17:54	06:38 18:45	21 17:47 (WEA 3) 18:08 (WEA 3)	06:27 20:38	05:33 21:27	05:12 21:57	06:23 20:49	07:14 19:38	08:05 18:30	18:37 (WEA 3) 18:50 (WEA 3)	08:05 18:30	07:56 16:36
21	08:29 16:59	07:38 17:56	06:35 18:46	21 17:48 (WEA 3) 18:07 (WEA 3)	06:25 20:40	05:31 21:28	05:12 21:57	06:25 20:46	07:16 19:36	08:07 18:28	18:35 (WEA 3) 18:51 (WEA 3)	08:07 18:28	07:58 16:35
22	08:28 17:01	07:36 17:58	06:33 18:48	19 17:49 (WEA 3) 18:06 (WEA 3)	06:23 20:41	05:30 21:30	05:12 21:57	06:27 20:44	07:17 19:33	08:08 18:26	18:33 (WEA 3) 18:51 (WEA 3)	08:08 18:26	07:59 16:34
23	08:27 17:03	07:34 18:00	06:31 18:50	17 17:50 (WEA 3) 18:04 (WEA 3)	06:21 20:43	05:29 21:31	05:12 21:57	06:28 20:42	07:19 19:31	08:10 18:24	18:32 (WEA 3) 18:52 (WEA 3)	08:10 18:24	07:56 16:33
24	08:26 17:05	07:32 18:02	06:28 18:52	14 17:52 (WEA 3) 18:01 (WEA 3)	06:19 20:45	05:28 21:33	05:13 21:58	06:30 20:40	07:21 19:29	08:12 18:22	18:31 (WEA 3) 18:53 (WEA 3)	08:12 18:22	07:58 16:31
25	08:25 17:06	07:29 18:04	06:26 18:53	9 06:17 20:46	06:26 21:34	05:26 21:58	05:13 21:55	06:31 20:38	07:22 19:26	08:14 18:26	18:30 (WEA 3) 18:52 (WEA 3)	08:14 18:26	07:59 16:30
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	05:14 21:58	06:33 20:36	07:24 19:24	08:16 18:24	18:30 (WEA 3) 18:52 (WEA 3)	08:16 18:24	07:59 16:29
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	05:14 21:58	06:35 20:33	07:26 19:22	08:17 18:30	18:30 (WEA 3) 18:52 (WEA 3)	08:17 18:30	07:59 16:29
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	05:14 21:57	06:36 20:31	07:27 19:19	08:19 18:51	18:30 (WEA 3) 18:51 (WEA 3)	08:19 18:51	07:59 16:28
29	08:19 17:13	07:17 20:00	06:19 20:00	06:09 20:53	05:22 21:39	05:15 21:57	05:15 21:57	06:38 20:29	07:29 19:17	08:21 18:50	18:30 (WEA 3) 18:50 (WEA 3)	08:21 18:50	07:59 16:28
30	08:18 17:15	07:15 20:02	06:18 20:02	06:07 20:55	05:21 21:40	05:15 21:57	05:15 21:57	06:40 20:27	07:31 19:15	08:23 18:31	18:31 (WEA 3) 18:48 (WEA 3)	08:23 18:48	07:59 16:28
31	08:16 17:17	07:12 20:04	06:17 20:04	06:05 21:42	05:20 21:42	05:14 21:57	05:14 21:57	06:41 20:25	07:32 19:15	08:25 17:08		08:25 17:08	07:59 16:27
	Sonnenscheinstunden astr.max.mögl.Beschattung	258 277	367 239	416	486	500	503	454	381	220	331	21	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)	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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinfallrichtung

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	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	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	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	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	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	05:55 21:05	05:15 21:48	05:20 21:55	06:01 21:16	06:51 20:11		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		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		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		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 21:09	06:58 20:02		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		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	5	18:56 (WEA 3) 19:01 (WEA 3)	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	12	18:52 (WEA 3) 19:04 (WEA 3)	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	16	18:50 (WEA 3) 19:06 (WEA 3)	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	18:48 (WEA 3) 19:06 (WEA 3)	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	20	18:47 (WEA 3) 19:07 (WEA 3)	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	22	18:45 (WEA 3) 19:07 (WEA 3)	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	22	18:45 (WEA 3) 19:07 (WEA 3)	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	23	18:45 (WEA 3) 19:08 (WEA 3)	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	22	18:44 (WEA 3) 19:06 (WEA 3)	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	22	18:44 (WEA 3) 19:06 (WEA 3)	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	05:30 21:30	05:12 21:57	05:38 21:39	06:27 20:44	07:17 19:33	21	18:44 (WEA 3) 19:05 (WEA 3)	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	20	18:44 (WEA 3) 19:04 (WEA 3)	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	17	18:45 (WEA 3) 19:02 (WEA 3)	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	13	18:46 (WEA 3) 18:59 (WEA 3)	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	8	18:49 (WEA 3) 18:57 (WEA 3)	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			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			07:19 17:14	08:13 16:28	08:41 16:27
29	08:19 17:13		07:17 20:00	06:09 20:53	05:22 21:39	05:15 21:57	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	08:18 17:15		07:15 20:02	06:07 20:55	05:21 21:40	05:15 21:57	05:50 21:28	06:40 20:27	07:31 19:15			07:23 17:10	08:16 16:26	08:42 16:29
31	08:16 17:17		07:12 20:04	06:04 20:55	05:20 21:42	05:15 21:57	05:51 21:26	06:41 20:25				07:25 17:08	08:17 16:25	08:42 16:30
Sonnenscheinstunden	258	277	367		416	486	500	503	454	381		331	266	243
astr.max.mögl.Beschattung				261						261				

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)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	---------------------------------	---------------------------	----------------------------

