

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 01 - IP 01 Grenzweg 5

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni					
1	08:40	10:12 (WEA09)	08:14	09:05 (WEA05)	07:20	08:10 (WEA04)	07:10	08:00 (WEA03)	06:06	07:08 (WEA08)	05:21
	16:32	73 11:44 (WEA-01)	17:20	76 11:58 (WEA-01)	18:11	64 17:27 (WEA-1)	20:05	48 19:33 (WEA-3 E-160)	20:56	63 20:22 (WEA-4 E-160)	21:41
2	08:40	10:13 (WEA09)	08:12	09:06 (WEA05)	07:18	08:11 (WEA04)	07:08	08:00 (WEA03)	06:04	07:07 (WEA08)	05:20
	16:33	74 11:45 (WEA-01)	17:22	73 11:57 (WEA-01)	18:13	62 17:26 (WEA-1)	20:07	48 19:33 (WEA-3 E-160)	20:57	64 20:22 (WEA-4 E-160)	21:42
3	08:40	10:14 (WEA09)	08:10	09:08 (WEA05)	07:16	08:12 (WEA04)	07:06	08:01 (WEA03)	06:02	07:07 (WEA08)	05:19
	16:34	73 11:46 (WEA-01)	17:24	67 11:56 (WEA-01)	18:15	59 17:25 (WEA-1)	20:08	46 19:33 (WEA-3 E-160)	20:59	64 20:21 (WEA-4 E-160)	21:43
4	08:40	10:14 (WEA09)	08:09	09:11 (WEA05)	07:14	08:14 (WEA04)	07:03	08:03 (WEA03)	06:00	07:07 (WEA08)	05:18
	16:36	73 11:46 (WEA-01)	17:25	60 11:56 (WEA-01)	18:17	53 17:24 (WEA-1)	20:10	43 19:33 (WEA-3 E-160)	21:01	64 20:22 (WEA-4 E-160)	21:44
5	08:39	10:15 (WEA09)	08:07	09:11 (WEA05)	07:12	16:38 (WEA-2 E-138)	07:01	08:05 (WEA03)	05:58	07:07 (WEA08)	05:18
	16:37	73 11:47 (WEA-01)	17:27	55 11:56 (WEA-01)	18:18	44 17:22 (WEA-1)	20:12	40 19:34 (WEA-3 E-160)	21:02	63 20:21 (WEA-4 E-160)	21:45
6	08:39	10:17 (WEA09)	08:05	09:11 (WEA05)	07:09	16:38 (WEA-2 E-138)	06:59	19:04 (WEA-3 E-160)	05:56	07:07 (WEA08)	05:17
	16:38	72 11:48 (WEA-01)	17:29	54 11:55 (WEA-01)	18:20	42 17:20 (WEA-1)	20:13	28 19:32 (WEA-3 E-160)	21:04	63 20:21 (WEA-4 E-160)	21:46
7	08:39	10:18 (WEA09)	08:04	09:11 (WEA05)	07:07	16:37 (WEA-2 E-138)	06:56	19:05 (WEA-3 E-160)	05:55	07:07 (WEA08)	05:16
	16:39	70 11:48 (WEA-01)	17:31	52 11:54 (WEA-01)	18:22	42 17:19 (WEA-2 E-138)	20:15	27 19:32 (WEA-3 E-160)	21:05	62 20:20 (WEA-4 E-160)	21:47
8	08:38	10:19 (WEA09)	08:02	09:11 (WEA05)	07:05	16:37 (WEA-2 E-138)	06:54	19:05 (WEA-3 E-160)	05:53	07:07 (WEA08)	05:16
	16:41	69 11:49 (WEA-01)	17:33	50 11:53 (WEA-01)	18:24	42 17:19 (WEA-2 E-138)	20:17	27 19:32 (WEA-3 E-160)	21:07	61 20:20 (WEA-4 E-160)	21:48
9	08:38	10:21 (WEA09)	08:00	09:11 (WEA05)	07:03	16:37 (WEA-2 E-138)	06:52	19:05 (WEA-3 E-160)	05:51	07:07 (WEA08)	05:15
	16:42	66 11:50 (WEA-01)	17:35	47 11:51 (WEA-01)	18:25	42 17:19 (WEA-2 E-138)	20:19	26 19:31 (WEA-3 E-160)	21:09	58 20:19 (WEA-4 E-160)	21:49
10	08:37	10:24 (WEA09)	07:58	09:11 (WEA05)	07:01	16:36 (WEA-2 E-138)	06:50	19:05 (WEA-3 E-160)	05:49	07:08 (WEA08)	05:15
	16:43	62 11:50 (WEA-01)	17:37	45 11:50 (WEA-01)	18:27	42 17:18 (WEA-2 E-138)	20:20	24 19:29 (WEA-3 E-160)	21:10	56 20:19 (WEA-4 E-160)	21:50
11	08:37	10:52 (WEA-01)	07:57	11:08 (WEA-01)	06:58	16:36 (WEA-2 E-138)	06:47	19:06 (WEA-3 E-160)	05:48	07:08 (WEA08)	05:15
	16:45	59 11:51 (WEA-01)	17:38	41 11:49 (WEA-01)	18:29	42 17:18 (WEA-2 E-138)	20:22	22 19:28 (WEA-3 E-160)	21:12	53 20:17 (WEA-4 E-160)	21:50
12	08:36	10:52 (WEA-01)	07:55	11:09 (WEA-01)	06:56	16:37 (WEA-2 E-138)	06:45	19:08 (WEA-3 E-160)	05:46	07:09 (WEA08)	05:14
	16:46	59 11:51 (WEA-01)	17:40	38 11:47 (WEA-01)	18:31	40 17:17 (WEA-2 E-138)	20:24	18 19:26 (WEA-3 E-160)	21:14	50 20:17 (WEA-4 E-160)	21:51
13	08:35	10:53 (WEA-01)	07:53	11:11 (WEA-01)	06:54	16:38 (WEA-2 E-138)	06:43	19:09 (WEA-3 E-160)	05:44	07:09 (WEA08)	05:14
	16:48	60 11:53 (WEA-01)	17:42	34 11:45 (WEA-01)	18:32	39 17:17 (WEA-2 E-138)	20:25	15 19:24 (WEA-3 E-160)	21:15	46 20:15 (WEA-4 E-160)	21:52
14	08:35	10:53 (WEA-01)	07:51	11:14 (WEA-01)	06:51	16:37 (WEA-2 E-138)	06:41	19:13 (WEA-3 E-160)	05:43	07:10 (WEA08)	05:14
	16:49	60 11:53 (WEA-01)	17:44	28 11:42 (WEA-01)	18:34	38 17:15 (WEA-2 E-138)	20:27	8 19:21 (WEA-3 E-160)	21:17	39 20:13 (WEA-4 E-160)	21:52
15	08:34	10:53 (WEA-01)	07:49	11:18 (WEA-01)	06:49	16:38 (WEA-2 E-138)	06:39	19:04 (WEA-3 E-160)	05:41	07:10 (WEA08)	05:14
	16:51	61 11:54 (WEA-01)	17:46	20 11:38 (WEA-01)	18:36	37 17:15 (WEA-2 E-138)	20:29	19:09 (WEA-3 E-160)	21:18	30 20:14 (WEA-4 E-160)	21:53
16	08:33	09:07 (WEA05)	07:47	11:25 (WEA-01)	06:47	16:39 (WEA-2 E-138)	06:36	19:08 (WEA-3 E-160)	05:40	07:11 (WEA08)	05:13
	16:52	64 11:54 (WEA-01)	17:48	5 11:30 (WEA-01)	18:38	35 17:14 (WEA-2 E-138)	20:30	19:13 (WEA-3 E-160)	21:20	29 20:14 (WEA-4 E-160)	21:53
17	08:32	09:05 (WEA05)	07:45	09:05 (WEA05)	06:45	16:40 (WEA-2 E-138)	06:34	19:08 (WEA-3 E-160)	05:38	07:13 (WEA08)	05:13
	16:54	70 11:55 (WEA-01)	17:49	18:39	32 17:12 (WEA-2 E-138)	20:32	16:41 (WEA-2 E-138)	06:32	21:21	26 07:39 (WEA08)	21:54
18	08:31	09:04 (WEA05)	07:43	08:15 (WEA04)	06:42	16:41 (WEA-2 E-138)	06:32	19:08 (WEA-3 E-160)	05:37	07:13 (WEA08)	05:13
	16:55	74 11:56 (WEA-01)	17:51	10 08:25 (WEA04)	18:41	29 17:10 (WEA-2 E-138)	20:34	19:09 (WEA-3 E-160)	21:23	24 07:37 (WEA08)	21:54
19	08:30	09:02 (WEA05)	07:41	08:13 (WEA04)	06:40	16:43 (WEA-2 E-138)	06:30	19:08 (WEA-3 E-160)	05:35	07:15 (WEA08)	05:13
	16:57	76 11:55 (WEA-01)	17:53	19 17:18 (WEA-1)	18:43	26 17:09 (WEA-2 E-138)	20:35	16:45 (WEA-2 E-138)	21:24	21 07:36 (WEA08)	21:55
20	08:29	09:02 (WEA05)	07:39	08:11 (WEA04)	06:38	16:45 (WEA-2 E-138)	06:28	19:08 (WEA-3 E-160)	05:34	07:16 (WEA08)	05:13
	16:59	78 11:56 (WEA-01)	17:55	31 17:22 (WEA-1)	18:45	20 17:05 (WEA-2 E-138)	20:37	12 07:23 (WEA08)	21:26	19 07:35 (WEA08)	21:55
21	08:28	09:02 (WEA05)	07:37	08:10 (WEA04)	06:35	17:05 (WEA-2 E-138)	06:26	19:09 (WEA03)	05:33	07:19 (WEA08)	05:14
	17:00	80 11:57 (WEA-01)	17:57	37 17:24 (WEA-1)	18:46	25 17:02 (WEA-2 E-138)	20:39	19 07:38 (WEA08)	21:27	15 07:33 (WEA08)	21:55
22	08:27	09:02 (WEA05)	07:35	08:09 (WEA04)	06:33	17:02 (WEA-2 E-138)	06:24	19:08 (WEA-3 E-160)	05:31	07:20 (WEA08)	05:14
	17:02	80 11:57 (WEA-01)	17:59	41 17:25 (WEA-1)	18:48	16 07:23 (WEA03)	20:40	23 07:40 (WEA08)	21:28	10 07:30 (WEA08)	21:55
23	08:26	09:01 (WEA05)	07:33	08:09 (WEA04)	06:31	17:02 (WEA-2 E-138)	06:22	19:09 (WEA03)	05:30	07:15 (WEA08)	05:14
	17:04	82 11:57 (WEA-01)	18:00	49 17:26 (WEA-1)	18:50	20 07:24 (WEA03)	20:42	27 07:42 (WEA08)	21:30	07:30 (WEA08)	21:56
24	08:25	09:01 (WEA05)	07:31	08:09 (WEA04)	06:28	17:04 (WEA-2 E-138)	06:20	19:08 (WEA-3 E-160)	05:29	07:13 (WEA08)	05:14
	17:06	82 11:57 (WEA-01)	18:02	57 17:27 (WEA-1)	18:51	22 07:25 (WEA03)	20:44	37 20:14 (WEA-4 E-160)	21:31	07:30 (WEA08)	21:56
25	08:23	09:01 (WEA05)	07:29	08:09 (WEA04)	06:26	17:04 (WEA-2 E-138)	06:17	19:09 (WEA03)	05:28	07:12 (WEA08)	05:15
	17:07	82 11:57 (WEA-01)	18:04	61 17:27 (WEA-1)	18:53	24 07:26 (WEA03)	20:46	45 20:17 (WEA-4 E-160)	21:32	07:30 (WEA08)	21:56
26	08:22	09:01 (WEA05)	07:27	08:08 (WEA04)	06:24	17:04 (WEA-2 E-138)	06:15	19:08 (WEA-3 E-160)	05:27	07:11 (WEA08)	05:15
	17:09	84 11:58 (WEA-01)	18:06	63 17:27 (WEA-1)	18:55	24 07:25 (WEA03)	20:47	50 20:18 (WEA-4 E-160)	21:34	07:30 (WEA08)	21:56
27	08:21	09:02 (WEA05)	07:25	08:08 (WEA04)	06:22	17:04 (WEA-2 E-138)	06:13	19:09 (WEA03)	05:25	07:10 (WEA08)	05:15
	17:11	82 11:58 (WEA-01)	18:08	65 17:27 (WEA-1)	18:56	29 18:23 (WEA-3 E-160)	20:49	54 20:19 (WEA-4 E-160)	21:35	07:30 (WEA08)	21:56
28	08:19	09:02 (WEA05)	07:23	08:09 (WEA04)	06:19	17:04 (WEA-2 E-138)	06:11	19:09 (WEA03)	05:24	07:09 (WEA08)	05:16
	17:13	82 11:58 (WEA-01)	18:09	65 17:27 (WEA-1)	18:58	29 18:28 (WEA-3 E-160)	20:51	57 20:20 (WEA-4 E-160)	21:36	07:30 (WEA08)	21:56
29	08:18	09:02 (WEA05)	07:21	08:09 (WEA04)	06:17	17:04 (WEA-2 E-138)	06:09	19:09 (WEA03)	05:23	07:09 (WEA08)	05:16
	17:14	80 11:57 (WEA-01)	18:00	44 20:00	44 19:30 (WEA-3 E-160)	20:52	59 20:21 (WEA-4 E-160)	21:38	07:30 (WEA08)	21:56	
30	08:17	09:03 (WEA05)	07:19	08:09 (WEA04)	06:15	17:04 (WEA-2 E-138)	06:08	19:09 (WEA03)	05:22	07:09 (WEA08)	05:17
	17:16	80 11:58 (WEA-01)	18:01	46 20:02	46 19:31 (WEA-3 E-160)	20:54	61 20:22 (WEA-4 E-160)	21:39	07:30 (WEA08)	21:56	
31	08:15	09:04 (WEA05)	07:17	08:09 (WEA04)	06:12	17:04 (WEA-2 E-138)	06:06	19:09 (WEA03)	05:21	07:09 (WEA08)	05:17
	17:18	77 11:57 (WEA-01)	18:00	47 20:03	47 19:32 (WEA-3 E-160)	20:54	61 20:22 (WEA-4 E-160)	21:40	07:30 (WEA08)	21:56	
Sonnenscheinstunden	259	278	367	416	464	485	498	498	485	498	498
astr.max.mögl.Beschattung	2257	1243	1166	864	864	980	980	980	980	980	980
Red. Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,41	0,46	0,46	0,46	0,46	0,46	0,46
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,56	0,60	0,70	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67
Gesamte Reduktion	0,09	0,15	0,17	0,22	0,22	0,25	0,25	0,25	0,25	0,25	0,25
Met. wahrsch. Beschattung	202	186	198	194	194	247	247	247	247	247	247

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 01 - IP 01 Grenzweg 5

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember			
1	05:18				07:19 (WEA08) 06:43		19:05 (WEA-3 E-160) 07:32		17:16 (WEA-2 E-138) 07:26		10:35 (WEA-01) 08:16		10:34 (WEA-01)
	21:55				20:28 (WEA-4 E-160) 20:22	22	19:27 (WEA-3 E-160) 19:13	40	17:56 (WEA-2 E-138) 17:07	45	11:20 (WEA-01) 16:27	59	11:33 (WEA-01)
2	05:18				07:18 (WEA08) 06:45		19:04 (WEA-3 E-160) 07:34		17:15 (WEA-2 E-138) 07:27		10:33 (WEA-01) 08:18		10:07 (WEA09)
	21:55				20:28 (WEA-4 E-160) 20:19	24	19:28 (WEA-3 E-160) 19:10	41	17:56 (WEA-2 E-138) 17:05	48	11:21 (WEA-01) 16:26	63	11:34 (WEA-01)
3	05:19				07:17 (WEA08) 06:47		19:02 (WEA-3 E-160) 07:35		17:14 (WEA-2 E-138) 07:29		10:32 (WEA-01) 08:19		10:04 (WEA09)
	21:54				20:29 (WEA-4 E-160) 20:12	26	19:28 (WEA-3 E-160) 19:43	42	17:56 (WEA-2 E-138) 17:03	50	11:22 (WEA-01) 16:25	66	11:33 (WEA-01)
4	05:20				07:18 (WEA08) 06:48		19:02 (WEA-3 E-160) 07:37		17:14 (WEA-2 E-138) 07:31		10:32 (WEA-01) 08:20		10:04 (WEA09)
	21:54				20:30 (WEA-4 E-160) 20:15	27	19:29 (WEA-3 E-160) 19:06	42	17:56 (WEA-2 E-138) 17:01	52	11:24 (WEA-01) 16:25	69	11:34 (WEA-01)
5	05:21				07:17 (WEA08) 06:50		19:02 (WEA-3 E-160) 07:39		17:14 (WEA-2 E-138) 07:33		10:31 (WEA-01) 08:22		10:03 (WEA09)
	21:53				20:30 (WEA-4 E-160) 20:13	27	19:29 (WEA-3 E-160) 19:03	42	17:56 (WEA-2 E-138) 17:00	54	11:25 (WEA-01) 16:24	71	11:34 (WEA-01)
6	05:21				07:17 (WEA08) 06:51		19:00 (WEA-3 E-160) 07:40		17:14 (WEA-2 E-138) 07:34		10:30 (WEA-01) 08:23		10:02 (WEA09)
	21:53				20:31 (WEA-4 E-160) 20:10	28	19:28 (WEA-3 E-160) 19:01	42	17:56 (WEA-2 E-138) 16:58	56	11:26 (WEA-01) 16:24	72	11:35 (WEA-01)
7	05:22				07:16 (WEA08) 06:52		19:02 (WEA-3 E-160) 07:32		17:13 (WEA-2 E-138) 07:30		10:31 (WEA-01) 08:24		10:02 (WEA09)
	21:52				20:30 (WEA-4 E-160) 20:08	39	19:29 (WEA-3 E-160) 18:59	41	17:54 (WEA-2 E-138) 16:56	61	11:26 (WEA-01) 16:23	73	11:34 (WEA-01)
8	05:23				07:17 (WEA08) 06:55		19:02 (WEA-3 E-160) 07:34		17:13 (WEA-2 E-138) 07:38		10:32 (WEA-01) 08:25		10:02 (WEA09)
	21:52				20:31 (WEA-4 E-160) 20:06	43	19:28 (WEA-3 E-160) 18:57	43	17:56 (WEA-2 E-138) 16:54	68	11:27 (WEA-01) 16:23	73	11:34 (WEA-01)
9	05:24				07:16 (WEA08) 06:56		19:02 (WEA-3 E-160) 07:35		17:13 (WEA-2 E-138) 07:40		10:32 (WEA-01) 08:27		10:04 (WEA09)
	21:51				20:30 (WEA-4 E-160) 20:04	46	19:27 (WEA-3 E-160) 18:54	45	17:58 (WEA-2 E-138) 16:53	73	11:28 (WEA-01) 16:23	73	11:34 (WEA-01)
10	05:25				07:16 (WEA08) 06:58		19:02 (WEA-3 E-160) 07:37		17:59 (WEA-2 E-138) 16:52		10:36 (WEA-01) 08:28		10:02 (WEA09)
	21:50				20:31 (WEA-4 E-160) 20:01	48	19:26 (WEA-3 E-160) 18:52	56	17:59 (WEA-2 E-138) 16:51	76	11:29 (WEA-01) 16:23	74	11:34 (WEA-01)
11	05:26				07:16 (WEA08) 07:00		19:02 (WEA-3 E-160) 07:39		17:59 (WEA-2 E-138) 16:50		10:35 (WEA-01) 08:29		10:03 (WEA09)
	21:50				20:30 (WEA-4 E-160) 19:59	49	19:26 (WEA-3 E-160) 18:50	60	17:59 (WEA-2 E-138) 16:50	78	11:29 (WEA-01) 16:22	73	11:35 (WEA-01)
12	05:27				07:17 (WEA08) 07:01		19:02 (WEA-3 E-160) 07:31		17:59 (WEA-2 E-138) 16:49		10:35 (WEA-01) 08:30		10:03 (WEA09)
	21:49				20:30 (WEA-4 E-160) 19:57	48	19:24 (WEA-3 E-160) 18:48	64	18:00 (WEA-1) 16:48	80	11:30 (WEA-01) 16:22	74	11:35 (WEA-01)
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	21:47				20:29 (WEA-4 E-160) 19:52	44	19:21 (WEA-3 E-160) 18:43	64	18:00 (WEA-1) 16:45	82	11:30 (WEA-01) 16:21	74	11:36 (WEA-01)
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	05:5												

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 02/1 - IP 02/1 Grenzweg 7

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni			
1 08:40		10:35 (WEA09) 08:13		09:00 (WEA05) 07:20		12:42 (WEA-01) 07:10		08:22 (WEA04) 06:06		05:21	06:31 (WEA03)		
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17:09		11:13 (WEA09) 18:00	102	14:24 (WEA-01) 18:55	119	18:12 (WEA-2 E-138) 20:47		21:34	39	07:09 (WEA03) 05:16	21:56	37 07:14 (WEA03)	
27 08:21		10:59 (WEA09) 07:25		12:42 (WEA-01) 06:22		07:21 (WEA04) 06:13		19:40 (WEA-3 E-160) 05:25		06:30 (WEA03) 05:15	06:37 (WEA03)		
17:11	20	11:13 (WEA09) 18:00	102	14:24 (WEA-01) 18:56	113	18:13 (WEA-2 E-138) 20:49		21:35	39	07:09 (WEA03) 05:16	21:56	37 07:14 (WEA03)	
28 08:19		10:56 (WEA09) 07:23		12:42 (WEA-01) 06:19		07:21 (WEA04) 06:11		19:40 (WEA-3 E-160) 05:24		06:30 (WEA03) 05:16	06:37 (WEA03)		
17:13	38	11:13 (WEA09) 18:01	103	14:25 (WEA-01) 18:58	104	18:14 (WEA-2 E-138) 20:51		21:36	39	07:09 (WEA03) 05:16	21:56	36 07:13 (WEA03)	
29 08:18		10:57 (WEA09) 07:21		12:41 (WEA-01) 06:17		07:20 (WEA04) 06:09		19:40 (WEA-3 E-160) 05:23		06:30 (WEA03) 05:16	06:37 (WEA03)		
17:14	50	11:14 (WEA09) 18:02	100	14:25 (WEA-01) 19:00	90	18:14 (WEA-2 E-138) 20:52		21:38	39	07:09 (WEA03) 05:15	21:55	37 07:14 (WEA03)	
30 08:16		10:58 (WEA09) 07:20		12:41 (WEA-01) 06:15		07:19 (WEA04) 06:08		19:40 (WEA-3 E-160) 05:22		06:31 (WEA03) 05:17	06:38 (WEA03)		
17:16	59	11:15 (WEA09) 18:03	100	14:25 (WEA-01) 19:01	66	18:15 (WEA-2 E-138) 20:54		21:39	39	07:10 (WEA03) 05:15	21:55	37 07:15 (WEA03)	
31 08:15		10:59 (WEA09) 07:19		12:41 (WEA-01) 06:12		07:18 (WEA04) 06:06		19:40 (WEA-3 E-160) 05:21		06:31 (WEA03) 05:17	06:38 (WEA03)		
17:18	67	11:16 (WEA09) 18:04	100	14:25 (WEA-01) 19:02	66	18:15 (WEA-2 E-138) 20:54		21:40	39	07:10 (WEA03) 05:16	21:55	37 07:15 (WEA03)	
Sonnenscheinstunden	260		278		367		416		485		498		
astr.max.mögl.Beschattung	863		2835		3505		811		746				1114
Red.Sonnenscheinwahrsch.	0,20		0,30		0,30		0,41		0,46				