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinfallrichtung

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	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	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	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	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	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	05:55 21:05	05:15 21:48	05:20 21:55	06:01 21:16	06:51 20:11		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		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		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		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 21:09	06:58 20:02		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		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	9	18:54 (WEA 3) 19:03 (WEA 3)	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	14	18:52 (WEA 3) 19:06 (WEA 3)	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	18:50 (WEA 3) 19:08 (WEA 3)	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	20	18:48 (WEA 3) 19:08 (WEA 3)	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	22	18:47 (WEA 3) 19:09 (WEA 3)	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	22	18:46 (WEA 3) 19:08 (WEA 3)	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	22	18:46 (WEA 3) 19:08 (WEA 3)	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	22	18:46 (WEA 3) 19:08 (WEA 3)	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	22	18:45 (WEA 3) 19:07 (WEA 3)	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	22	18:45 (WEA 3) 19:07 (WEA 3)	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	05:30 21:30	05:12 21:57	05:38 21:39	06:27 20:44	07:17 19:33	22	18:45 (WEA 3) 19:05 (WEA 3)	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	20	18:46 (WEA 3) 19:04 (WEA 3)	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	18:47 (WEA 3) 19:02 (WEA 3)	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	15	18:48 (WEA 3) 18:59 (WEA 3)	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	11	18:52 (WEA 3) 18:56 (WEA 3)	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	4	18:56 (WEA 3)	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			07:19 17:14	08:13 16:28	08:41 16:27
29	08:19 17:13		07:17 20:00	06:09 20:53	05:22 21:39	05:15 21:57	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	08:18 17:15		07:15 20:02	06:07 20:55	05:21 21:40	05:15 21:57	05:50 21:28	06:40 20:27	07:31 19:15			07:23 17:10	08:16 16:26	08:42 16:29
31	08:16 17:17		07:12 20:04	06:05 20:59	05:20 21:42	05:16 21:57	05:51 21:26	06:41 20:25				07:25 17:08	08:17 16:25	08:42 16:30
Sonnenscheinstunden	258	277	367		416	486	500	503	454	381		331	266	243
astr.max.mögl.Beschattung				257						261				

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinflussrichtung

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	19:30 (WEA 3)	06:05	05:19	05:16	05:53	06:43	19:20 (WEA 3)	07:32	07:26	08:18		
	16:31	17:19	18:11	20:05	10	19:40 (WEA 3)	20:57	21:43	21:57	21:25	20:22	22	19:42 (WEA 3)	19:12	17:06	16:25
2	08:42	08:13	07:19	07:08		19:27 (WEA 3)	06:03	05:18	05:17	05:54	06:45	19:20 (WEA 3)	07:34	07:28	08:19	
	16:32	17:21	18:13	20:07	14	19:41 (WEA 3)	20:58	21:44	21:56	21:23	20:20	22	19:42 (WEA 3)	19:10	17:04	16:25
3	08:41	08:11	07:16	07:05		19:25 (WEA 3)	06:01	05:18	05:17	05:56	06:46	19:18 (WEA 3)	07:36	07:30	08:21	
	16:33	17:23	18:15	20:09	18	19:43 (WEA 3)	21:00	21:45	21:56	21:21	20:18	24	19:42 (WEA 3)	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03		19:24 (WEA 3)	05:59	05:17	05:18	05:57	06:48	19:18 (WEA 3)	07:37	07:32	08:22	
	16:34	17:25	18:16	20:10	20	19:44 (WEA 3)	21:02	21:46	21:56	21:20	20:15	24	19:42 (WEA 3)	19:06	17:00	16:23
5	08:41	08:08	07:12	07:01		19:22 (WEA 3)	05:57	05:16	05:19	05:59	06:49	19:17 (WEA 3)	07:39	07:34	08:23	
	16:35	17:26	18:18	20:12	22	19:44 (WEA 3)	21:03	21:47	21:55	21:18	20:13	24	19:41 (WEA 3)	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58		19:22 (WEA 3)	05:55	05:15	05:20	06:01	06:51	19:18 (WEA 3)	07:41	07:35	08:25	
	16:37	17:28	18:20	20:14	22	19:44 (WEA 3)	21:05	21:48	21:55	21:16	20:11	23	19:41 (WEA 3)	19:01	16:57	16:22
7	08:40	08:05	07:08	06:56		19:21 (WEA 3)	05:54	05:15	05:21	06:02	06:53	19:18 (WEA 3)	07:42	07:37	08:26	
	16:38	17:30	18:22	20:16	24	19:45 (WEA 3)	21:07	21:49	21:54	21:12	20:09	22	19:40 (WEA 3)	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54		19:21 (WEA 3)	05:52	05:14	05:22	06:04	06:54	19:18 (WEA 3)	07:44	07:39	08:27	
	16:39	17:32	18:24	20:17	24	19:45 (WEA 3)	21:08	21:50	21:53	21:12	20:06	20	19:38 (WEA 3)	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52		19:20 (WEA 3)	05:50	05:14	05:23	06:05	06:56	19:19 (WEA 3)	07:46	07:41	08:28	
	16:41	17:34	18:25	20:19	24	19:44 (WEA 3)	21:10	21:51	21:53	21:10	20:04	18	19:37 (WEA 3)	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49		19:21 (WEA 3)	05:48	05:13	05:24	06:07	06:58	19:20 (WEA 3)	07:47	07:43	08:29	
	16:42	17:36	18:27	20:21	22	19:43 (WEA 3)	21:11	21:51	21:52	21:09	20:02	14	19:34 (WEA 3)	18:52	16:50	16:21
11	08:38	07:58	06:58	06:47		19:21 (WEA 3)	05:47	05:13	05:25	06:09	06:59	19:22 (WEA 3)	07:49	07:44	08:30	
	16:43	17:38	18:29	20:22	22	19:43 (WEA 3)	21:13	21:52	21:51	21:07	19:59	10	19:32 (WEA 3)	18:50	16:49	16:21
12	08:38	07:56	06:56	06:45		19:22 (WEA 3)	05:45	05:13	05:26	06:10	07:01		07:51	07:46	08:31	
	16:45	17:40	18:31	20:24	20	19:42 (WEA 3)	21:15	21:53	21:50	21:05	19:57		18:47	16:47	16:21	
13	08:37	07:54	06:54	06:43		19:23 (WEA 3)	05:43	05:12	05:27	06:12	07:03		07:53	07:48	08:32	
	16:46	17:41	18:32	20:26	18	19:41 (WEA 3)	21:16	21:54	21:49	21:03	19:55		18:45	16:46	16:21	
14	08:36	07:52	06:52	06:40		19:23 (WEA 3)	05:42	05:12	05:28	06:13	07:04		07:54	07:50	08:33	
	16:48	17:43	18:34	20:28	15	19:38 (WEA 3)	21:18	21:54	21:49	21:01	19:52		18:43	16:44	16:21	
15	08:35	07:50	06:49	06:38		19:25 (WEA 3)	05:40	05:12	05:29	06:15	07:06		07:56	07:52	08:34	
	16:49	17:45	18:36	20:29	11	19:36 (WEA 3)	21:19	21:55	21:48	20:59	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	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	06:34			05:37	05:12	05:32	06:18	07:09		08:00	07:55	08:36	
	16:53	17:49	18:39	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	06:32			05:36	05:12	05:33	06:20	07:11		08:01	07:57	08:37	
	16:54	17:51	18:41	20:34			21:24	21:56	21:44	20:53	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	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	06:27			05:33	05:12	05:36	06:23	07:14		08:05	08:00	08:38	
	16:58	17:54	18:45	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		08:07	08:02	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		08:08	08:04	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		08:10	08:05	08:40	
	17:03	18:00	18:50	20:43			21:31	21:57	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	05:41	06:30	07:21		08:12	08:07	08:40	
	17:05	18:02	18:52	20:45			21:33	21:57	21:37	20:40	19:29		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		07:14	08:08	08:41	
	17:06	18:04	18:53	20:46			21:34	21:58	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	05:44	06:33	07:24		07:16	08:10	08:41	
	17:08	18:05	18:55	20:48			21:35	21:58	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	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	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	07:27		07:19	08:13	08:41	
	17:12	18:09	18:58	20:51			21:38	21:57	21:31	20:31	19:19		17:14	16:28	16:27	
29	08:19	07:17	06:09	06:02			05:22	05:15	05:48	06:38	07:29		07:21	08:15	08:42	
	17:13	18:10	19:00	20:53			21:39	21:57	21:29	20:29	19:17		17:12	16:27	16:28	
30	08:18	07:15	06:07	06:00			05:21	05:15	05:50	06:40	07:31		07:23	08:16	08:42	
	17:15	18:12	19:02	20:55			21:40	21:57	21:28	20:27	19:15		17:10	16:26	16:29	
31	08:16	07:12	06:04	06:00			05:20	05:14	05:51	06:41	07:32		07:25	08:18	08:42	
	17:17	18:14	19:04	20:57			21:42	21:56	21:26	20:25	19:14		17:08	16:25	16:30	
Sonnenscheinstunden	258	277	367	416	286	486	500	503	454	64	381	223	331	266	243	
astr.max.mögl.Beschattung																

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

Tag im Monat	Sonnenaufgang (SS:MM)	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenanfang	Zeitpunkt (SS:MM) Schatteneende	Schattenanfang (WEA mit erstem Schatten)	Schatteneende (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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 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 Sonneneinflussrichtung

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	19:33 (WEA 3)	06:05	05:19	05:16	05:53	06:43	19:21 (WEA 3)	07:32	07:26	08:18		
	16:31	17:19	18:11	20:05	6	19:39 (WEA 3)	20:57	21:43	21:57	21:25	20:22	22	19:43 (WEA 3)	19:12	17:06	16:25
2	08:42	08:13	07:19	07:08		19:29 (WEA 3)	06:03	05:18	05:17	05:54	06:45		19:20 (WEA 3)	07:34	07:28	08:19
	16:32	17:21	18:13	20:07	12	19:41 (WEA 3)	20:58	21:44	21:56	21:23	20:20	23	19:43 (WEA 3)	19:10	17:04	16:25
3	08:41	08:11	07:16	07:05		19:27 (WEA 3)	06:01	05:18	05:17	05:56	06:46		19:19 (WEA 3)	07:36	07:30	08:21
	16:33	17:23	18:15	20:09	16	19:43 (WEA 3)	21:00	21:45	21:56	21:21	20:18	23	19:42 (WEA 3)	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03		19:26 (WEA 3)	05:59	05:17	05:18	05:57	06:48		19:19 (WEA 3)	07:37	07:32	08:22
	16:34	17:25	18:16	20:10	19	19:45 (WEA 3)	21:02	21:46	21:56	21:20	20:15	24	19:43 (WEA 3)	19:06	17:00	16:23
5	08:41	08:08	07:12	07:01		19:24 (WEA 3)	05:57	05:16	05:19	05:59	06:49		19:19 (WEA 3)	07:39	07:34	08:23
	16:35	17:26	18:18	20:12	21	19:45 (WEA 3)	21:03	21:47	21:55	21:18	20:13	23	19:42 (WEA 3)	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58		19:23 (WEA 3)	05:55	05:15	05:20	06:01	06:51		19:19 (WEA 3)	07:41	07:35	08:25
	16:37	17:28	18:20	20:14	22	19:45 (WEA 3)	21:05	21:48	21:55	21:16	20:11	22	19:41 (WEA 3)	19:01	16:57	16:22
7	08:40	08:05	07:08	06:56		19:23 (WEA 3)	05:54	05:15	05:21	06:02	06:53		19:20 (WEA 3)	07:42	07:37	08:26
	16:38	17:30	18:22	20:16	22	19:45 (WEA 3)	21:07	21:49	21:54	21:14	20:09	21	19:41 (WEA 3)	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54		19:22 (WEA 3)	05:52	05:14	05:22	06:04	06:54		19:20 (WEA 3)	07:44	07:39	08:27
	16:39	17:32	18:24	20:17	24	19:46 (WEA 3)	21:08	21:50	21:53	21:12	20:06	19	19:39 (WEA 3)	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52		19:21 (WEA 3)	05:50	05:14	05:23	06:05	06:56		19:21 (WEA 3)	07:46	07:41	08:28
	16:41	17:34	18:25	20:19	23	19:44 (WEA 3)	21:10	21:51	21:53	21:10	20:04	16	19:37 (WEA 3)	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49		19:21 (WEA 3)	05:48	05:13	05:24	06:07	06:58		19:22 (WEA 3)	07:47	07:43	08:29
	16:42	17:36	18:27	20:21	23	19:44 (WEA 3)	21:11	21:51	21:52	21:09	20:02	12	19:34 (WEA 3)	18:52	16:50	16:21
11	08:38	07:58	06:58	06:47		19:22 (WEA 3)	05:47	05:13	05:25	06:09	06:59		19:25 (WEA 3)	07:49	07:44	08:30
	16:43	17:38	18:29	20:22	22	19:44 (WEA 3)	21:13	21:52	21:51	21:07	19:59	7	19:32 (WEA 3)	18:50	16:49	16:21
12	08:38	07:56	06:56	06:45		19:22 (WEA 3)	05:45	05:13	05:26	06:10	07:01		19:25 (WEA 3)	07:51	07:46	08:31
	16:45	17:40	18:31	20:24	21	19:43 (WEA 3)	21:15	21:53	21:50	21:05	19:57		19:32 (WEA 3)	18:47	16:47	16:21
13	08:37	07:54	06:54	06:43		19:23 (WEA 3)	05:43	05:12	05:27	06:12	07:03		19:25 (WEA 3)	07:53	07:48	08:32
	16:46	17:41	18:32	20:26	19	19:42 (WEA 3)	21:16	21:54	21:49	21:03	19:55		19:32 (WEA 3)	18:45	16:46	16:21
14	08:36	07:52	06:52	06:40		19:23 (WEA 3)	05:42	05:12	05:28	06:13	07:04		19:25 (WEA 3)	07:54	07:50	08:33
	16:48	17:43	18:34	20:28	17	19:40 (WEA 3)	21:18	21:54	21:49	21:01	19:52		19:32 (WEA 3)	18:43	16:44	16:21
15	08:35	07:50	06:49	06:38		19:25 (WEA 3)	05:40	05:12	05:29	06:15	07:06		19:25 (WEA 3)	07:56	07:52	08:34
	16:49	17:45	18:36	20:29	13	19:38 (WEA 3)	21:19	21:55	21:48	20:59	19:50		19:32 (WEA 3)	18:41	16:43	16:21
16	08:34	07:48	06:47	06:36		19:29 (WEA 3)	05:39	05:12	05:30	06:17	07:07		19:25 (WEA 3)	07:58	07:53	08:35
	16:51	17:47	18:38	20:31	5	19:34 (WEA 3)	21:21	21:55	21:47	20:57	19:48		19:32 (WEA 3)	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		19:25 (WEA 3)	08:00	07:55	08:36
	16:53	17:49	18:39	20:33			21:22	21:56	21:45	20:55	19:45		19:32 (WEA 3)	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		19:25 (WEA 3)	08:01	07:57	08:37
	16:54	17:51	18:41	20:34			21:24	21:56	21:44	20:53	19:43		19:32 (WEA 3)	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		19:25 (WEA 3)	08:03	07:58	08:37
	16:56	17:53	18:43	20:36			21:25	21:56	21:43	20:51	19:41		19:32 (WEA 3)	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		19:25 (WEA 3)	08:05	08:00	08:38
	16:58	17:54	18:45	20:38			21:27	21:57	21:42	20:49	19:38		19:32 (WEA 3)	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		19:25 (WEA 3)	08:07	08:02	08:39
	16:59	17:56	18:46	20:40			21:28	21:57	21:41	20:46	19:36		19:32 (WEA 3)	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		19:25 (WEA 3)	08:08	08:04	08:39
	17:01	17:58	18:48	20:41			21:30	21:57	21:39	20:44	19:33		19:32 (WEA 3)	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		19:25 (WEA 3)	08:10	08:05	08:40
	17:03	18:00	18:50	20:43			21:31	21:57	21:38	20:42	19:31		19:32 (WEA 3)	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		19:25 (WEA 3)	08:12	08:07	08:40
	17:05	18:02	18:52	20:45			21:33	21:57	21:37	20:40	19:29		19:32 (WEA 3)	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		19:25 (WEA 3)	08:14	08:08	08:41
	17:06	18:04	18:53	20:46			21:34	21:58	21:35	20:38	19:26		19:32 (WEA 3)	18:20	16:30	16:25
26	08:23	07:27	06:24	06:15			05:25	05:13	05:44	06:33	07:24		19:25 (WEA 3)	08:16	08:10	08:41
	17:08	18:05	18:55	20:48			21:35	21:58	21:34	20:36	19:24		19:32 (WEA 3)	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		19:25 (WEA 3)	08:17	08:12	08:41
	17:10	18:07	18:57	20:50			21:37	21:57	21:32	20:33	6	19:36 (WEA 3)	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	07:27		19:25 (WEA 3)	08:19	08:13	08:41
	17:12	18:09	18:58	20:51			21:38	21:57	21:31	20:31	13	19:40 (WEA 3)	19:19	17:14	16:28	16:27
29	08:19	07:17	06:09	06:01			05:22	05:15	05:48	06:38	07:29		19:25 (WEA 3)	08:21	08:15	08:42
	17:13	18:10	19:00	20:53			21:39	21:57	21:29	20:29	16	19:40 (WEA 3)	19:17	17:12	16:27	16:28
30	08:18	07:15	06:07	06:00			05:21	05:15	05:50	06:40	07:31		19:25 (WEA 3)	08:23	08:16	08:42
	17:15	18:12	19:02	20:55			21:40	21:57	21:28	20:27	19	19:42 (WEA 3)	19:15	17:10	16:26	16:29
31	08:16	07:12	06:04	06:00			05:20	05:14	05:51	06:41	07:32		19:25 (WEA 3)	08:25	08:18	08:42
	17:17	18:14	19:04	20:57			21:42	21:56	21:26	20:25	21	19:43 (WEA 3)	19:13	17:08	16:25	16:30
Sonnenscheinstunden	258	277	367	416			486	500	503	454	381		331	266	243	
astr.max.mögl.Beschattung					285				75		212					

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)
--------------	-----------------------	-------------------------	----------------------	-------------------	--	---

## SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 Schattenrezeptor: IP 31-NW - IP 31-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 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	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	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	05:18 21:56	05:56 21:21	06:46 20:18	07:36 19:08	07:30 17:02	08:20 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	05:58 21:20	06:48 20:15	07:37 19:06	07:32 17:01	08:22 16:23
5	08:41 16:36	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	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	07:41 19:01	07:35 16:57	08:24 16:23
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	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	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	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 21:09	06:58 20:02	07:47 18:52	07:43 16:50	08:29 16:21
11	08:38 16:44	07:58 17:38	06:59 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	07:49 18:50	07:44 16:49	08:30 16:21
12	08:37 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	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 21:53	05:27 21:49	06:12 21:03	07:03 19:55	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	06:14 21:01	07:04 19:52	07:54 18:43	07:50 16:44	08:33 16:21
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	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	08:34 16:51	07:48 17:47	06:47 18:38	06:36 20:31	05:39 21:21	05:12 21:55	05:31 21:47	06:17 20:57	07:07 19:48	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	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	08:01 18:34	07:57 16:39	08:37 16:21
19	08:31 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	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	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	08:07 18:28	08:02 16:35	08:39 16:23
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	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	08:10 18:24	08:05 16:33	08:40 16:24
24	08:26 17:05	07:32 18:02	06:28 18:52	06:19 20:45	05:28 21:33	05:13 21:57	05:41 21:37	06:30 20:40	07:21 19:29	08:12 18:22	08:07 16:32	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	08:14 17:20	08:08 16:30	08:41 16:25
26	08:23 17:08	07:27 18:06	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	08:16 17:18	08:10 16:30	08:41 16:25
27	08:22 17:10	07:25 18:07	06:22 18:57	06:13 20:50	05:24 21:37	05:14 21:57	05:45 21:32	06:35 20:33	07:26 19:22	08:17 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	08:19 17:14	08:13 16:28	08:41 16:27
29	08:19 17:14		06:17 20:00	06:09 20:53	05:22 21:39	05:15 21:57	05:48 21:29	06:38 20:29	07:29 19:17	08:21 17:12	08:15 16:27	08:42 16:28
30	08:18 17:15		06:15 20:02	06:07 20:55	05:21 21:40	05:16 21:57	05:50 21:28	06:40 20:27	07:31 19:15	08:23 17:10	08:16 16:26	08:42 16:29
31	08:16 17:17		06:12 20:04		05:20 21:42		05:51 21:26	06:41 20:25		08:25 17:08		08:42 16:30
Sonnenscheinstunden	258	277	367	416	486	500	503	454	381	331	266	243
astr.max.mögl.Beschattung						131						