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 02/1 - IP 02/1 Grenzweg 7

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18	06:37 (WEA03)	05:54	06:49 (WEA03)	06:43	18:43 (WEA-2 E-138)	07:32	13:20 (WEA-01)	07:26	08:26 (WEA05)	08:16	10:24 (WEA09)
	21:55	38 07:15 (WEA03)	21:23	22 07:11 (WEA03)	20:22	39 19:54 (WEA-3 E-160)	19:13	120 18:41 (WEA-1)	17:07	108 13:42 (WEA-01)	16:27	32 10:56 (WEA09)
2	05:18	06:38 (WEA03)	05:55	06:50 (WEA03)	06:45	18:41 (WEA-2 E-138)	07:34	13:20 (WEA-01)	07:27	08:26 (WEA05)	08:18	10:24 (WEA09)
	21:55	37 07:15 (WEA03)	21:22	19 07:09 (WEA03)	20:19	39 19:52 (WEA-3 E-160)	19:10	118 18:40 (WEA-1)	17:05	106 13:41 (WEA-01)	16:26	34 10:58 (WEA09)
3	05:19	06:38 (WEA03)	05:57	06:52 (WEA03)	06:47	18:39 (WEA-2 E-138)	07:35	13:18 (WEA-01)	07:29	08:26 (WEA05)	08:19	10:24 (WEA09)
	21:54	38 07:16 (WEA03)	21:20	14 07:06 (WEA03)	20:17	35 19:48 (WEA-3 E-160)	19:08	116 18:37 (WEA-1)	17:03	104 13:40 (WEA-01)	16:25	34 10:58 (WEA09)
4	05:20	06:38 (WEA03)	05:59	06:57 (WEA03)	06:48	18:38 (WEA-2 E-138)	07:37	13:18 (WEA-01)	07:36	08:27 (WEA05)	08:20	10:24 (WEA09)
	21:54	37 07:15 (WEA03)	21:18	5 07:02 (WEA03)	20:15	30 19:08 (WEA-2 E-138)	19:06	111 18:35 (WEA-1)	17:01	100 13:39 (WEA-01)	16:25	35 10:59 (WEA09)
5	05:21	06:38 (WEA03)	06:00	06:50	06:50	18:38 (WEA-2 E-138)	07:39	13:17 (WEA-01)	07:33	08:27 (WEA05)	08:22	10:24 (WEA09)
	21:53	38 07:16 (WEA03)	21:17	20 20:13	31 19:09 (WEA-2 E-138)	19:03	104 15:01 (WEA-01)	16:59	97 13:38 (WEA-01)	16:24	35 10:59 (WEA09)	
6	05:21	06:38 (WEA03)	06:02	06:51	06:51	08:27 (WEA04)	07:40	13:17 (WEA-01)	07:34	08:28 (WEA05)	08:23	10:24 (WEA09)
	21:53	38 07:16 (WEA03)	21:15	20 20:10	38 19:08 (WEA-2 E-138)	19:01	104 15:01 (WEA-01)	16:58	92 13:36 (WEA-01)	16:24	36 11:00 (WEA09)	
7	05:22	06:38 (WEA03)	06:03	06:53	06:53	08:23 (WEA04)	07:42	13:16 (WEA-01)	07:36	08:28 (WEA05)	08:24	10:25 (WEA09)
	21:52	39 07:17 (WEA03)	21:13	20 20:08	48 19:09 (WEA-2 E-138)	18:59	104 15:00 (WEA-01)	16:56	89 13:35 (WEA-01)	16:23	36 11:01 (WEA09)	
8	05:23	06:39 (WEA03)	06:05	06:55	06:55	08:20 (WEA04)	07:44	13:16 (WEA-01)	07:38	08:29 (WEA05)	08:25	10:25 (WEA09)
	21:52	38 07:17 (WEA03)	21:11	20 20:06	54 19:08 (WEA-2 E-138)	18:57	104 15:00 (WEA-01)	16:54	84 13:33 (WEA-01)	16:23	36 11:01 (WEA09)	
9	05:24	06:39 (WEA03)	06:06	06:56	06:56	08:18 (WEA04)	07:45	13:16 (WEA-01)	07:40	08:30 (WEA05)	08:27	10:25 (WEA09)
	21:51	39 07:18 (WEA03)	21:09	20 20:04	59 19:09 (WEA-2 E-138)	18:54	104 15:00 (WEA-01)	16:53	80 13:32 (WEA-01)	16:23	37 11:02 (WEA09)	
10	05:25	06:38 (WEA03)	06:08	06:58	06:58	08:16 (WEA04)	07:47	13:15 (WEA-01)	07:42	08:31 (WEA05)	08:28	10:25 (WEA09)
	21:50	39 07:17 (WEA03)	21:08	20 20:01	62 19:08 (WEA-2 E-138)	18:52	104 14:59 (WEA-01)	16:51	73 13:30 (WEA-01)	16:23	37 11:02 (WEA09)	
11	05:26	06:38 (WEA03)	06:10	06:59	06:59	08:14 (WEA04)	07:49	13:15 (WEA-01)	07:43	08:32 (WEA05)	08:29	10:25 (WEA09)
	21:50	39 07:17 (WEA03)	21:06	19 19:59	65 19:08 (WEA-2 E-138)	18:50	103 14:58 (WEA-01)	16:50	67 13:28 (WEA-01)	16:22	37 11:02 (WEA09)	
12	05:27	06:38 (WEA03)	06:11	07:01	07:01	08:13 (WEA04)	07:50	13:15 (WEA-01)	07:45	08:33 (WEA05)	08:30	10:27 (WEA09)
	21:49	39 07:17 (WEA03)	21:04	19 19:57	64 19:06 (WEA-2 E-138)	18:48	103 14:58 (WEA-01)	16:48	59 13:25 (WEA-01)	16:22	37 11:04 (WEA09)	
13	05:28	06:39 (WEA03)	06:13	07:03	07:03	08:12 (WEA04)	07:52	13:15 (WEA-01)	07:47	08:35 (WEA05)	08:31	10:27 (WEA09)
	21:48	39 07:18 (WEA03)	21:02	19 19:54	66 19:06 (WEA-2 E-138)	18:45	103 14:58 (WEA-01)	16:47	49 13:22 (WEA-01)	16:22	37 11:04 (WEA09)	
14	05:30	06:39 (WEA03)	06:14	07:04	07:04	08:12 (WEA04)	07:54	13:15 (WEA-01)	07:49	08:38 (WEA05)	08:32	10:27 (WEA09)
	21:47	40 07:19 (WEA03)	21:00	19 19:52	86 19:06 (WEA-2 E-138)	18:43	103 14:58 (WEA-01)	16:45	38 13:19 (WEA-01)	16:22	38 11:05 (WEA09)	
15	05:31	06:40 (WEA03)	06:16	07:06	07:06	08:10 (WEA04)	07:56	13:14 (WEA-01)	07:50	12:55 (WEA-01)	08:33	10:27 (WEA09)
	21:46	39 07:19 (WEA03)	20:58	19 19:50	103 19:04 (WEA-2 E-138)	18:41	102 14:56 (WEA-01)	16:44	20 13:15 (WEA-01)	16:22	38 11:05 (WEA09)	
16	05:32	06:40 (WEA03)	06:18	07:08	07:08	08:10 (WEA04)	07:57	13:15 (WEA-01)	07:52	08:34	08:34	10:28 (WEA09)
	21:45	39 07:19 (WEA03)	20:56	19 19:47	112 19:03 (WEA-2 E-138)	18:39	101 14:56 (WEA-01)	16:42	101 13:15 (WEA-01)	16:42	37 11:05 (WEA09)	
17	05:33	06:40 (WEA03)	06:19	07:09	07:09	08:09 (WEA04)	07:59	13:15 (WEA-01)	07:54	08:34	08:34	10:28 (WEA09)
	21:44	38 07:18 (WEA03)	20:54	19 19:45	120 19:01 (WEA-2 E-138)	18:37	101 14:56 (WEA-01)	16:41	101 13:15 (WEA-01)	16:41	38 11:06 (WEA09)	
18	05:34	06:40 (WEA03)	06:21	19 19:46 (WEA-3 E-160)	07:11	122 18:59 (WEA-2 E-138)	18:35	100 14:55 (WEA-01)	16:40	08:35	08:35	10:29 (WEA09)
	21:43	38 07:18 (WEA03)	20:52	8 19:54 (WEA-3 E-160)	19:43	122 18:59 (WEA-2 E-138)	18:35	100 14:55 (WEA-01)	16:40	08:36	08:36	10:29 (WEA09)
19	05:36	06:40 (WEA03)	06:22	19 19:42 (WEA-3 E-160)	07:12	125 18:58 (WEA-2 E-138)	18:33	99 14:55 (WEA-01)	16:38	08:37	08:37	10:30 (WEA09)
	21:42	38 07:18 (WEA03)	20:50	14 19:56 (WEA-3 E-160)	19:40	125 18:58 (WEA-2 E-138)	18:33	99 14:55 (WEA-01)	16:38	08:37	08:37	10:30 (WEA09)
20	05:37	06:41 (WEA03)	06:24	19 19:41 (WEA-3 E-160)	07:14	122 18:54 (WEA-2 E-138)	18:30	98 14:53 (WEA-01)	16:37	08:38	08:38	10:31 (WEA09)
	21:41	38 07:19 (WEA03)	20:48	17 19:58 (WEA-3 E-160)	19:38	122 18:54 (WEA-2 E-138)	18:30	98 14:53 (WEA-01)	16:37	08:39	08:39	10:31 (WEA09)
21	05:38	06:41 (WEA03)	06:26	19 19:39 (WEA-3 E-160)	07:16	117 18:38 (WEA-1)	18:28	97 14:53 (WEA-01)	16:36	10:31 (WEA09)	08:37	10:30 (WEA09)
	21:39	37 07:18 (WEA03)	20:46	19 19:58 (WEA-3 E-160)	19:36	117 18:38 (WEA-1)	18:28	97 14:53 (WEA-01)	16:36	10:32 (WEA09)	08:38	10:30 (WEA09)
22	05:40	06:41 (WEA03)	06:27	19 19:38 (WEA-3 E-160)	07:17	127 18:41 (WEA-1)	18:26	96 14:52 (WEA-01)	16:35	16 10:45 (WEA09)	16:24	38 11:08 (WEA09)
	21:38	37 07:18 (WEA03)	20:43	21 19:59 (WEA-3 E-160)	19:33	127 18:41 (WEA-1)	18:26	96 14:52 (WEA-01)	16:35	16 10:45 (WEA09)	16:24	38 11:08 (WEA09)
23	05:41	06:41 (WEA03)	06:29	19 19:37 (WEA-3 E-160)	07:19	132 18:42 (WEA-1)	18:24	106 14:51 (WEA-01)	16:34	19 10:47 (WEA09)	16:25	37 11:08 (WEA09)
	21:37	36 07:17 (WEA03)	20:41	22 19:59 (WEA-3 E-160)	19:31	132 18:42 (WEA-1)	18:24	106 14:51 (WEA-01)	16:34	19 10:47 (WEA09)	16:25	37 11:08 (WEA09)
24	05:42	06:42 (WEA03)	06:30	19 19:36 (WEA-3 E-160)	07:21	137 18:44 (WEA-01)	18:22	111 14:51 (WEA-01)	16:33	22 10:49 (WEA09)	16:25	37 11:09 (WEA09)
	21:35	36 07:18 (WEA03)	20:39	24 20:00 (WEA-3 E-160)	19:29	137 18:44 (WEA-01)	18:22	111 14:51 (WEA-01)	16:33	22 10:49 (WEA09)	16:25	37 11:09 (WEA09)
25	05:44	06:42 (WEA03)	06:32	19 19:36 (WEA-3 E-160)	07:22	137 18:43 (WEA-1)	17:20	111 13:50 (WEA-01)	16:32	25 10:50 (WEA09)	16:26	38 11:10 (WEA09)
	21:34	35 07:17 (WEA03)	20:37	24 20:00 (WEA-3 E-160)	19:26	137 18:43 (WEA-1)	17:20	111 13:50 (WEA-01)	16:32	25 10:50 (WEA09)	16:26	38 11:10 (WEA09)
26	05:45	06:43 (WEA03)	06:34	19 19:35 (WEA-3 E-160)	07:24	138 18:44 (WEA-1)	17:18	114 13:49 (WEA-01)	16:31	27 10:52 (WEA09)	16:27	38 11:10 (WEA09)
	21:33	33 07:16 (WEA03)	20:35	24 19:59 (WEA-3 E-160)	19:24	138 18:44 (WEA-1)	17:18	114 13:49 (WEA-01)	16:31	27 10:52 (WEA09)	16:27	38 11:10 (WEA09)
27	05:47	06:44 (WEA03)	06:35	19 19:36 (WEA-3 E-160)	07:25	135 18:43 (WEA-1)	17:16	114 13:48 (WEA-01)	16:30	28 10:53 (WEA09)	16:28	38 11:10 (WEA09)
	21:31	32 07:16 (WEA03)	20:33	23 19:59 (WEA-3 E-160)	19:22	135 18:43 (WEA-1)	17:16	114 13:48 (WEA-01)	16:30	28 10:53 (WEA09)	16:28	38 11:10 (WEA09)
28	05:48	06:44 (WEA03)	06:37	19 19:35 (WEA-3 E-160)	07:27	131 13:23 (WEA-01)	17:14	113 13:47 (WEA-01)	16:29	29 10:54 (WEA09)	16:28	37 11:11 (WEA09)
	21:30	31 07:15 (WEA03)	20:31	23 19:58 (WEA-3 E-160)	19:19	131 13:23 (WEA-01)	17:14	113 13:47 (WEA-01)	16:29	29 10:54 (WEA09)	16:28	37 11:11 (WEA09)
29	05:49	06:45 (WEA03)	06:38	19 19:36 (WEA-3 E-160)	07:29	119 18:43 (WEA-1)	17:12	113 13:46 (WEA-01)	16:28	31 10:55 (WEA09)	16:29	38 11:12 (WEA09)
	21:28	29 07:14 (WEA03)	20:28	22 19:58 (WEA-3 E-160)	19:17	119 18:43 (WEA-1)	17:12	113 13:46 (WEA-01)	16:28	31 10:55 (WEA09)	16:29	38 11:12 (WEA09)
30	05:51	06:46 (WEA03)	06:40	18 18:49 (WEA-2 E-138)	07:30	120 18:42 (WEA-1)	17:12	112 13:45 (WEA-01)	16:27	32 10:56 (WEA09)	16:30	37 11:12 (WEA09)
	21:27	28 07:14 (WEA03)	20:26	34 19:57 (WEA-3 E-160)	19:15	120 18:42 (WEA-1)	17:12	112 13:45 (WEA-01)	16:27	32 10:56 (WEA09)	16:30	37 11:12 (WEA09)
31	05:52	06:47 (WEA03)	06:42	18 18:46 (WEA-2 E-138)	07:34	111 17:09	111 13:44 (WEA-01)	16:27	32 10:56 (WEA09)	16:30	37 11:12 (WEA09)	
	21:25	25 07:12 (WEA03)	20:24	38 19:56 (WEA-3 E-160)	19:15	111 17:09	111 13:44 (WEA-01)	16:27	32 10:56 (WEA09)	16:30	37 11:12 (WEA09)	
Sonneneinstrahlung	501		453		381		332		267		244	
astr.max.mögl.Beschattung	1127		373		2713		3300		1406		1140	
Red.Sonneneinstrahlung	0,41		0,43		0,36		0,32		0,23		0,15	
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84		0,84	
Reduktion Windrichtung	0,71		0,66		0,65		0,62		0,60		0,56	
Gesamte Reduktion	0,24		0,23		0,19		0,16		0,11		0,07	
Met.wahrsch.Beschattung	275		87		524		541		161		78	

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 17/1 - IP 17/1 Rhader Straße 27

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni		
1 08:40		09:51 (WEA10) 08:14		08:57 (WEA02) 07:20		07:10		08:31 (WEA-01) 06:06		06:32 (WEA03) 05:21		06:05 (WEA08)
16:32	16	10:07 (WEA10) 17:20	18	09:15 (WEA02) 18:11		20:05	92	19:07 (WEA-1) 20:56	43	09:03 (WEA-01) 21:41	128	20:33 (WEA-3 E-160)
08:40		09:52 (WEA10) 08:12		08:56 (WEA02) 07:18		07:08		07:32 (WEA04) 06:04		06:32 (WEA03) 05:20		06:04 (WEA08)
16:33	15	10:07 (WEA10) 17:22	20	09:16 (WEA02) 18:13		20:07	100	19:05 (WEA-1) 20:57	39	09:00 (WEA-01) 21:42	130	20:33 (WEA-3 E-160)
08:40		09:53 (WEA10) 08:10		08:55 (WEA02) 07:16		07:06		07:29 (WEA04) 06:02		06:31 (WEA03) 05:19		06:05 (WEA08)
16:35	15	10:08 (WEA10) 17:24	22	09:17 (WEA02) 18:15		20:08	104	19:04 (WEA-1) 20:59	31	08:55 (WEA-01) 21:43	128	20:33 (WEA-3 E-160)
08:40		09:53 (WEA10) 08:09		08:54 (WEA02) 07:14		07:03		07:28 (WEA04) 06:00		06:31 (WEA03) 05:18		06:04 (WEA08)
16:36	14	10:07 (WEA10) 17:25	24	09:18 (WEA02) 18:17		20:10	105	19:03 (WEA-1) 21:01	36	19:23 (WEA-2 E-138) 21:44	129	20:33 (WEA-3 E-160)
08:39		09:55 (WEA10) 08:07		08:54 (WEA02) 07:12		07:01		07:27 (WEA04) 05:58		06:31 (WEA03) 05:18		06:05 (WEA08)
16:37	12	10:07 (WEA10) 17:27	26	09:20 (WEA02) 18:18		20:12	106	19:02 (WEA-1) 21:02	56	20:23 (WEA-3 E-160) 21:53	129	20:33 (WEA-3 E-160)
08:39		09:56 (WEA10) 08:05		08:50 (WEA09) 07:09		06:59		07:26 (WEA04) 05:56		06:31 (WEA03) 05:17		06:04 (WEA08)
16:38	11	10:07 (WEA10) 17:29	30	09:20 (WEA02) 18:20		20:13	103	18:59 (WEA-1) 21:04	66	20:25 (WEA-3 E-160) 21:46	129	20:32 (WEA-3 E-160)
08:39		09:58 (WEA10) 08:04		08:47 (WEA09) 07:07		06:56		07:25 (WEA04) 05:55		06:31 (WEA03) 05:16		06:05 (WEA08)
16:39	8	10:06 (WEA10) 17:31	34	09:21 (WEA02) 18:22		20:15	100	18:57 (WEA-1) 21:05	75	20:26 (WEA-3 E-160) 21:47	130	20:32 (WEA-3 E-160)
08:38		09:59 (WEA10) 08:02		08:45 (WEA09) 07:05		06:54		07:25 (WEA04) 05:53		06:32 (WEA03) 05:16		06:05 (WEA08)
16:41	5	10:04 (WEA10) 17:33	36	09:21 (WEA02) 18:24	7	07:30 (WEA05) 06:54		07:25 (WEA04) 05:53	80	20:28 (WEA-3 E-160) 21:48	127	20:32 (WEA-3 E-160)
08:38		08:00		08:43 (WEA09) 07:03		06:52		07:26 (WEA04) 05:51		06:32 (WEA03) 05:15		06:05 (WEA08)
16:42		17:35	38	09:21 (WEA02) 18:25	13	07:40 (WEA05) 06:52		07:27 (WEA04) 05:51	85	20:29 (WEA-3 E-160) 21:49	127	20:32 (WEA-3 E-160)
08:37		07:58		08:42 (WEA09) 07:01		06:50		07:25 (WEA04) 05:49		06:33 (WEA03) 05:15		06:04 (WEA08)
16:43		17:37	39	09:21 (WEA02) 18:27	15	07:40 (WEA05) 06:50		07:25 (WEA04) 05:49	89	20:31 (WEA-3 E-160) 21:50	127	20:31 (WEA-3 E-160)
08:37		07:57		08:42 (WEA09) 06:58		06:47		07:26 (WEA04) 05:48		06:34 (WEA03) 05:15		06:05 (WEA08)
16:45		17:38	40	09:22 (WEA02) 18:29	17	07:41 (WEA05) 06:51		07:26 (WEA04) 05:48	90	20:31 (WEA-3 E-160) 21:50	127	20:31 (WEA-3 E-160)
08:36		07:55		08:41 (WEA09) 06:56		06:45		07:27 (WEA04) 05:46		06:37 (WEA03) 05:14		06:05 (WEA08)
16:46		17:40	41	09:22 (WEA02) 18:31	17	07:41 (WEA05) 06:51		07:27 (WEA04) 05:46	90	20:32 (WEA-3 E-160) 21:51	127	20:32 (WEA-3 E-160)
08:35		07:53		08:41 (WEA09) 06:54		06:43		07:30 (WEA04) 05:44		06:37 (WEA03) 05:14		06:06 (WEA08)
16:48		17:42	40	09:21 (WEA02) 18:32	17	07:41 (WEA05) 06:51		07:30 (WEA04) 05:44	88	20:32 (WEA-3 E-160) 21:52	126	20:32 (WEA-3 E-160)
08:35		07:51		08:41 (WEA09) 06:51		06:41		07:31 (WEA04) 05:43		06:38 (WEA03) 05:14		06:06 (WEA08)
16:49		17:44	40	09:21 (WEA02) 18:34	17	07:40 (WEA05) 06:50		07:31 (WEA04) 05:43	90	20:33 (WEA-3 E-160) 21:52	126	20:32 (WEA-3 E-160)
08:34		07:49		08:40 (WEA09) 06:49		06:39		07:32 (WEA04) 05:41		06:39 (WEA03) 05:14		06:06 (WEA08)
16:51		17:46	40	09:20 (WEA02) 18:36	17	07:40 (WEA05) 06:50		07:32 (WEA04) 05:41	94	20:33 (WEA-3 E-160) 21:53	126	20:32 (WEA-3 E-160)
08:33		07:47		08:40 (WEA09) 06:47		06:37		07:33 (WEA04) 05:40		06:40 (WEA03) 05:13		06:06 (WEA08)
16:52		17:48	39	09:19 (WEA02) 18:38	15	07:39 (WEA05) 06:30		07:34 (WEA04) 05:39	95	20:33 (WEA-3 E-160) 21:53	124	20:31 (WEA-3 E-160)
08:32		07:45		08:40 (WEA09) 06:45		06:34		07:35 (WEA04) 05:38		06:41 (WEA03) 05:13		06:06 (WEA08)
16:54		17:49	38	09:18 (WEA02) 18:39	12	07:37 (WEA05) 06:32		07:36 (WEA04) 05:37	98	20:34 (WEA-3 E-160) 21:54	125	20:31 (WEA-3 E-160)
08:31		07:43		08:40 (WEA09) 06:42		06:32		07:37 (WEA04) 05:37		06:42 (WEA03) 05:13		06:07 (WEA08)
16:56		17:51	36	09:16 (WEA02) 18:41	8	07:35 (WEA05) 06:32		07:38 (WEA04) 05:36	98	20:33 (WEA-3 E-160) 21:54	125	20:32 (WEA-3 E-160)
08:30		07:41		08:40 (WEA09) 06:40		06:30		07:39 (WEA04) 05:35		06:43 (WEA03) 05:13		06:07 (WEA08)
16:57		17:53	34	09:14 (WEA02) 18:43	15	07:42 (WEA-1) 06:30		07:40 (WEA04) 05:35	100	20:34 (WEA-3 E-160) 21:55	124	20:32 (WEA-3 E-160)
08:29		07:39		08:41 (WEA09) 06:38		06:28		07:41 (WEA04) 05:34		06:44 (WEA03) 05:13		06:07 (WEA08)
16:59		17:55	30	09:11 (WEA02) 18:45	19	08:03 (WEA-1) 06:28		07:42 (WEA04) 05:34	102	20:34 (WEA-3 E-160) 21:55	123	20:32 (WEA-3 E-160)
08:28		07:37		08:42 (WEA09) 06:35		06:26		07:43 (WEA04) 05:33		06:45 (WEA03) 05:14		06:07 (WEA08)
17:00		17:57	23	09:05 (WEA02) 18:46	43	08:05 (WEA-1) 06:26		07:44 (WEA04) 05:33	103	20:34 (WEA-3 E-160) 21:55	123	20:32 (WEA-3 E-160)
08:27		07:35		08:43 (WEA09) 06:33		06:24		07:45 (WEA04) 05:32		06:46 (WEA03) 05:14		06:07 (WEA08)
17:02		17:59	21	09:04 (WEA02) 18:48	55	08:07 (WEA-1) 06:24		07:46 (WEA04) 05:32	104	20:34 (WEA-3 E-160) 21:55	123	20:32 (WEA-3 E-160)
08:26		07:33		08:44 (WEA09) 06:31		06:22		07:47 (WEA04) 05:31		06:47 (WEA03) 05:14		06:07 (WEA08)
17:04		18:00	18	09:02 (WEA02) 18:50	63	08:07 (WEA-1) 06:22		07:48 (WEA04) 05:31	111	20:34 (WEA-3 E-160) 21:56	123	20:32 (WEA-3 E-160)
08:25		07:31		08:46 (WEA09) 06:29		06:20		07:49 (WEA04) 05:30		06:48 (WEA03) 05:14		06:08 (WEA08)
17:06		18:02	14	09:00 (WEA02) 18:51	70	08:08 (WEA-1) 06:20		07:50 (WEA04) 05:30	117	20:34 (WEA-3 E-160) 21:56	124	20:33 (WEA-3 E-160)
08:23		07:29		08:50 (WEA09) 06:26		06:18		07:51 (WEA04) 05:29		06:49 (WEA03) 05:15		06:08 (WEA08)
17:07		18:04	7	08:57 (WEA09) 18:53	74	08:08 (WEA-1) 06:18		07:52 (WEA04) 05:29	120	20:34 (WEA-3 E-160) 21:56	125	20:33 (WEA-3 E-160)
08:22		07:27		06:24		06:15		07:53 (WEA04) 05:27		06:50 (WEA03) 05:15		06:09 (WEA08)
17:09		18:06		18:55	80	08:08 (WEA-1) 06:15		07:54 (WEA04) 05:27	123	20:34 (WEA-3 E-160) 21:56	124	20:34 (WEA-3 E-160)
08:21		07:25		06:22		06:13		07:55 (WEA04) 05:26		06:51 (WEA03) 05:15		06:08 (WEA08)
17:11		18:08		18:56	83	08:08 (WEA-1) 06:13		07:56 (WEA04) 05:26	123	20:34 (WEA-3 E-160) 21:56	126	20:34 (WEA-3 E-160)
08:19		07:23		06:19		06:11		07:57 (WEA04) 05:25		06:52 (WEA03) 05:15		06:09 (WEA08)
17:13		18:09		18:58	85	08:08 (WEA-1) 06:11		07:58 (WEA04) 05:25	125	20:33 (WEA-3 E-160) 21:56	125	20:35 (WEA-3 E-160)
08:18				07:17		06:10		07:59 (WEA04) 05:24		06:53 (WEA03) 05:16		06:09 (WEA08)
17:14				20:00	87	08:07 (WEA-1) 06:10		08:00 (WEA-1) 06:10	127	20:33 (WEA-3 E-160) 21:56	126	20:35 (WEA-3 E-160)
08:17				07:15		06:08		08:01 (WEA-1) 06:10		06:54 (WEA03) 05:17		06:09 (WEA08)
17:16	9	09:10 (WEA02)		20:02	89	08:07 (WEA-1) 06:08		08:02 (WEA-1) 06:10	127	20:34 (WEA-3 E-160) 21:57	128	20:36 (WEA-3 E-160)
08:15		08:58 (WEA02)		07:12		06:07		08:03 (WEA-1) 06:10		06:55 (WEA03) 05:17		06:09 (WEA08)
17:18	14	09:12 (WEA02)		20:03	91	08:07 (WEA-1) 06:07		08:04 (WEA-1) 06:10	129	20:34 (WEA-3 E-160) 21:57		
Sonnenscheinstunden	260	278	367	416	485	498						
astr.max.mögl.Beschattung	119	748	1009	2114	2854	3784						
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	0,36						
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84						
Reduktion Windrichtung	0,57	0,58	0,65	0,64	0,63	0,64						
Gesamte Reduktion	0,09	0,15	0,16	0,22	0,24	0,19						
Met.wahrsch.Beschattung	11	111	164	463	691	735						