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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 Schattenrezeptor: IP 32-NW - IP 32-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	20:40 (WEA 3)	05:16	20:45 (WEA 3)	05:53	06:43	07:32	07:26	08:18		
	16:31	17:19	18:11	20:05	20:57	21:43	26	21:06 (WEA 3)	21:57	28	21:13 (WEA 3)	21:25	20:22	19:12	17:06	16:25
2	08:42	08:13	07:19	07:08	06:03	05:18	20:40 (WEA 3)	05:17	20:46 (WEA 3)	05:54	06:45	07:34	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	21:44	26	21:06 (WEA 3)	21:56	27	21:13 (WEA 3)	21:23	20:20	19:10	17:04	16:25
3	08:41	08:11	07:16	07:05	06:01	05:18	20:41 (WEA 3)	05:18	20:46 (WEA 3)	05:56	06:46	07:36	07:30	08:20		
	16:33	17:23	18:15	20:09	21:00	21:45	26	21:07 (WEA 3)	21:56	27	21:13 (WEA 3)	21:21	20:18	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	05:17	20:40 (WEA 3)	05:18	20:46 (WEA 3)	05:58	06:48	07:37	07:32	08:22		
	16:34	17:25	18:16	20:10	21:02	21:46	27	21:07 (WEA 3)	21:56	27	21:13 (WEA 3)	21:20	20:15	19:06	17:01	16:23
5	08:41	08:08	07:12	07:01	05:57	05:16	20:40 (WEA 3)	05:19	20:46 (WEA 3)	05:59	06:49	07:39	07:34	08:23		
	16:35	17:26	18:18	20:12	21:03	21:47	26	21:06 (WEA 3)	21:55	27	21:13 (WEA 3)	21:18	20:13	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	05:15	20:41 (WEA 3)	05:20	20:47 (WEA 3)	06:01	06:51	07:41	07:35	08:24		
	16:37	17:28	18:20	20:14	21:05	21:48	26	21:07 (WEA 3)	21:55	27	21:14 (WEA 3)	21:16	20:11	19:01	16:57	16:23
7	08:40	08:05	07:08	06:56	05:54	05:15	20:40 (WEA 3)	05:21	20:47 (WEA 3)	06:02	06:53	07:42	07:37	08:26		
	16:38	17:30	18:22	20:16	21:07	21:49	27	21:07 (WEA 3)	21:54	27	21:14 (WEA 3)	21:14	20:09	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	05:52	05:14	20:41 (WEA 3)	05:22	20:47 (WEA 3)	06:04	06:54	07:44	07:39	08:27		
	16:39	17:32	18:24	20:17	21:08	21:50	27	21:08 (WEA 3)	21:53	26	21:13 (WEA 3)	21:12	20:06	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	05:50	05:14	20:41 (WEA 3)	05:23	20:47 (WEA 3)	06:05	06:56	07:46	07:41	08:28		
	16:41	17:34	18:25	20:19	21:10	21:51	27	21:08 (WEA 3)	21:53	26	21:13 (WEA 3)	21:10	20:04	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	05:48	05:13	20:41 (WEA 3)	05:24	20:47 (WEA 3)	06:07	06:58	07:47	07:43	08:29		
	16:42	17:36	18:27	20:21	21:11	21:51	27	21:08 (WEA 3)	21:52	26	21:13 (WEA 3)	21:09	20:02	18:52	16:50	16:21
11	08:38	07:58	06:59	06:47	05:47	05:13	20:41 (WEA 3)	05:25	20:48 (WEA 3)	06:09	06:59	07:49	07:44	08:30		
	16:44	17:38	18:29	20:22	21:13	21:52	27	21:08 (WEA 3)	21:51	25	21:13 (WEA 3)	21:07	19:59	18:50	16:49	16:21
12	08:37	07:56	06:56	06:45	05:45	05:13	20:42 (WEA 3)	05:26	20:48 (WEA 3)	06:10	07:01	07:51	07:46	08:31		
	16:45	17:40	18:31	20:24	21:15	21:53	27	21:09 (WEA 3)	21:50	25	21:13 (WEA 3)	21:05	19:57	18:47	16:47	16:21
13	08:37	07:54	06:54	06:43	05:43	05:12	20:42 (WEA 3)	05:27	20:48 (WEA 3)	06:12	07:03	07:53	07:48	08:32		
	16:46	17:41	18:32	20:26	21:16	21:53	27	21:09 (WEA 3)	21:49	25	21:13 (WEA 3)	21:03	19:55	18:45	16:46	16:21
14	08:36	07:52	06:52	06:40	05:42	05:12	20:41 (WEA 3)	05:28	20:50 (WEA 3)	06:14	07:04	07:54	07:50	08:33		
	16:48	17:43	18:34	20:28	21:18	21:54	27	21:08 (WEA 3)	21:49	24	21:14 (WEA 3)	21:01	19:52	18:43	16:44	16:21
15	08:35	07:50	06:49	06:38	05:40	05:12	20:42 (WEA 3)	05:29	20:50 (WEA 3)	06:15	07:06	07:56	07:52	08:34		
	16:50	17:45	18:36	20:29	21:19	21:55	27	21:09 (WEA 3)	21:48	23	21:13 (WEA 3)	20:59	19:50	18:41	16:43	16:21
16	08:34	07:48	06:47	06:36	05:39	05:12	20:42 (WEA 3)	05:30	20:51 (WEA 3)	06:17	07:07	07:58	07:53	08:35		
	16:51	17:47	18:38	20:31	21:21	21:55	27	21:09 (WEA 3)	21:47	22	21:13 (WEA 3)	20:57	19:48	18:39	16:41	16:21
17	08:33	07:46	06:45	06:34	05:37	05:12	20:42 (WEA 3)	05:32	20:51 (WEA 3)	06:18	07:09	08:00	07:55	08:36		
	16:53	17:49	18:39	20:33	21:22	21:56	27	21:09 (WEA 3)	21:45	21	21:12 (WEA 3)	20:55	19:45	18:36	16:40	16:21
18	08:33	07:44	06:42	06:32	05:36	05:12	20:43 (WEA 3)	05:33	20:52 (WEA 3)	06:20	07:11	08:01	07:57	08:37		
	16:54	17:51	18:41	20:34	21:24	21:56	26	21:09 (WEA 3)	21:44	20	21:12 (WEA 3)	20:53	19:43	18:34	16:39	16:21
19	08:31	07:42	06:40	06:29	05:34	05:12	20:43 (WEA 3)	05:34	20:52 (WEA 3)	06:22	07:12	08:03	07:58	08:37		
	16:56	17:53	18:43	20:36	21:25	21:56	27	21:10 (WEA 3)	21:43	19	21:11 (WEA 3)	20:51	19:41	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33	05:12	20:44 (WEA 3)	05:36	20:54 (WEA 3)	06:23	07:14	08:05	08:00	08:38		
	16:58	17:54	18:45	20:38	21:27	21:57	27	21:11 (WEA 3)	21:42	17	21:11 (WEA 3)	20:49	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	05:12	20:44 (WEA 3)	05:37	20:55 (WEA 3)	06:25	07:16	08:07	08:02	08:39		
	16:59	17:56	18:46	20:40	21:30	21:57	27	21:11 (WEA 3)	21:41	14	21:09 (WEA 3)	20:46	19:36	18:28	16:35	16:23
22	08:28	07:36	06:33	06:23	05:28	05:12	20:44 (WEA 3)	05:38	20:56 (WEA 3)	06:27	07:17	08:08	08:04	08:39		
	17:01	17:58	18:48	20:41	21:30	21:57	27	21:11 (WEA 3)	21:39	11	21:07 (WEA 3)	20:44	19:33	18:26	16:34	16:23
23	08:27	07:34	06:31	06:21	05:29	05:12	20:44 (WEA 3)	05:40	20:58 (WEA 3)	06:28	07:19	08:10	08:05	08:40		
	17:03	18:00	18:50	20:43	21:31	21:57	27	21:11 (WEA 3)	21:38	7	21:05 (WEA 3)	20:42	19:31	18:24	16:33	16:24
24	08:26	07:32	06:28	06:19	05:28	05:13	20:43 (WEA 3)	05:41	20:45 (WEA 3)	06:30	07:21	08:12	08:07	08:40		
	17:05	18:02	18:52	20:45	21:33	21:57	26	21:11 (WEA 3)	21:37		20:40	19:29	18:22	16:31	16:24	
25	08:25	07:29	06:26	06:17	05:26	05:13	20:42 (WEA 3)	05:42	20:44 (WEA 3)	06:31	07:22	08:13	08:08	08:41		
	17:06	18:04	18:53	20:46	21:34	21:58	27	21:11 (WEA 3)	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	20:42 (WEA 3)	05:43	20:44 (WEA 3)	06:33	07:24	08:15	08:10	08:41		
	17:08	18:06	18:55	20:48	21:35	21:58	27	21:11 (WEA 3)	21:34		20:36	19:24	17:18	16:29	16:25	
27	08:22	07:25	06:22	06:13	05:24	05:14	20:41 (WEA 3)	05:45	20:45 (WEA 3)	06:35	07:26	08:17	08:12	08:41		
	17:10	18:07	18:57	20:50	21:37	22	21:03 (WEA 3)	21:57	21:12 (WEA 3)	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	20:41 (WEA 3)	05:47	20:45 (WEA 3)	06:36	07:27	08:19	08:13	08:41		
	17:12	18:09	18:58	20:51	21:38	23	21:04 (WEA 3)	21:57	21:12 (WEA 3)	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	20:40 (WEA 3)	05:48	20:45 (WEA 3)	06:38	07:29	08:21	08:15	08:42		
	17:14	18:11	19:00	20:53	21:39	24	21:04 (WEA 3)	21:57	21:12 (WEA 3)	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	20:40 (WEA 3)	05:50	20:45 (WEA 3)	06:40	07:31	08:23	08:16	08:42		
	17:15	18:12	19:01	20:55	21:40	24	21:04 (WEA 3)	21:57	21:12 (WEA 3)	21:28	20:27	19:15	17:10	16:26	16:29	
31	08:16	07:12	06:04	05:20	05:15	05:15	20:41 (WEA 3)	05:51	20:46 (WEA 3)	06:41	07:32	08:24	08:17	08:42		
	17:17	18:14	19:03	20:54	21:42	25	21:06 (WEA 3)	21:56	21:26	20:25	17:08	16:30	16:30	16:30		
Sonnenscheinstunden	258	277	367	416	486	500		503		454	381	331	266	243		
astr.max.mögl.Beschattung					213	803		521								