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 17/1 - IP 17/1 Rhader Straße 27

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember								
1	05:18	06:09 (WEA08)	05:54	06:46 (WEA03)	06:43	07:25 (WEA04)	07:32	08:03 (WEA05)	07:26	08:12 (WEA09)	08:16							
2	21:55	127	20:36 (WEA-3 E-160)	21:23	90	20:42 (WEA-3 E-160)	20:22	79	09:28 (WEA-01)	19:13	17	08:20 (WEA05)	17:07	39	08:51 (WEA02)	16:27		
3	05:19	06:10 (WEA08)	06:00	06:44 (WEA03)	06:45	07:24 (WEA04)	07:34	08:03 (WEA05)	07:27	08:13 (WEA09)	08:18							
4	21:55	127	20:36 (WEA-3 E-160)	21:22	89	20:41 (WEA-3 E-160)	20:19	82	09:29 (WEA-01)	19:10	17	08:20 (WEA05)	17:05	38	08:51 (WEA02)	16:26		
5	05:21	06:10 (WEA08)	06:00	06:44 (WEA03)	06:47	07:23 (WEA04)	07:35	08:03 (WEA05)	07:29	08:15 (WEA09)	08:19							
6	21:54	127	20:37 (WEA-3 E-160)	21:20	88	20:40 (WEA-3 E-160)	20:17	83	09:28 (WEA-01)	19:08	15	08:18 (WEA05)	17:03	36	08:51 (WEA02)	16:25		
7	05:20	06:10 (WEA08)	05:59	06:42 (WEA03)	06:48	07:22 (WEA04)	07:37	08:04 (WEA05)	07:31	08:17 (WEA09)	08:20	09:45 (WEA10)						
8	21:54	128	20:37 (WEA-3 E-160)	21:18	83	20:39 (WEA-3 E-160)	20:15	94	18:51 (WEA-1)	19:06	13	08:17 (WEA05)	17:01	33	08:50 (WEA02)	16:25	4	09:49 (WEA10)
9	05:21	06:10 (WEA08)	06:00	06:41 (WEA03)	06:50	07:22 (WEA04)	07:39	08:05 (WEA05)	07:33	08:20 (WEA09)	08:23	09:43 (WEA10)						
10	21:53	129	20:38 (WEA-3 E-160)	21:17	78	20:37 (WEA-3 E-160)	20:13	100	18:54 (WEA-1)	19:03	11	08:16 (WEA05)	17:00	30	08:50 (WEA02)	16:24	8	09:51 (WEA10)
11	05:21	06:11 (WEA08)	06:02	06:41 (WEA03)	06:51	07:22 (WEA04)	07:40	08:09 (WEA05)	07:34	08:24 (WEA09)	08:23	09:42 (WEA10)						
12	21:53	128	20:38 (WEA-3 E-160)	21:15	72	20:36 (WEA-3 E-160)	20:10	103	18:55 (WEA-1)	19:01	3	08:12 (WEA05)	16:58	25	08:49 (WEA02)	16:24	10	09:52 (WEA10)
13	05:22	06:11 (WEA08)	06:03	06:40 (WEA03)	06:53	07:22 (WEA04)	07:42	08:12 (WEA05)	07:36	08:24 (WEA09)	08:24	09:42 (WEA10)						
14	21:52	129	20:39 (WEA-3 E-160)	21:13	64	20:34 (WEA-3 E-160)	20:08	105	18:57 (WEA-1)	18:59	16:56	25	08:49 (WEA02)	16:23	12	09:54 (WEA10)		
15	05:23	06:12 (WEA08)	06:05	06:40 (WEA03)	06:55	07:22 (WEA04)	07:44	08:13 (WEA05)	07:38	08:25 (WEA09)	08:25	09:41 (WEA10)						
16	21:52	129	20:40 (WEA-3 E-160)	21:11	53	20:31 (WEA-3 E-160)	20:06	106	18:57 (WEA-1)	18:57	16:54	23	08:48 (WEA02)	16:23	14	09:55 (WEA10)		
17	05:24	06:12 (WEA08)	06:06	06:40 (WEA03)	06:56	07:24 (WEA04)	07:45	08:14 (WEA05)	07:40	08:27 (WEA09)	08:27	09:41 (WEA10)						
18	21:51	129	20:40 (WEA-3 E-160)	21:09	31	19:29 (WEA-2 E-138)	20:04	103	18:58 (WEA-1)	18:54	16:53	20	08:47 (WEA02)	16:23	15	09:56 (WEA10)		
19	05:25	06:13 (WEA08)	06:08	06:40 (WEA03)	06:58	07:25 (WEA04)	07:47	08:15 (WEA05)	07:42	08:28 (WEA09)	08:28	09:41 (WEA10)						
20	21:50	128	20:41 (WEA-3 E-160)	21:08	34	09:06 (WEA-01)	20:01	100	18:58 (WEA-1)	18:52	16:51	18	08:46 (WEA02)	16:23	15	09:56 (WEA10)		
21	05:26	06:13 (WEA08)	06:10	06:40 (WEA03)	07:00	08:23 (WEA-01)	07:49	08:16 (WEA05)	07:43	08:30 (WEA09)	08:29	09:42 (WEA10)						
22	21:50	128	20:41 (WEA-3 E-160)	21:06	40	09:09 (WEA-01)	19:59	92	18:59 (WEA-1)	18:50	16:50	14	08:44 (WEA02)	16:22	16	09:58 (WEA10)		
23	05:27	06:13 (WEA08)	06:11	06:41 (WEA03)	07:01	08:23 (WEA-01)	07:51	08:17 (WEA05)	07:45	08:33 (WEA09)	08:30	09:42 (WEA10)						
24	21:49	129	20:42 (WEA-3 E-160)	21:04	45	09:13 (WEA-01)	19:57	91	18:58 (WEA-1)	18:48	16:48	9	08:42 (WEA02)	16:22	17	09:59 (WEA10)		
25	05:28	06:14 (WEA08)	06:13	06:41 (WEA03)	07:03	08:24 (WEA-01)	07:52	08:18 (WEA05)	07:47	08:34 (WEA09)	08:31	09:42 (WEA10)						
26	21:48	129	20:42 (WEA-3 E-160)	21:02	47	09:14 (WEA-01)	19:54	91	18:59 (WEA-1)	18:45	16:47	16:22	17	09:59 (WEA10)				
27	05:30	06:14 (WEA08)	06:14	06:43 (WEA03)	07:04	08:25 (WEA-01)	07:54	08:19 (WEA05)	07:49	08:35 (WEA09)	08:32	09:42 (WEA10)						
28	21:47	128	20:43 (WEA-3 E-160)	21:00	48	09:17 (WEA-01)	19:52	89	18:59 (WEA-1)	18:43	16:45	16:22	18	10:00 (WEA10)				
29	05:31	06:15 (WEA08)	06:16	06:45 (WEA03)	07:06	08:25 (WEA-01)	07:56	08:20 (WEA05)	07:50	08:36 (WEA09)	08:33	09:42 (WEA10)						
30	21:46	126	20:43 (WEA-3 E-160)	20:58	46	09:18 (WEA-01)	19:50	87	18:58 (WEA-1)	18:41	16:44	16:22	18	10:00 (WEA10)				
31	05:32	06:16 (WEA08)	06:18	08:37 (WEA-01)	07:08	08:27 (WEA-01)	07:57	08:21 (WEA05)	07:52	08:37 (WEA09)	08:34	09:42 (WEA10)						
32	21:45	124	20:43 (WEA-3 E-160)	20:56	43	09:20 (WEA-01)	19:47	84	18:58 (WEA-1)	18:39	16:42	16:22	19	10:01 (WEA10)				
33	05:33	06:16 (WEA08)	06:19	08:35 (WEA-01)	07:09	08:27 (WEA-01)	07:59	08:22 (WEA05)	07:54	08:34 (WEA09)	08:34	09:43 (WEA10)						
34	21:44	125	20:43 (WEA-3 E-160)	20:54	46	09:21 (WEA-01)	19:45	79	18:56 (WEA-1)	18:37	11	09:19 (WEA09)	07:54	16:23	18	10:01 (WEA10)		
35	05:34	06:17 (WEA08)	06:21	08:34 (WEA-01)	07:11	08:29 (WEA-01)	08:01	08:23 (WEA05)	07:56	08:35 (WEA09)	08:35	09:43 (WEA10)						
36	21:43	121	20:43 (WEA-3 E-160)	20:52	48	09:22 (WEA-01)	19:43	76	18:56 (WEA-1)	18:35	15	09:32 (WEA09)	07:56	16:23	19	10:02 (WEA10)		
37	05:36	06:18 (WEA08)	06:22	08:32 (WEA-01)	07:12	08:31 (WEA-01)	08:03	08:24 (WEA05)	07:57	08:36 (WEA09)	08:36	09:43 (WEA10)						
38	21:42	118	20:43 (WEA-3 E-160)	20:50	51	09:23 (WEA-01)	19:40	70	18:55 (WEA-1)	18:33	19	09:34 (WEA09)	07:57	16:23	19	10:02 (WEA10)		
39	05:37	06:21 (WEA08)	06:24	08:32 (WEA-01)	07:14	08:32 (WEA-01)	08:04	08:25 (WEA05)	07:59	08:37 (WEA09)	08:37	09:44 (WEA10)						
40	21:41	113	20:44 (WEA-3 E-160)	20:48	52	09:24 (WEA-01)	19:38	65	18:54 (WEA-1)	18:30	22	09:36 (WEA09)	07:57	16:24	19	10:03 (WEA10)		
41	05:38	06:24 (WEA08)	06:26	08:30 (WEA-01)	07:16	08:35 (WEA-01)	08:06	08:26 (WEA05)	08:01	08:38 (WEA09)	08:37	09:45 (WEA10)						
42	21:39	107	20:44 (WEA-3 E-160)	20:46	55	09:25 (WEA-01)	19:36	57	18:53 (WEA-1)	18:28	24	09:36 (WEA09)	08:01	16:24	19	10:04 (WEA10)		
43	05:40	18:50 (WEA-2 E-138)	06:27	08:29 (WEA-01)	07:17	08:37 (WEA-01)	08:08	08:28 (WEA05)	08:02	09:11 (WEA09)	08:02	08:38	09:45 (WEA10)					
44	21:38	103	20:44 (WEA-3 E-160)	20:44	57	09:26 (WEA-01)	19:33	47	18:50 (WEA-1)	18:26	31	09:42 (WEA02)	08:04	16:24	19	10:04 (WEA10)		
45	05:41	18:50 (WEA-2 E-138)	06:29	08:29 (WEA-01)	07:19	08:44 (WEA-01)	08:10	08:29 (WEA05)	08:04	09:10 (WEA09)	08:04	08:38	09:45 (WEA10)					
46	21:37	102	20:44 (WEA-3 E-160)	20:41	58	09:27 (WEA-01)	19:31	31	18:49 (WEA-1)	18:24	35	09:45 (WEA02)	08:06	16:25	19	10:04 (WEA10)		
47	05:42	18:51 (WEA-2 E-138)	06:30	08:28 (WEA-01)	07:21	08:45 (WEA-01)	08:11	08:30 (WEA05)	08:06	09:11 (WEA09)	08:06	08:39	09:46 (WEA10)					
48	21:35	101	20:45 (WEA-3 E-160)	20:39	59	09:27 (WEA-01)	19:29	16	18:46 (WEA-1)	18:22	37	09:47 (WEA02)	08:07	16:26	19	10:05 (WEA10)		
49	05:44	18:51 (WEA-2 E-138)	06:32	08:27 (WEA-01)	07:22	08:11 (WEA05)	07:13	08:10 (WEA05)	08:07	09:12 (WEA09)	08:07	08:39	09:46 (WEA10)					
50	21:34	100	20:44 (WEA-3 E-160)	20:37	61	09:28 (WEA-01)	19:26	13	18:41 (WEA-1)	17:20	38	08:48 (WEA02)	08:08	16:26	19	10:05 (WEA10)		
51	05:45	18:52 (WEA-2 E-138)	06:34	08:26 (WEA-01)	07:24	08:08 (WEA05)	07:15	08:10 (WEA05)	08:09	09:14 (WEA09)	08:09	08:39	09:47 (WEA10)					
52	21:33	98	20:44 (WEA-3 E-160)	20:35	62	09:28 (WEA-01)	19:24	11	18:19 (WEA05)	17:18	39	08:49 (WEA02)	08:13	16:27	18	10:05 (WEA10)		
53	05:47	18:53 (WEA-2 E-138)	06:35	08:26 (WEA-01)	07:25	08:05 (WEA05)	07:17	08:10 (WEA05)	08:10	09:15 (WEA09)	08:10	08:40	09:48 (WEA10)					
54	21:31	96	20:44 (WEA-3 E-160)	20:33	63	09:29 (WEA-01)	19:22	15	18:20 (WEA05)	17:16	40	08:50 (WEA02)	08:10	16:28	19	10:07 (WEA10)		
55	05:48	18:53 (WEA-2 E-138)	06:37	08:25 (WEA-01)	07:27	08:04 (WEA05)	07:18	08:10 (WEA05)	08:12	09:16 (WEA09)	08:12	08:40	09:49 (WEA10)					
56	21:30	95	20:44 (WEA-3 E-160)	20:31	63	09:28 (WEA-01)	19:19	16	18:20 (WEA05)	17:14	41	08:51 (WEA02)	08:12	16:28	18	10:07 (WEA10)		
57	05:49	18:54 (WEA-2 E-138)	06:39	08:25 (WEA-01)	07:29	08:04 (WEA05)	07:20	08:10 (WEA05)	08:13	09:18 (WEA09)	08:13	08:40	09:49 (WEA10)					
58	21:28	92	20:43 (WEA-3 E-160)	20:28	64	09:29 (WEA-01)	19:17	17	18:21 (WEA05)	17:12	40	08:50 (WEA02)	08:13	16:29	18	10:07 (WEA10)		
59	05:51	18:56 (WEA-2 E-138)	06:40	07:30 (WEA04)	07:30	08:03 (WEA05)	07:22	08:10 (WEA05)	08:15	09:20 (WEA09)	08:15	08:40	09:50 (WEA10)					
60	21:27	88	20:43 (WEA-3 E-160)	20:26	70	09:28 (WEA-01)	19:15	17	18:20 (WEA05)	17:10	40	08:50 (WEA02)	08:16	16:30	17	10:07 (WEA10)		
61	05:52	18:56 (WEA-2 E-138)	06:42	07:27 (WEA04)	07:30	08:04 (WEA05)	07:24	08:11 (WEA05)	08:16	09:21 (WEA09)	08:16	08:40	09:51 (WEA10)					
62	21:25	86	20:42 (WEA-3 E-160)	20:24	76	09:29 (WEA-01)	19:04	17	17:09	16:40	40	08:51 (WEA02)	08:17	16:31	17	10:08 (WEA10)		
63	Sonnenscheinstunden	501	453	381	2019	332	548	267	310	460								
64	astr.max.mögl.Beschattung	3590	1836	2019	548	267	310	460	460	32								
65	Red.Sonnenscheinwahrsch.	0,41	0,43	0,36	0,32	0,32	0,32	0,23	0,15	0,15								
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84								
67	Reduktion Windrichtung	0,63																