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	Schattendecke (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 10:01/4.0.424

### SHADOW - Kalender

Berechnung: Immissionspunktberechnung Zusatzbelastung durch WEA 3 Schattenrezeptor: IP 32-SW - IP 32-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	Jun	Jul	August	September	Oktober	November	Dezember				
1	08:42	08:15	07:21	07:10	06:05	05:19	20:43 (WEA 3)	05:16	20:48 (WEA 3)	05:53	06:43	07:32	07:26	08:18		
	16:31	17:19	18:11	20:05	20:57	21:43	24	21:07 (WEA 3)	21:57	26	21:14 (WEA 3)	21:25	20:22	19:12	17:06	16:25
2	08:42	08:13	07:19	07:08	06:03	05:18	20:43 (WEA 3)	05:17	20:48 (WEA 3)	05:54	06:45	07:34	07:28	08:19		
	16:32	17:21	18:13	20:07	20:58	21:44	24	21:07 (WEA 3)	21:56	27	21:15 (WEA 3)	21:23	20:20	19:10	17:04	16:25
3	08:41	08:11	07:16	07:05	06:01	05:18	20:43 (WEA 3)	05:18	20:48 (WEA 3)	05:56	06:46	07:36	07:30	08:20		
	16:33	17:23	18:15	20:09	21:00	21:45	25	21:08 (WEA 3)	21:56	26	21:14 (WEA 3)	21:21	20:18	19:08	17:02	16:24
4	08:41	08:10	07:14	07:03	05:59	05:17	20:43 (WEA 3)	05:18	20:48 (WEA 3)	05:58	06:48	07:37	07:32	08:22		
	16:34	17:25	18:16	20:10	21:02	21:46	25	21:08 (WEA 3)	21:56	27	21:15 (WEA 3)	21:20	20:15	19:06	17:01	16:23
5	08:41	08:08	07:12	07:01	05:57	05:16	20:42 (WEA 3)	05:19	20:49 (WEA 3)	05:59	06:49	07:39	07:34	08:23		
	16:35	17:26	18:18	20:12	21:03	21:47	26	21:08 (WEA 3)	21:55	26	21:15 (WEA 3)	21:18	20:13	19:03	16:59	16:23
6	08:41	08:06	07:10	06:58	05:55	05:15	20:43 (WEA 3)	05:20	20:49 (WEA 3)	06:01	06:51	07:41	07:35	08:24		
	16:37	17:28	18:20	20:14	21:05	21:48	26	21:09 (WEA 3)	21:55	26	21:15 (WEA 3)	21:16	20:11	19:01	16:57	16:23
7	08:40	08:05	07:08	06:56	05:54	05:15	20:42 (WEA 3)	05:21	20:50 (WEA 3)	06:02	06:53	07:42	07:37	08:26		
	16:38	17:30	18:22	20:16	21:07	21:49	27	21:09 (WEA 3)	21:54	26	21:16 (WEA 3)	21:14	20:09	18:59	16:55	16:22
8	08:40	08:03	07:05	06:54	05:52	05:14	20:43 (WEA 3)	05:22	20:49 (WEA 3)	06:04	06:54	07:44	07:39	08:27		
	16:39	17:32	18:24	20:17	21:08	21:50	26	21:09 (WEA 3)	21:53	26	21:15 (WEA 3)	21:12	20:06	18:56	16:54	16:22
9	08:39	08:01	07:03	06:52	05:50	05:14	20:43 (WEA 3)	05:23	20:49 (WEA 3)	06:05	06:56	07:46	07:41	08:28		
	16:41	17:34	18:25	20:19	21:10	21:51	27	21:10 (WEA 3)	21:53	26	21:15 (WEA 3)	21:10	20:04	18:54	16:52	16:21
10	08:39	07:59	07:01	06:49	05:48	05:13	20:43 (WEA 3)	05:24	20:50 (WEA 3)	06:07	06:58	07:47	07:43	08:29		
	16:42	17:36	18:27	20:21	21:11	21:51	27	21:10 (WEA 3)	21:52	25	21:15 (WEA 3)	21:09	20:02	18:52	16:50	16:21
11	08:38	07:58	06:59	06:47	05:47	05:13	20:43 (WEA 3)	05:25	20:50 (WEA 3)	06:09	06:59	07:49	07:44	08:30		
	16:44	17:38	18:29	20:22	21:13	21:52	27	21:10 (WEA 3)	21:51	25	21:15 (WEA 3)	21:07	19:59	18:50	16:49	16:21
12	08:37	07:56	06:56	06:45	05:45	05:13	20:44 (WEA 3)	05:26	20:51 (WEA 3)	06:10	07:01	07:51	07:46	08:31		
	16:45	17:40	18:31	20:24	21:15	21:53	27	21:11 (WEA 3)	21:50	23	21:14 (WEA 3)	21:05	19:57	18:47	16:47	16:21
13	08:37	07:54	06:54	06:43	05:43	05:12	20:44 (WEA 3)	05:27	20:51 (WEA 3)	06:12	07:03	07:53	07:48	08:32		
	16:46	17:41	18:32	20:26	21:16	21:53	27	21:11 (WEA 3)	21:49	23	21:14 (WEA 3)	21:03	19:55	18:45	16:46	16:21
14	08:36	07:52	06:52	06:40	05:42	05:12	20:44 (WEA 3)	05:28	20:53 (WEA 3)	06:14	07:04	07:54	07:50	08:33		
	16:48	17:43	18:34	20:28	21:18	21:54	26	21:10 (WEA 3)	21:49	22	21:15 (WEA 3)	21:01	19:52	18:43	16:44	16:21
15	08:35	07:50	06:49	06:38	05:40	05:12	20:44 (WEA 3)	05:29	20:53 (WEA 3)	06:15	07:06	07:56	07:52	08:34		
	16:50	17:45	18:36	20:29	21:19	21:55	27	21:11 (WEA 3)	21:48	21	21:14 (WEA 3)	20:59	19:50	18:41	16:43	16:21