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 17/2 - IP 17/2 Rhader Straße 27a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni		
1	08:40	09:48 (WEA10)	08:14		07:20		07:10	08:29 (WEA-01)	06:06	08:09 (WEA-01)	05:21	06:03 (WEA08)
	16:32	19 10:07 (WEA10)	17:20		18:11		20:05	74 19:15 (WEA-1)	20:56	61 09:10 (WEA-01)	21:41	108 20:40 (WEA-3 E-160)
2	08:40	09:49 (WEA10)	08:12		07:18		07:08	08:26 (WEA-01)	06:04	06:31 (WEA03)	05:20	06:01 (WEA08)
	16:33	19 10:08 (WEA10)	17:22		18:13		20:07	78 19:14 (WEA-1)	20:57	63 09:09 (WEA-01)	21:42	110 20:39 (WEA-3 E-160)
3	08:40	09:50 (WEA10)	08:10		07:16		07:06	08:24 (WEA-01)	06:02	06:27 (WEA03)	05:19	06:01 (WEA08)
	16:35	18 10:08 (WEA10)	17:24		18:15		20:08	82 19:14 (WEA-1)	20:59	67 09:07 (WEA-01)	21:43	113 20:40 (WEA-3 E-160)
4	08:40	09:50 (WEA10)	08:09	08:54 (WEA02)	07:14		07:03	08:23 (WEA-01)	06:00	06:26 (WEA03)	05:18	06:00 (WEA08)
	16:36	18 10:08 (WEA10)	17:25	11 09:05 (WEA02)	18:17		20:10	84 19:14 (WEA-1)	21:01	69 09:07 (WEA-01)	21:44	114 20:40 (WEA-3 E-160)
5	08:39	09:51 (WEA10)	08:07	08:52 (WEA02)	07:12		07:01	08:21 (WEA-01)	05:58	06:25 (WEA03)	05:18	06:01 (WEA08)
	16:37	17 10:06 (WEA10)	17:27	16 09:06 (WEA02)	18:18		20:12	85 19:13 (WEA-1)	21:02	70 09:06 (WEA-01)	21:45	116 20:40 (WEA-3 E-160)
6	08:39	09:53 (WEA10)	08:05	08:50 (WEA02)	07:09		06:59	07:23 (WEA04)	05:56	06:24 (WEA03)	05:17	06:00 (WEA08)
	16:38	15 10:08 (WEA10)	17:29	20 09:10 (WEA02)	18:20		20:13	95 19:11 (WEA-1)	21:04	68 09:04 (WEA-01)	21:46	116 20:40 (WEA-3 E-160)
7	08:39	09:53 (WEA10)	08:04	08:49 (WEA02)	07:07		06:56	07:21 (WEA04)	05:55	06:23 (WEA03)	05:16	06:00 (WEA08)
	16:39	15 10:08 (WEA10)	17:31	22 09:11 (WEA02)	18:22		20:15	98 19:10 (WEA-1)	21:05	68 09:03 (WEA-01)	21:47	117 20:40 (WEA-3 E-160)
8	08:38	09:54 (WEA10)	08:02	08:48 (WEA02)	07:05		06:54	07:19 (WEA04)	05:53	06:23 (WEA03)	05:16	05:59 (WEA08)
	16:41	13 10:07 (WEA10)	17:33	24 09:12 (WEA02)	18:24		20:17	102 19:09 (WEA-1)	21:07	78 20:28 (WEA-3 E-160)	21:48	117 20:39 (WEA-3 E-160)
9	08:38	09:56 (WEA10)	08:00	08:45 (WEA09)	07:03		06:52	07:19 (WEA04)	05:51	06:22 (WEA03)	05:15	06:00 (WEA08)
	16:42	11 10:07 (WEA10)	17:35	28 09:13 (WEA02)	18:25		20:19	101 19:08 (WEA-1)	21:09	82 20:30 (WEA-3 E-160)	21:49	119 20:40 (WEA-3 E-160)
10	08:37	09:57 (WEA10)	07:58	08:42 (WEA09)	07:01		06:50	07:17 (WEA04)	05:49	06:23 (WEA03)	05:15	05:59 (WEA08)
	16:43	9 10:06 (WEA10)	17:37	32 09:14 (WEA02)	18:27	07:24 (WEA05)	06:47	102 19:05 (WEA-1)	21:10	81 20:32 (WEA-3 E-160)	21:50	119 20:39 (WEA-3 E-160)
11	08:37	09:59 (WEA10)	07:57	08:41 (WEA09)	06:58		06:47	07:17 (WEA04)	05:48	06:22 (WEA03)	05:15	05:59 (WEA08)
	16:45	5 10:04 (WEA10)	17:38	34 09:15 (WEA02)	18:29	5 07:29 (WEA05)	20:22	98 19:03 (WEA-1)	21:12	81 20:33 (WEA-3 E-160)	21:50	118 20:39 (WEA-3 E-160)
12	08:36		07:55	08:39 (WEA09)	06:56		06:45	07:17 (WEA04)	05:46	06:23 (WEA03)	05:14	05:59 (WEA08)
	16:46		17:40	37 09:16 (WEA02)	18:31	11 07:32 (WEA05)	20:24	90 18:59 (WEA-1)	21:13	81 20:35 (WEA-3 E-160)	21:51	121 20:40 (WEA-3 E-160)
13	08:35		07:53	08:38 (WEA09)	06:54		06:43	07:19 (WEA05)	05:44	06:23 (WEA03)	05:14	06:00 (WEA08)
	16:48		17:42	38 09:16 (WEA02)	18:32	15 07:34 (WEA05)	20:25	84 09:19 (WEA-01)	21:15	97 20:35 (WEA-3 E-160)	21:52	119 20:40 (WEA-3 E-160)
14	08:35		07:51	08:37 (WEA09)	06:51		06:41	07:17 (WEA05)	05:43	06:24 (WEA03)	05:14	06:00 (WEA08)
	16:49		17:44	39 09:16 (WEA02)	18:34	17 07:34 (WEA05)	20:27	85 09:19 (WEA-01)	21:17	100 20:36 (WEA-3 E-160)	21:52	119 20:40 (WEA-3 E-160)
15	08:34		07:49	08:37 (WEA09)	06:49		06:39	07:18 (WEA05)	05:41	06:24 (WEA03)	05:14	06:00 (WEA08)
	16:51		17:46	39 09:16 (WEA02)	18:36	17 07:34 (WEA05)	20:29	83 09:19 (WEA-01)	21:18	103 20:37 (WEA-3 E-160)	21:53	119 20:40 (WEA-3 E-160)
16	08:33		07:47	08:36 (WEA09)	06:47		06:36	07:18 (WEA05)	05:40	06:25 (WEA03)	05:13	05:59 (WEA08)
	16:52		17:48	40 09:16 (WEA02)	18:38	18 07:35 (WEA05)	20:30	80 09:18 (WEA-01)	21:20	100 20:37 (WEA-3 E-160)	21:53	121 20:39 (WEA-3 E-160)
17	08:32		07:45	08:36 (WEA09)	06:45		06:34	07:20 (WEA04)	05:38	06:27 (WEA03)	05:13	05:59 (WEA08)
	16:54		17:49	40 09:16 (WEA02)	18:39	18 07:34 (WEA05)	20:32	77 09:18 (WEA-01)	21:21	96 20:38 (WEA-3 E-160)	21:54	120 20:39 (WEA-3 E-160)
18	08:31		07:43	08:35 (WEA09)	06:42		06:32	08:09 (WEA-01)	05:37	06:28 (WEA03)	05:13	06:00 (WEA08)
	16:56		17:51	40 09:15 (WEA02)	18:41	17 07:33 (WEA05)	20:34	69 09:18 (WEA-01)	21:23	88 20:38 (WEA-2 E-160)	21:54	120 20:40 (WEA-3 E-160)
19	08:30		07:41	08:35 (WEA09)	06:40		06:30	08:09 (WEA-01)	05:35	19:09 (WEA-2 E-138)	05:13	06:01 (WEA08)
	16:57		17:53	39 09:14 (WEA02)	18:43	16 07:33 (WEA05)	20:35	68 09:17 (WEA-01)	21:24	77 20:39 (WEA-3 E-160)	21:55	120 20:41 (WEA-3 E-160)
20	08:29		07:39	08:35 (WEA09)	06:38		06:28	08:08 (WEA-01)	05:34	19:08 (WEA-2 E-138)	05:13	06:01 (WEA08)
	16:59		17:55	38 09:13 (WEA02)	18:45	14 07:31 (WEA05)	20:37	69 09:17 (WEA-01)	21:26	80 20:39 (WEA-3 E-160)	21:55	120 20:41 (WEA-3 E-160)
21	08:28		07:37	08:35 (WEA09)	06:35		06:26	08:08 (WEA-01)	05:33	19:07 (WEA-2 E-138)	05:14	06:01 (WEA08)
	17:00		17:57	37 09:12 (WEA02)	18:46	11 07:29 (WEA05)	20:39	69 09:17 (WEA-01)	21:27	83 20:40 (WEA-3 E-160)	21:55	120 20:41 (WEA-3 E-160)
22	08:27		07:35	08:35 (WEA09)	06:33		06:24	08:08 (WEA-01)	05:31	19:05 (WEA-2 E-138)	05:14	06:01 (WEA08)
	17:02		17:59	36 09:11 (WEA02)	18:48	11 18:05 (WEA-1)	20:40	68 09:16 (WEA-01)	21:28	85 20:39 (WEA-3 E-160)	21:55	120 20:41 (WEA-3 E-160)
23	08:26		07:33	08:36 (WEA09)	06:31		06:22	08:08 (WEA-01)	05:30	19:04 (WEA-2 E-138)	05:14	06:01 (WEA08)
	17:04		18:00	34 09:10 (WEA02)	18:50	16 18:09 (WEA-1)	20:42	68 09:16 (WEA-01)	21:30	87 20:39 (WEA-3 E-160)	21:56	120 20:41 (WEA-3 E-160)
24	08:25		07:31	08:37 (WEA09)	06:29		06:20	08:08 (WEA-01)	05:29	19:04 (WEA-2 E-138)	05:14	06:01 (WEA08)
	17:06		18:02	30 09:07 (WEA02)	18:51	21 18:11 (WEA-1)	20:44	67 09:15 (WEA-01)	21:31	88 20:39 (WEA-3 E-160)	21:56	121 20:42 (WEA-3 E-160)
25	08:23		07:29	08:38 (WEA09)	06:26		06:18	08:08 (WEA-01)	05:28	19:03 (WEA-2 E-138)	05:15	06:01 (WEA08)
	17:07		18:04	26 09:04 (WEA02)	18:53	25 18:13 (WEA-1)	20:46	66 09:14 (WEA-01)	21:32	90 20:39 (WEA-3 E-160)	21:56	120 20:41 (WEA-3 E-160)
26	08:22		07:27	08:38 (WEA09)	06:24		06:15	08:08 (WEA-01)	05:27	19:03 (WEA-2 E-138)	05:15	06:02 (WEA08)
	17:09		18:06	20 08:58 (WEA09)	18:55	27 18:13 (WEA-1)	20:47	66 09:14 (WEA-01)	21:34	92 20:40 (WEA-3 E-160)	21:56	120 20:42 (WEA-3 E-160)
27	08:21		07:25	08:40 (WEA09)	06:22		06:13	08:08 (WEA-01)	05:25	19:02 (WEA-2 E-138)	05:15	06:02 (WEA08)
	17:11		18:08	16 08:56 (WEA09)	18:56	29 18:14 (WEA-1)	20:49	65 09:13 (WEA-01)	21:35	94 20:40 (WEA-3 E-160)	21:56	119 20:42 (WEA-3 E-160)
28	08:19		07:23	08:44 (WEA09)	06:19		06:11	08:08 (WEA-01)	05:24	19:01 (WEA-2 E-138)	05:16	06:03 (WEA08)
	17:13		18:09	8 08:52 (WEA09)	18:58	40 18:15 (WEA-1)	20:51	64 09:12 (WEA-01)	21:36	94 20:40 (WEA-3 E-160)	21:56	119 20:43 (WEA-3 E-160)
29	08:18				07:17		06:10	08:09 (WEA-01)	05:23	19:01 (WEA-2 E-138)	05:16	06:03 (WEA08)
	17:14				20:00	54 19:14 (WEA-1)	20:52	63 09:12 (WEA-01)	21:38	94 20:39 (WEA-3 E-160)	21:55	121 20:43 (WEA-3 E-160)
30	08:17				07:15		06:08	08:09 (WEA-01)	05:22	06:07 (WEA08)	05:17	06:04 (WEA08)
	17:16				20:02	64 19:15 (WEA-1)	20:54	62 09:11 (WEA-01)	21:39	99 20:40 (WEA-3 E-160)	21:55	119 20:44 (WEA-3 E-160)
31	08:15				07:12		06:08	08:31 (WEA-01)	05:22	06:04 (WEA08)	05:17	
	17:18				20:03	70 19:15 (WEA-1)			21:40	105 20:40 (WEA-3 E-160)		
Sonnenscheinstunden		260	278	367	416	485	498					
astr. max. mögl. Beschattung		159	744	516	2362	2621	3545					
Red. Sonnenscheinwahrsch.		0,20	0,30	0,30	0,41	0,46	0,36					
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84	0,84					
Reduktion Windrichtung		0,57	0,59	0,66	0,66	0,64	0,64					
Gesamte Reduktion		0,09	0,15	0,17	0,22	0,24	0,19					
Met. wahrsch. Beschattung		15	112	86	531	640	685					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 17/2 - IP 17/2 Rhader Straße 27a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1	05:18	06:03 (WEA08) 05:54	06:33 (WEA03) 06:43	07:16 (WEA04) 07:32	07:59 (WEA05) 07:26	08:12 (WEA09) 08:16	
2	21:55	119 20:43 (WEA-3 E-160) 21:23	81 20:45 (WEA-3 E-160) 20:22	98 19:02 (WEA-1) 19:13	13 08:12 (WEA05) 17:07	31 08:43 (WEA02) 16:27	
3	05:19	06:05 (WEA08) 05:57	06:32 (WEA03) 06:45	07:16 (WEA04) 07:34	08:01 (WEA05) 07:27	08:15 (WEA09) 08:18	
4	21:54	118 20:45 (WEA-3 E-160) 21:20	82 20:43 (WEA-3 E-160) 20:19	102 19:04 (WEA-1) 19:10	9 08:10 (WEA05) 17:05	28 08:43 (WEA02) 16:26	
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14	21:52	115 20:47 (WEA-3 E-160) 21:11	68 09:15 (WEA-01) 20:06	83 19:08 (WEA-1) 18:57	16:54	16:23	
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17	05:25	06:09 (WEA08) 06:08	06:37 (WEA03) 06:58	08:19 (WEA-01) 07:47	07:42	08:28	
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27	05:31	19:11 (WEA-2 E-138) 06:16	08:15 (WEA-01) 07:06	08:33 (WEA-01) 07:56	09:12 (WEA09) 07:50	16:22	
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30	21:45	93 20:49 (WEA-3 E-160) 20:56	66 09:21 (WEA-01) 19:47	30 19:04 (WEA-1) 18:39	20 09:30 (WEA09) 16:42	16:22	
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32	21:44	92 20:49 (WEA-3 E-160) 20:54	66 09:20 (WEA-01) 19:45	28 19:02 (WEA-1) 18:37	28 09:37 (WEA09) 16:41	16:23	
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35	05:36	19:13 (WEA-2 E-138) 06:22	08:13 (WEA-01) 07:12	18:37 (WEA-1) 08:03	09:07 (WEA09) 07:57	16:23	
36	21:42	89 20:49 (WEA-3 E-160) 20:50	68 09:21 (WEA-01) 19:40	22 18:59 (WEA-1) 18:33	35 09:42 (WEA09) 16:38	16:23	
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43	05:41	19:17 (WEA-2 E-138) 06:29	08:13 (WEA-01) 07:19	08:02 (WEA05) 08:10	09:05 (WEA09) 08:04	16:24	
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45	05:42	19:19 (WEA-2 E-138) 06:30	08:12 (WEA-01) 07:21	08:00 (WEA05) 08:11	09:05 (WEA09) 08:06	16:25	
46	21:35	78 20:49 (WEA-3 E-160) 20:39	69 09:21 (WEA-01) 19:29	16 08:16 (WEA05) 18:22	40 09:45 (WEA02) 16:33	16:26	
47	05:44	06:40 (WEA03) 06:32	08:13 (WEA-01) 07:22	07:59 (WEA05) 07:13	08:05 (WEA09) 08:07	16:26	
48	21:34	80 20:49 (WEA-3 E-160) 20:37	68 09:21 (WEA-01) 19:26	17 08:16 (WEA05) 17:20	41 08:46 (WEA02) 16:32	16:26	
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51	05:47	06:37 (WEA03) 06:35	07:21 (WEA04) 07:25	18 07:57 (WEA05) 07:17	08:06 (WEA09) 08:10	16:27	
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54	21:30	103 20:48 (WEA-3 E-160) 20:31	83 09:20 (WEA-01) 19:19	18 08:15 (WEA05) 17:14	39 08:46 (WEA02) 16:29	16:28	
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56	21:28	102 20:47 (WEA-3 E-160) 20:28	85 09:20 (WEA-01) 19:17	17 08:15 (WEA05) 17:12	38 08:45 (WEA02) 16:28	16:29	
57	05:51	06:34 (WEA03) 06:40	07:17 (WEA04) 07:30	17 07:58 (WEA05) 07:22	08:08 (WEA09) 08:15	16:30	
58	21:27	100 20:47 (WEA-3 E-160) 20:26	84 09:19 (WEA-01) 19:15	15 08:13 (WEA05) 17:10	36 08:44 (WEA02) 16:27	16:30	
59	05:52	06:33 (WEA03) 06:42	07:17 (WEA04) 07:30	15 08:13 (WEA05) 17:10	36 08:44 (WEA02) 16:27	16:30	
60	21:25	93 20:45 (WEA-3 E-160) 20:24	91 18:59 (WEA-1) 18:59	34 17:09	34 08:44 (WEA02)	16:31	
61	Sonnenscheinstunden	501	453	381	332	267	244
62	astr.max.mögl.Beschattung	3130	2231	1510	627	151	570
63	Red.Sonnenscheinwahrsch.	0,41	0,43	0,36	0,32	0,23	0,15
64	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84
65	Reduktion Windrichtung	0,63	0,65	0,67	0,59	0,59	0,57
66	Gesamte Reduktion	0,22	0,23	0,20	0,16	0,11	0,07
67	Met.wahrsch.Beschattung	684	522	303	99	17	40

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

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



Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 18 - IP 18 Grenzweg 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	09:20 (WEA05) 08:14	08:47 (WEA04) 07:20	16:22 (WEA-2 E-138) 07:10	18:53 (WEA-3 E-160) 06:06	19:46 (WEA-4 E-160) 05:21	
2	16:32	71 12:11 (WEA-01) 17:20	10 08:57 (WEA04) 18:11	33 16:55 (WEA-2 E-138) 20:05	21 19:14 (WEA-3 E-160) 20:56	13 19:59 (WEA-4 E-160) 21:41	
3	08:40	09:20 (WEA05) 08:12	08:45 (WEA04) 07:18	16:23 (WEA-2 E-138) 07:08	08:06 (WEA08) 06:04	19:48 (WEA-4 E-160) 05:20	
4	16:33	71 12:11 (WEA-01) 17:22	14 08:59 (WEA04) 18:13	31 16:54 (WEA-2 E-138) 20:07	28 19:11 (WEA-3 E-160) 20:57	8 19:56 (WEA-4 E-160) 21:42	
5	08:40	09:21 (WEA05) 08:10	08:44 (WEA04) 07:16	07:52 (WEA03) 07:06	08:02 (WEA08) 06:02	20:59	
6	16:34	72 12:12 (WEA-01) 17:24	16 09:00 (WEA04) 18:15	39 16:52 (WEA-2 E-138) 20:08	31 19:09 (WEA-3 E-160) 20:59	21:43	
7	08:40	09:21 (WEA05) 08:09	08:43 (WEA04) 07:14	07:49 (WEA03) 07:03	07:59 (WEA08) 06:00	20:58	
8	16:36	72 12:12 (WEA-01) 17:25	18 09:01 (WEA04) 18:17	42 16:51 (WEA-2 E-138) 20:10	29 19:05 (WEA-3 E-160) 21:01	21:44	
9	08:39	09:21 (WEA05) 08:07	08:43 (WEA04) 07:12	07:47 (WEA03) 07:01	07:57 (WEA08) 05:58	20:58	
10	16:37	73 12:13 (WEA-01) 17:27	20 09:03 (WEA04) 18:18	41 16:49 (WEA-2 E-138) 20:12	27 08:24 (WEA08) 21:02	21:45	
11	08:39	09:22 (WEA05) 08:05	08:42 (WEA04) 07:09	07:46 (WEA03) 06:59	07:54 (WEA08) 05:56	20:57	
12	16:38	72 12:13 (WEA-01) 17:29	21 09:03 (WEA04) 18:20	39 16:47 (WEA-2 E-138) 20:13	31 08:25 (WEA08) 21:04	21:46	
13	08:39	09:22 (WEA05) 08:04	08:42 (WEA04) 07:07	07:44 (WEA03) 06:56	07:53 (WEA08) 05:54	20:56	
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15	08:38	09:22 (WEA05) 08:02	08:41 (WEA04) 07:05	07:43 (WEA03) 06:54	07:52 (WEA08) 05:53	20:56	
16	16:41	72 12:13 (WEA-01) 17:33	23 09:04 (WEA04) 18:24	25 08:08 (WEA03) 20:17	35 08:27 (WEA08) 21:07	21:48	
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18	16:42	72 12:14 (WEA-01) 17:35	23 09:04 (WEA04) 18:25	26 08:09 (WEA03) 20:19	36 08:27 (WEA08) 21:09	21:49	
19	08:37	09:24 (WEA05) 07:58	08:41 (WEA04) 07:01	07:42 (WEA03) 06:50	07:49 (WEA08) 05:49	20:55	
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22	16:45	70 12:14 (WEA-01) 17:38	37 16:47 (WEA-2 E-138) 18:29	26 08:08 (WEA03) 20:22	38 08:27 (WEA08) 21:12	21:50	
23	08:36	09:24 (WEA05) 07:55	08:43 (WEA04) 06:56	07:42 (WEA03) 06:45	07:48 (WEA08) 05:46	20:54	
24	16:46	70 12:14 (WEA-01) 17:40	52 17:08 (WEA-1) 18:31	26 08:08 (WEA03) 20:24	40 08:28 (WEA08) 21:13	21:51	
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27	08:35	09:27 (WEA05) 07:51	08:44 (WEA04) 06:51	07:42 (WEA03) 06:41	07:47 (WEA08) 05:43	20:54	
28	16:49	66 12:15 (WEA-01) 17:44	62 17:11 (WEA-1) 18:34	24 08:06 (WEA03) 20:27	41 08:28 (WEA08) 21:17	21:52	
29	08:34	09:27 (WEA05) 07:49	08:45 (WEA04) 06:49	07:42 (WEA03) 06:39	07:47 (WEA08) 05:41	20:54	
30	16:51	65 12:15 (WEA-01) 17:46	64 17:13 (WEA-1) 18:36	22 08:05 (WEA03) 20:29	51 20:01 (WEA-4 E-160) 21:18	21:53	
31	08:33	09:28 (WEA05) 07:47	08:47 (WEA04) 06:47	07:44 (WEA03) 06:36	07:46 (WEA08) 05:40	20:53	
32	16:52	63 12:15 (WEA-01) 17:48	61 17:13 (WEA-1) 18:38	20 08:04 (WEA03) 20:30	55 20:02 (WEA-4 E-160) 21:20	21:53	
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35	08:31	09:31 (WEA05) 07:43	16:21 (WEA-2 E-138) 06:42	07:47 (WEA03) 06:32	07:46 (WEA08) 05:37	20:53	
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37	08:30	09:32 (WEA05) 07:41	16:21 (WEA-2 E-138) 06:40	07:52 (WEA03) 06:30	07:46 (WEA08) 05:35	20:53	
38	16:57	53 12:14 (WEA-01) 17:53	52 17:13 (WEA-1) 18:43	15 18:14 (WEA-3 E-160) 20:35	61 20:05 (WEA-4 E-160) 21:24	21:55	
39	08:29	11:30 (WEA-01) 07:39	16:21 (WEA-2 E-138) 06:38	17:57 (WEA-3 E-160) 06:28	07:46 (WEA08) 05:34	20:53	
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47	08:25	11:35 (WEA-01) 07:31	16:20 (WEA-2 E-138) 06:28	17:52 (WEA-3 E-160) 06:20	58 07:48 (WEA08) 05:29	20:54	
48	17:06	36 12:11 (WEA-01) 18:02	51 17:11 (WEA-1) 18:51	26 18:18 (WEA-3 E-160) 20:44	57 20:06 (WEA-4 E-160) 21:31	21:56	
49	08:23	11:35 (WEA-01) 07:29	16:21 (WEA-2 E-138) 06:26	17:52 (WEA-3 E-160) 06:17	57 07:49 (WEA08) 05:28	20:55	
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53	08:21	11:40 (WEA-01) 07:25	16:20 (WEA-2 E-138) 06:22	17:51 (WEA-3 E-160) 06:13	07:52 (WEA08) 05:25	20:55	
54	17:11	28 12:08 (WEA-01) 18:08	36 16:56 (WEA-2 E-138) 18:56	27 18:18 (WEA-3 E-160) 20:49	46 20:04 (WEA-4 E-160) 21:35	21:56	
55	08:19	11:42 (WEA-01) 07:23	16:21 (WEA-2 E-138) 06:19	17:51 (WEA-3 E-160) 06:11	39 07:54 (WEA08) 05:24	20:56	
56	17:13	23 12:05 (WEA-01) 18:09	35 16:56 (WEA-2 E-138) 18:58	27 18:18 (WEA-3 E-160) 20:51	39 20:03 (WEA-4 E-160) 21:36	21:56	
57	08:18	11:44 (WEA-01)	07:17	18:50 (WEA-3 E-160) 06:09	07:57 (WEA08) 05:23	20:56	
58	17:14	18 12:02 (WEA-01)	20:00	19:16 (WEA-3 E-160) 20:52	33 20:03 (WEA-4 E-160) 21:38	21:56	
59	08:17	11:50 (WEA-01)	07:15	18:51 (WEA-3 E-160) 06:08	19:44 (WEA-4 E-160) 05:22	20:57	
60	17:16	8 11:58 (WEA-01)	20:02	19:16 (WEA-3 E-160) 20:54	17 20:01 (WEA-4 E-160) 21:39	21:55	
61	08:15		07:12	18:52 (WEA-3 E-160)		05:21	
62	17:18		20:03	19:15 (WEA-3 E-160)		21:40	
63	Sonnenscheinstunden	259	278	367	416	485	498
64	astr.max.mögl.Beschattung	1632	1116	824	1290	21	0,46
65	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	0,46
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84
67	Reduktion Windrichtung	0,57	0,68	0,67	0,66	0,62	0,62
68	Gesamte Reduktion	0,09	0,17	0,16	0,22	0,24	0,24
69	Met.wahrsch.Beschattung	150	191	134	286	5	5