16	08:34	07:48	06:47	06:36	05:39	05:12	20:44 (WEA 3)	05:30	20:54 (WEA 3)	06:17	07:07	07:58	07:53	08:35		
	16:51	17:47	18:38	20:31	21:21	21:55	27	21:11 (WEA 3)	21:47	20	21:14 (WEA 3)	20:57	19:48	18:39	16:41	16:21
17	08:33	07:46	06:45	06:34	05:37	05:12	20:44 (WEA 3)	05:32	20:54 (WEA 3)	06:18	07:09	08:00	07:55	08:36		
	16:53	17:49	18:39	20:33	21:22	21:56	27	21:11 (WEA 3)	21:45	19	21:13 (WEA 3)	20:55	19:45	18:36	16:40	16:21
18	08:33	07:44	06:42	06:32	05:36	05:12	20:44 (WEA 3)	05:33	20:55 (WEA 3)	06:20	07:11	08:01	07:57	08:37		
	16:54	17:51	18:41	20:34	21:24	21:56	27	21:11 (WEA 3)	21:44	17	21:12 (WEA 3)	20:53	19:43	18:34	16:39	16:21
19	08:31	07:42	06:40	06:29	05:34	05:12	20:45 (WEA 3)	05:34	20:56 (WEA 3)	06:22	07:12	08:03	07:58	08:37		
	16:56	17:53	18:43	20:36	21:25	21:56	27	21:12 (WEA 3)	21:43	15	21:11 (WEA 3)	20:51	19:41	18:32	16:37	16:22
20	08:30	07:40	06:38	06:27	05:33	05:12	20:46 (WEA 3)	05:36	20:58 (WEA 3)	06:23	07:14	08:05	08:00	08:38		
	16:58	17:54	18:45	20:38	21:27	21:57	27	21:13 (WEA 3)	21:42	12	21:10 (WEA 3)	20:49	19:38	18:30	16:36	16:22
21	08:29	07:38	06:35	06:25	05:31	05:12	20:46 (WEA 3)	05:37	21:00 (WEA 3)	06:25	07:16	08:07	08:02	08:39		
	16:59	17:56	18:46	20:40	21:28	21:57	27	21:13 (WEA 3)	21:41	8	21:08 (WEA 3)	20:46	19:36	18:28	16:35	16:23
22	08:28	07:36	06:33	06:23	05:30	05:12	20:46 (WEA 3)	05:38	06:27	07:17	08:08	08:04	08:04	08:39		
	17:01	17:58	18:48	20:41	21:30	5	20:56 (WEA 3)	21:57	27	21:13 (WEA 3)	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	20:49 (WEA 3)	05:40	06:28	07:19	08:10	08:05	08:04	08:40		
	17:03	18:00	18:50	20:43	21:31	10	20:59 (WEA 3)	21:57	27	21:13 (WEA 3)	21:38	20:42	19:31	18:24	16:33	16:24
24	08:26	07:32	06:28	06:19	05:28	05:13	20:47 (WEA 3)	05:41	06:30	07:21	08:12	08:07	08:04	08:40		
	17:05	18:02	18:52	20:45	21:33	14	21:01 (WEA 3)	21:57	26	21:13 (WEA 3)	21:37	20:40	19:29	18:22	16:32	16:24
25	08:25	07:29	06:26	06:17	05:26	05:13	20:46 (WEA 3)	05:42	06:31	07:22	08:14	08:08	08:04	08:41		
	17:06	18:04	18:53	20:46	21:34	16	21:02 (WEA 3)	21:58	27	21:13 (WEA 3)	21:35	20:38	19:26	18:20	16:30	16:25
26	08:23	07:27	06:24	06:15	05:25	05:13	20:45 (WEA 3)	05:43	06:33	07:24	08:16	08:10	08:04	08:41		
	17:08	18:06	18:55	20:48	21:35	18	21:03 (WEA 3)	21:58	27	21:13 (WEA 3)	21:34	20:36	19:24	18:18	16:29	16:25
27	08:22	07:25	06:22	06:13	05:24	05:14	20:45 (WEA 3)	05:44	06:35	07:26	08:17	08:12	08:04	08:41		
	17:10	18:07	18:57	20:50	21:37	19	21:04 (WEA 3)	21:57	27	21:14 (WEA 3)	21:32	20:33	19:22	18:16	16:29	16:26
28	08:20	07:23	06:19	06:11	05:23	05:14	20:44 (WEA 3)	05:44	06:36	07:27	08:19	08:13	08:04	08:41		
	17:12	18:09	18:58	20:51	21:38	21	21:05 (WEA 3)	21:57	27	21:14 (WEA 3)	21:31	20:31	19:19	18:14	16:28	16:27
29	08:19	07:17	06:09	05:22	05:15	05:15	20:43 (WEA 3)	05:45	06:38	07:29	08:21	08:15	08:04	08:42		
	17:14	18:11	19:00	20:53	21:39	22	21:05 (WEA 3)	21:57	27	21:14 (WEA 3)	21:29	20:29	19:17	18:12	16:27	16:28
30	08:18	07:15	06:07	05:21	05:15	05:15	20:43 (WEA 3)	05:45	06:40	07:31	08:23	08:16	08:04	08:42		
	17:15	18:12	19:01	20:55	21:40	23	21:06 (WEA 3)	21:57	27	21:14 (WEA 3)	21:28	20:27	19:15	18:10	16:26	16:29
31	08:16	07:12	06:03	05:20	05:15	05:15	20:43 (WEA 3)	05:45	06:41	07:32	08:24	08:16	08:04	08:42		
	17:17	18:14	19:03	20:56	21:41	24	21:07 (WEA 3)	21:57	27	21:14 (WEA 3)	21:26	20:25	19:13	18:08	16:30	16:30
Sonnenscheinstunden	258	277	367	416	486	500		500	466	454	381	331	266	243		
astr.max.mögl.Beschattung					172	795										

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	Schattendecke (WEA mit letztem Schatten)