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 18 - IP 18 Grenzweg 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember				
1	05:18	05:54	06:43	07:47 (WEA08)	07:32	08:21 (WEA03)	07:26	08:11 (WEA04)	08:16	09:06 (WEA05)
	21:55	21:23	20:22	19:13	18:26 (WEA08)	17:07	17:07	16:27	15:27	14:56 (WEA-01)
2	05:18	05:55	06:45	07:48 (WEA08)	07:34	08:21 (WEA03)	07:27	08:11 (WEA04)	08:18	09:07 (WEA05)
	21:55	21:22	20:19	19:10	18:26 (WEA08)	17:05	17:05	16:26	15:26	14:57 (WEA-01)
3	05:19	05:57	06:47	07:48 (WEA08)	07:35	08:20 (WEA03)	07:29	08:11 (WEA04)	08:19	09:06 (WEA05)
	21:54	21:20	20:17	19:08	18:24 (WEA08)	17:03	17:03	16:25	15:25	14:57 (WEA-01)
4	05:20	05:59	06:48	07:49 (WEA08)	07:37	08:20 (WEA03)	07:31	08:11 (WEA04)	08:20	09:07 (WEA05)
	21:54	21:18	20:15	19:06	18:24 (WEA08)	17:01	17:01	16:25	15:25	14:58 (WEA-01)
5	05:21	06:00	06:50	07:50 (WEA08)	07:39	08:20 (WEA03)	07:33	08:12 (WEA04)	08:22	09:07 (WEA05)
	21:53	21:17	20:13	19:03	18:23 (WEA08)	17:00	17:00	16:24	15:24	14:58 (WEA-01)
6	05:21	06:02	06:51	07:50 (WEA08)	07:40	08:21 (WEA03)	07:34	08:13 (WEA04)	08:23	09:07 (WEA05)
	21:53	21:15	20:10	19:01	18:21 (WEA08)	16:58	16:58	16:24	15:24	14:59 (WEA-01)
7	05:22	06:03	06:53	07:52 (WEA08)	07:42	08:20 (WEA03)	07:36	08:13 (WEA04)	08:24	09:09 (WEA05)
	21:52	21:13	20:08	18:59	18:19 (WEA08)	16:56	16:56	16:23	15:23	14:59 (WEA-01)
8	05:23	06:05	06:55	07:53 (WEA08)	07:44	08:22 (WEA03)	07:38	08:15 (WEA04)	08:25	09:09 (WEA05)
	21:52	21:11	20:06	18:59 (WEA-3 E-160)	18:57	17:23 (WEA-2 E-138)	16:54	16:23	15:23	14:59 (WEA-01)
9	05:24	06:06	06:56	07:55 (WEA08)	07:45	08:23 (WEA03)	07:40	08:16 (WEA04)	08:27	09:09 (WEA05)
	21:51	21:09	20:04	19:03 (WEA-3 E-160)	18:54	17:25 (WEA-2 E-138)	16:53	16:23	15:23	14:59 (WEA-01)
10	05:25	06:08	06:58	07:58 (WEA08)	07:47	08:25 (WEA03)	07:42	08:18 (WEA04)	08:28	09:09 (WEA05)
	21:50	21:08	20:01	19:04 (WEA-3 E-160)	18:52	17:27 (WEA-2 E-138)	16:51	16:23	15:23	14:59 (WEA-01)
11	05:26	06:10	19:56 (WEA-4 E-160)	07:00	18:45 (WEA-3 E-160)	07:49	08:28 (WEA03)	07:43	08:29	09:11 (WEA05)
	21:50	21:06	20:06 (WEA-4 E-160)	19:59	19:06 (WEA-3 E-160)	18:50	17:27 (WEA-2 E-138)	16:50	16:22	15:23
12	05:27	06:11	19:54 (WEA-4 E-160)	07:01	18:43 (WEA-3 E-160)	07:51	16:56 (WEA-2 E-138)	07:45	11:22 (WEA-01)	08:30
	21:49	21:04	20:08 (WEA-4 E-160)	19:57	19:06 (WEA-3 E-160)	18:48	17:28 (WEA-2 E-138)	16:48	11:30 (WEA-01)	16:22
13	05:28	06:13	08:09 (WEA08)	07:03	18:42 (WEA-3 E-160)	07:52	16:55 (WEA-2 E-138)	07:47	11:16 (WEA-01)	08:31
	21:48	21:02	20:09 (WEA-4 E-160)	19:54	19:07 (WEA-3 E-160)	18:45	17:29 (WEA-2 E-138)	16:47	11:34 (WEA-01)	16:22
14	05:29	06:14	08:04 (WEA08)	07:04	18:42 (WEA-3 E-160)	07:54	16:54 (WEA-2 E-138)	07:49	11:14 (WEA-01)	08:32
	21:47	21:00	20:10 (WEA-4 E-160)	19:52	19:08 (WEA-3 E-160)	18:43	17:29 (WEA-2 E-138)	16:45	11:37 (WEA-01)	16:22
15	05:31	06:16	08:01 (WEA08)	07:06	18:41 (WEA-3 E-160)	07:56	16:52 (WEA-2 E-138)	07:50	11:12 (WEA-01)	08:33
	21:46	20:58	20:11 (WEA-4 E-160)	19:50	19:07 (WEA-3 E-160)	18:41	17:37 (WEA-1)	16:44	11:40 (WEA-01)	16:22
16	05:32	06:18	07:59 (WEA08)	07:08	18:40 (WEA-3 E-160)	07:57	16:52 (WEA-2 E-138)	07:52	11:10 (WEA-01)	08:34
	21:45	20:56	20:12 (WEA-4 E-160)	19:47	19:07 (WEA-3 E-160)	18:39	17:40 (WEA-1)	16:42	11:42 (WEA-01)	16:22
17	05:33	06:19	07:57 (WEA08)	07:09	18:39 (WEA-3 E-160)	07:59	16:52 (WEA-2 E-138)	07:54	11:09 (WEA-01)	08:34
	21:44	20:54	20:11 (WEA-4 E-160)	19:45	19:06 (WEA-3 E-160)	18:37	17:42 (WEA-1)	16:41	11:44 (WEA-01)	16:23
18	05:34	06:21	07:56 (WEA08)	07:11	18:39 (WEA-3 E-160)	08:01	16:51 (WEA-2 E-138)	07:56	11:09 (WEA-01)	08:35
	21:43	20:52	20:12 (WEA-4 E-160)	19:43	19:06 (WEA-3 E-160)	18:35	17:43 (WEA-1)	16:40	11:45 (WEA-01)	16:23
19	05:36	06:22	07:54 (WEA08)	07:12	18:40 (WEA-3 E-160)	08:03	16:51 (WEA-2 E-138)	07:57	11:08 (WEA-01)	08:36
	21:42	20:50	20:11 (WEA-4 E-160)	19:40	19:06 (WEA-3 E-160)	18:33	17:44 (WEA-1)	16:38	11:47 (WEA-01)	16:23
20	05:37	06:24	07:53 (WEA08)	07:14	18:39 (WEA-3 E-160)	08:04	16:52 (WEA-2 E-138)	07:59	11:07 (WEA-01)	08:37
	21:41	20:48	20:12 (WEA-4 E-160)	19:38	19:05 (WEA-3 E-160)	18:30	17:44 (WEA-1)	16:37	11:48 (WEA-01)	16:24
21	05:38	06:26	07:52 (WEA08)	07:16	18:40 (WEA-3 E-160)	08:06	16:51 (WEA-2 E-138)	08:01	11:06 (WEA-01)	08:37
	21:39	20:46	20:11 (WEA-4 E-160)	19:36	19:04 (WEA-3 E-160)	18:28	17:44 (WEA-1)	16:36	11:48 (WEA-01)	16:24
22	05:40	06:27	07:51 (WEA08)	07:17	18:40 (WEA-3 E-160)	08:08	16:51 (WEA-2 E-138)	08:02	11:06 (WEA-01)	08:38
	21:38	20:44	20:11 (WEA-4 E-160)	19:33	19:02 (WEA-3 E-160)	18:26	17:44 (WEA-1)	16:35	11:50 (WEA-01)	16:24
23	05:41	06:29	07:50 (WEA08)	07:19	18:42 (WEA-3 E-160)	08:10	16:51 (WEA-2 E-138)	08:04	11:09 (WEA05)	08:38
	21:37	20:41	20:09 (WEA-4 E-160)	19:31	19:00 (WEA-3 E-160)	18:24	17:44 (WEA-1)	16:34	11:51 (WEA-01)	16:25
24	05:42	06:30	07:50 (WEA08)	07:21	18:43 (WEA-3 E-160)	08:11	16:52 (WEA-2 E-138)	08:06	11:08 (WEA05)	08:39
	21:35	20:39	20:09 (WEA-4 E-160)	19:29	18:59 (WEA-3 E-160)	18:22	17:44 (WEA-1)	16:33	11:52 (WEA-01)	16:25
25	05:44	06:32	07:50 (WEA08)	07:22	18:30 (WEA03)	07:13	08:19 (WEA04)	08:07	11:07 (WEA05)	08:39
	21:34	20:37	20:08 (WEA-4 E-160)	19:26	18:54 (WEA-3 E-160)	17:20	16:43 (WEA-1)	16:32	11:52 (WEA-01)	16:26
26	05:45	06:34	07:49 (WEA08)	07:24	18:28 (WEA03)	07:15	08:16 (WEA04)	08:09	11:53 (WEA05)	08:39
	21:33	20:35	20:06 (WEA-4 E-160)	19:24	18:44 (WEA03)	17:18	16:43 (WEA-1)	16:31	11:53 (WEA-01)	16:27
27	05:47	06:35	07:49 (WEA08)	07:25	18:25 (WEA03)	07:17	08:15 (WEA04)	08:10	11:54 (WEA05)	08:40
	21:31	20:33	20:05 (WEA-4 E-160)	19:22	18:44 (WEA03)	17:16	16:42 (WEA-1)	16:30	11:54 (WEA-01)	16:28
28	05:48	06:37	07:48 (WEA08)	07:27	18:24 (WEA03)	07:18	08:14 (WEA04)	08:12	11:54 (WEA05)	08:40
	21:30	20:31	20:01 (WEA-4 E-160)	19:19	18:46 (WEA03)	17:14	16:41 (WEA-1)	16:29	11:54 (WEA-01)	16:28
29	05:49	06:39	07:48 (WEA08)	07:29	18:23 (WEA03)	07:20	08:12 (WEA04)	08:13	11:55 (WEA05)	08:40
	21:28	20:28	19:17	19:17	18:23 (WEA03)	17:12	16:38 (WEA-1)	16:28	11:55 (WEA-01)	16:29
30	05:51	06:40	07:48 (WEA08)	07:30	18:21 (WEA03)	07:22	08:11 (WEA04)	08:15	11:56 (WEA05)	08:40
	21:27	20:26	19:15	19:15	18:21 (WEA03)	17:10	16:36 (WEA-1)	16:27	11:56 (WEA-01)	16:30
31	05:52	06:42	07:48 (WEA08)	07:31	18:20 (WEA03)	07:24	08:11 (WEA04)	08:16	11:56 (WEA05)	08:40
	21:25	20:24	19:14	19:14	18:19 (WEA03)	17:09	16:15 (WEA-2 E-138)	16:27	11:56 (WEA-01)	16:31
Sonnenscheinstunden	501	453	381	332	267	244				
astr.max.mögl.Beschattung		969	787	1347	1032	2203				
Red. Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	0,15				
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84				
Reduktion Windrichtung		0,66	0,67	0,69	0,57	0,57				
Gesamte Reduktion		0,23	0,20	0,18	0,11	0,07				
Met. wahrsch. Beschattung		223	157	242	111	151				

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 19 - IP 19 Große Heide 18

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40		09:18 (WEA05)	08:14	08:46 (WEA04)	07:20	07:55 (WEA03)	07:10	08:06 (WEA08)	06:06	05:21
	16:32	64	11:48 (WEA-01)	17:20	16:25 (WEA-2 E-138)	18:11	08:16 (WEA03)	20:05	08:42 (WEA08)	20:56	21:41
2	08:40		09:18 (WEA05)	08:12	08:45 (WEA04)	07:18	07:54 (WEA03)	07:08	08:05 (WEA08)	06:04	05:20
	16:33	64	11:48 (WEA-01)	17:22	16:27 (WEA-2 E-138)	18:13	08:17 (WEA03)	20:07	08:41 (WEA08)	20:57	21:42
3	08:40		09:19 (WEA05)	08:10	08:44 (WEA04)	07:16	07:53 (WEA03)	07:06	08:05 (WEA08)	06:02	05:19
	16:34	64	11:49 (WEA-01)	17:24	16:28 (WEA-2 E-138)	18:15	08:16 (WEA03)	20:08	08:41 (WEA08)	20:59	21:43
4	08:40		09:19 (WEA05)	08:09	08:44 (WEA04)	07:14	07:53 (WEA03)	07:03	08:05 (WEA08)	06:00	05:18
	16:36	63	11:49 (WEA-01)	17:25	16:29 (WEA-2 E-138)	18:17	08:16 (WEA03)	20:10	08:41 (WEA08)	21:01	21:44
5	08:39		09:20 (WEA05)	08:07	08:44 (WEA04)	07:12	07:53 (WEA03)	07:01	08:05 (WEA08)	05:58	05:18
	16:37	62	11:49 (WEA-01)	17:27	16:52 (WEA-1)	18:18	08:16 (WEA03)	20:12	08:41 (WEA08)	21:02	21:45
6	08:39		09:20 (WEA05)	08:05	08:44 (WEA04)	07:09	07:53 (WEA03)	06:59	08:04 (WEA08)	05:56	05:17
	16:38	63	11:50 (WEA-01)	17:29	16:55 (WEA-1)	18:20	08:16 (WEA03)	20:13	08:39 (WEA08)	21:04	21:46
7	08:39		09:20 (WEA05)	08:04	08:44 (WEA04)	07:07	07:53 (WEA03)	06:56	08:04 (WEA08)	05:55	05:16
	16:39	63	11:50 (WEA-01)	17:31	16:57 (WEA-1)	18:22	08:15 (WEA03)	20:15	08:39 (WEA08)	21:05	21:47
8	08:38		09:21 (WEA05)	08:02	08:44 (WEA04)	07:05	07:54 (WEA03)	06:54	08:04 (WEA08)	05:53	05:16
	16:41	61	11:49 (WEA-01)	17:33	16:58 (WEA-1)	18:24	08:14 (WEA03)	20:17	08:38 (WEA08)	21:07	21:48
9	08:38		09:22 (WEA05)	08:00	08:45 (WEA04)	07:03	07:55 (WEA03)	06:52	08:05 (WEA08)	05:51	05:15
	16:42	60	11:50 (WEA-01)	17:35	16:59 (WEA-1)	18:25	08:13 (WEA03)	20:19	08:38 (WEA08)	21:09	21:49
10	08:37		09:22 (WEA05)	07:58	08:46 (WEA04)	07:01	07:56 (WEA03)	06:50	08:05 (WEA08)	05:49	05:15
	16:43	60	11:50 (WEA-01)	17:37	16:59 (WEA-1)	18:27	08:10 (WEA03)	20:20	08:36 (WEA08)	21:10	21:50
11	08:37		09:22 (WEA05)	07:57	08:48 (WEA04)	06:58	07:58 (WEA03)	06:47	08:05 (WEA08)	05:48	05:15
	16:45	60	11:50 (WEA-01)	17:38	17:01 (WEA-1)	18:29	08:07 (WEA03)	20:22	08:34 (WEA08)	21:12	21:50
12	08:36		09:23 (WEA05)	07:55	08:49 (WEA04)	06:56		06:45	08:07 (WEA08)	05:46	05:14
	16:46	57	11:50 (WEA-01)	17:40	17:01 (WEA-1)	18:31		20:24	19:54 (WEA-4 E-160)	21:13	21:51
13	08:35		09:25 (WEA05)	07:53	08:52 (WEA04)	06:54		06:43	08:08 (WEA08)	05:44	05:14
	16:48	54	11:50 (WEA-01)	17:42	17:01 (WEA-1)	18:32		20:25	19:57 (WEA-4 E-160)	21:15	21:52
14	08:35		09:26 (WEA05)	07:51	15:57 (WEA-2 E-138)	06:51	17:52 (WEA-3 E-160)	06:41	08:10 (WEA08)	05:43	05:14
	16:49	53	11:50 (WEA-01)	17:44	17:01 (WEA-1)	18:34	18:03 (WEA-3 E-160)	20:27	19:58 (WEA-4 E-160)	21:17	21:52
15	08:34		09:27 (WEA05)	07:49	15:57 (WEA-2 E-138)	06:49	17:49 (WEA-3 E-160)	06:39	08:12 (WEA08)	05:41	05:14
	16:51	51	11:50 (WEA-01)	17:46	17:01 (WEA-1)	18:36	18:06 (WEA-3 E-160)	20:29	19:59 (WEA-4 E-160)	21:18	21:53
16	08:33		09:28 (WEA05)	07:47	15:58 (WEA-2 E-138)	06:47	17:47 (WEA-3 E-160)	06:36	19:36 (WEA-4 E-160)	05:40	05:13
	16:52	48	11:50 (WEA-01)	17:48	17:01 (WEA-1)	18:38	18:08 (WEA-3 E-160)	20:30	19:59 (WEA-4 E-160)	21:20	21:53
17	08:32		09:30 (WEA05)	07:45	15:58 (WEA-2 E-138)	06:45	17:45 (WEA-3 E-160)	06:34	19:35 (WEA-4 E-160)	05:38	05:13
	16:54	43	11:49 (WEA-01)	17:49	17:00 (WEA-1)	18:39	18:08 (WEA-3 E-160)	20:32	20:00 (WEA-4 E-160)	21:21	21:54
18	08:31		11:15 (WEA-01)	07:43	15:57 (WEA-2 E-138)	06:42	17:44 (WEA-3 E-160)	06:32	19:35 (WEA-4 E-160)	05:37	05:13
	16:55	34	11:49 (WEA-01)	17:51	16:59 (WEA-1)	18:41	18:09 (WEA-3 E-160)	20:34	20:00 (WEA-4 E-160)	21:23	21:54
19	08:30		11:15 (WEA-01)	07:41	15:58 (WEA-2 E-138)	06:40	17:43 (WEA-3 E-160)	06:30	19:34 (WEA-4 E-160)	05:35	05:13
	16:57	32	11:47 (WEA-01)	17:53	16:58 (WEA-1)	18:43	18:10 (WEA-3 E-160)	20:35	20:00 (WEA-4 E-160)	21:24	21:55
20	08:29		11:17 (WEA-01)	07:39	15:58 (WEA-2 E-138)	06:38	17:42 (WEA-3 E-160)	06:28	19:34 (WEA-4 E-160)	05:34	05:13
	16:59	30	11:47 (WEA-01)	17:55	16:56 (WEA-1)	18:45	18:09 (WEA-3 E-160)	20:37	20:00 (WEA-4 E-160)	21:26	21:55
21	08:28		11:18 (WEA-01)	07:37	15:59 (WEA-2 E-138)	06:35	17:42 (WEA-3 E-160)	06:26	19:34 (WEA-4 E-160)	05:33	05:14
	17:00	28	11:46 (WEA-01)	17:57	16:54 (WEA-1)	18:46	18:10 (WEA-3 E-160)	20:39	20:00 (WEA-4 E-160)	21:27	21:55
22	08:27		11:21 (WEA-01)	07:35	16:00 (WEA-2 E-138)	06:33	17:41 (WEA-3 E-160)	06:24	19:34 (WEA-4 E-160)	05:31	05:14
	17:02	24	11:45 (WEA-01)	17:59	16:33 (WEA-2 E-138)	18:48	18:10 (WEA-3 E-160)	20:40	20:00 (WEA-4 E-160)	21:28	21:56
23	08:26		11:22 (WEA-01)	07:33	16:02 (WEA-2 E-138)	06:31	17:41 (WEA-3 E-160)	06:22	19:34 (WEA-4 E-160)	05:30	05:14
	17:04	21	11:43 (WEA-01)	18:00	16:32 (WEA-2 E-138)	18:50	18:09 (WEA-3 E-160)	20:42	19:59 (WEA-4 E-160)	21:30	21:56
24	08:25		11:25 (WEA-01)	07:31	16:03 (WEA-2 E-138)	06:28	07:20 (WEA08)	06:20	19:34 (WEA-4 E-160)	05:29	05:14
	17:06	15	11:40 (WEA-01)	18:02	16:30 (WEA-2 E-138)	18:51	18:09 (WEA-3 E-160)	20:44	19:58 (WEA-4 E-160)	21:31	21:56
25	08:23		11:30 (WEA-01)	07:29	08:02 (WEA03)	06:26	07:17 (WEA08)	06:17	19:35 (WEA-4 E-160)	05:28	05:15
	17:07	5	11:35 (WEA-01)	18:04	16:29 (WEA-2 E-138)	18:53	18:08 (WEA-3 E-160)	20:46	19:57 (WEA-4 E-160)	21:33	21:56
26	08:22		07:27	18:06	07:58 (WEA03)	06:24	07:14 (WEA08)	06:15	19:35 (WEA-4 E-160)	05:27	05:15
	17:09		18:06	34	16:26 (WEA-2 E-138)	18:55	18:07 (WEA-3 E-160)	20:47	19:56 (WEA-4 E-160)	21:34	21:56
27	08:21		07:25	18:08	07:57 (WEA03)	06:22	07:12 (WEA08)	06:13	19:36 (WEA-4 E-160)	05:25	05:15
	17:11		18:08	29	16:22 (WEA-2 E-138)	18:56	18:06 (WEA-3 E-160)	20:49	19:55 (WEA-4 E-160)	21:35	21:56
28	08:19		07:23	18:09	07:56 (WEA03)	06:19	07:11 (WEA08)	06:11	19:37 (WEA-4 E-160)	05:24	05:16
	17:13		18:09	19	08:15 (WEA03)	18:58	18:05 (WEA-3 E-160)	20:51	19:53 (WEA-4 E-160)	21:36	21:56
29	08:18		08:48 (WEA04)	18:09	07:17	18:58	08:08 (WEA08)	06:09	19:40 (WEA-4 E-160)	05:23	05:16
	17:14	8	08:56 (WEA04)		20:00	51	19:02 (WEA-3 E-160)	20:52	19:52 (WEA-4 E-160)	21:38	21:56
30	08:17		08:47 (WEA04)		07:15	47	08:08 (WEA08)	06:08	19:44 (WEA-4 E-160)	05:22	05:17
	17:16	12	08:59 (WEA04)		20:02	47	19:00 (WEA-3 E-160)	20:54	19:48 (WEA-4 E-160)	21:39	21:55
31	08:15		08:46 (WEA04)		07:12	41	08:07 (WEA08)			05:21	
	17:18	26	16:21 (WEA-2 E-138)		20:03	41	18:56 (WEA-3 E-160)			21:40	
Sonnenscheinstunden	259		278		367		416		485		498
astr.max.mögl.Beschattung	1225		1452		832		844				
Red.Sonnenscheinwahrsch.	0,20		0,30		0,30		0,41				
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84				
Reduktion Windrichtung	0,55		0,69		0,66		0,65				
Gesamte Reduktion	0,09		0,17		0,16		0,22				
Met.wahrsch.Beschattung	110		252		135		183				

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:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 19 - IP 19 Große Heide 18

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember			
1	05:18	05:54	06:43	08:04 (WEA08)	07:32	07:26	08:15 (WEA04)	08:16	09:05 (WEA05)
	21:55	21:23	20:22	19:33 (WEA08)	19:13	17:07	16:29 (WEA-1)	16:27	11:32 (WEA-01)
2	05:18	05:55	06:45	08:04 (WEA08)	07:34	07:27	08:14 (WEA04)	08:18	09:05 (WEA05)
	21:55	21:22	20:19	19:31 (WEA08)	19:10	17:05	16:28 (WEA-1)	16:26	11:33 (WEA-01)
3	05:19	05:57	06:47	08:02 (WEA08)	07:35	07:29	08:35 (WEA03)	08:19	09:05 (WEA05)
	21:54	21:20	20:17	19:33 (WEA08)	19:08	17:03	16:27 (WEA-1)	16:25	11:33 (WEA-01)
4	05:20	05:59	06:48	08:01 (WEA08)	07:37	07:31	08:33 (WEA03)	08:20	09:06 (WEA05)
	21:54	21:18	20:15	19:34 (WEA08)	19:06	17:01	16:26 (WEA-1)	16:25	11:34 (WEA-01)
5	05:21	06:00	06:50	08:01 (WEA08)	07:39	07:33	08:31 (WEA03)	08:14 (WEA04)	09:06 (WEA05)
	21:53	21:17	20:13	19:35 (WEA08)	19:03	17:00	16:24 (WEA-1)	16:24	11:35 (WEA-01)
6	05:21	06:02	06:51	08:00 (WEA08)	07:40	07:34	08:30 (WEA03)	08:14 (WEA04)	09:06 (WEA05)
	21:53	21:15	20:10	19:36 (WEA08)	19:01	16:58	16:21 (WEA-1)	16:24	11:35 (WEA-01)
7	05:22	06:03	06:53	08:00 (WEA08)	07:42	07:36	08:29 (WEA03)	08:14 (WEA04)	09:07 (WEA05)
	21:52	21:13	20:08	19:36 (WEA08)	18:59	22	16:56 (WEA-2 E-138)	16:23	11:36 (WEA-01)
8	05:23	06:05	06:55	07:59 (WEA08)	07:44	07:38	08:28 (WEA03)	08:15 (WEA04)	09:07 (WEA05)
	21:52	21:11	20:06	19:35 (WEA08)	18:57	23	16:54 (WEA-2 E-138)	16:23	11:37 (WEA-01)
9	05:24	06:06	06:56	07:59 (WEA08)	07:45	07:40	08:28 (WEA03)	08:16 (WEA04)	09:07 (WEA05)
	21:51	21:09	20:04	19:35 (WEA08)	18:54	23	16:53 (WEA-2 E-138)	16:23	11:37 (WEA-01)
10	05:25	06:08	06:58	07:58 (WEA08)	07:47	07:42	08:28 (WEA03)	08:16 (WEA04)	09:07 (WEA05)
	21:50	21:08	20:01	19:34 (WEA08)	18:52	23	16:51 (WEA-2 E-138)	16:23	11:37 (WEA-01)
11	05:26	06:10	07:00	07:59 (WEA08)	07:49	07:43	08:27 (WEA03)	08:18 (WEA04)	09:09 (WEA05)
	21:50	21:06	19:59	19:35 (WEA08)	18:50	23	16:50 (WEA-2 E-138)	16:22	11:39 (WEA-01)
12	05:27	06:11	07:01	07:58 (WEA08)	07:51	07:45	08:28 (WEA03)	08:19 (WEA04)	09:09 (WEA05)
	21:49	21:04	19:57	18:47 (WEA-3 E-160)	18:48	22	16:48 (WEA-2 E-138)	16:22	11:39 (WEA-01)
13	05:28	06:13	07:03	07:59 (WEA08)	07:52	07:47	08:28 (WEA03)	08:20 (WEA04)	09:10 (WEA05)
	21:48	21:02	19:54	18:51 (WEA-3 E-160)	18:45	21	16:47 (WEA-2 E-138)	16:22	11:40 (WEA-01)
14	05:29	06:14	07:04	08:00 (WEA08)	07:54	07:49	08:29 (WEA03)	08:22	09:10 (WEA05)
	21:47	21:00	19:52	18:53 (WEA-3 E-160)	18:43	21	16:50 (WEA-2 E-138)	16:22	11:40 (WEA-01)
15	05:31	06:16	07:06	08:00 (WEA08)	07:56	07:50	08:30 (WEA03)	08:24	09:10 (WEA05)
	21:46	20:58	19:50	18:54 (WEA-3 E-160)	18:41	31	16:56 (WEA-2 E-138)	16:24	11:40 (WEA-01)
16	05:32	06:18	07:08	08:01 (WEA08)	07:57	07:52	08:31 (WEA03)	08:24	09:10 (WEA05)
	21:45	20:56	19:47	18:55 (WEA-3 E-160)	18:39	34	16:59 (WEA-2 E-138)	16:24	11:40 (WEA-01)
17	05:33	06:19	07:09	08:02 (WEA08)	07:59	07:54	08:35 (WEA03)	08:24	09:11 (WEA05)
	21:44	20:54	19:45	18:55 (WEA-3 E-160)	18:37	30	17:01 (WEA-2 E-138)	16:41	11:41 (WEA-01)
18	05:34	06:21	07:11	08:04 (WEA08)	08:01	07:56	16:34 (WEA-2 E-138)	16:23	09:12 (WEA05)
	21:43	20:52	19:43	18:56 (WEA-3 E-160)	18:35	28	17:02 (WEA-2 E-138)	16:40	11:42 (WEA-01)
19	05:36	06:22	07:12	08:06 (WEA08)	08:03	07:57	16:32 (WEA-2 E-138)	16:23	09:12 (WEA05)
	21:42	20:50	19:40	18:56 (WEA-3 E-160)	18:33	31	17:03 (WEA-2 E-138)	16:38	11:42 (WEA-01)
20	05:37	06:24	07:14	18:27 (WEA-3 E-160)	08:04	08:04	16:31 (WEA-2 E-138)	16:23	09:13 (WEA05)
	21:41	20:48	19:38	18:55 (WEA-3 E-160)	18:30	37	17:22 (WEA-1)	16:37	11:43 (WEA-01)
21	05:38	06:26	07:16	18:27 (WEA-3 E-160)	08:06	08:01	16:29 (WEA-2 E-138)	16:23	09:14 (WEA05)
	21:39	20:46	19:36	18:55 (WEA-3 E-160)	18:28	47	17:25 (WEA-1)	16:36	11:44 (WEA-01)
22	05:40	06:27	07:17	18:26 (WEA-3 E-160)	08:08	08:02	16:29 (WEA-2 E-138)	16:23	09:14 (WEA05)
	21:38	20:44	19:33	18:54 (WEA-3 E-160)	18:26	52	17:27 (WEA-1)	16:35	11:44 (WEA-01)
23	05:41	06:29	07:19	18:26 (WEA-3 E-160)	08:10	08:04	16:28 (WEA-2 E-138)	16:23	09:14 (WEA05)
	21:37	20:41	19:31	18:54 (WEA-3 E-160)	18:24	55	17:28 (WEA-1)	16:34	11:44 (WEA-01)
24	05:42	06:30	07:21	18:27 (WEA-3 E-160)	08:11	08:06	16:28 (WEA-2 E-138)	16:23	09:15 (WEA05)
	21:35	20:39	19:29	18:54 (WEA-3 E-160)	18:22	58	17:29 (WEA-1)	16:33	11:45 (WEA-01)
25	05:44	06:32	07:22	18:26 (WEA-3 E-160)	07:13	08:07	15:27 (WEA-2 E-138)	16:23	09:15 (WEA05)
	21:34	20:37	19:26	18:52 (WEA-3 E-160)	17:20	61	16:30 (WEA-1)	16:32	11:45 (WEA-01)
26	05:45	06:34	07:24	18:27 (WEA-3 E-160)	07:15	08:09	15:27 (WEA-2 E-138)	16:23	09:15 (WEA05)
	21:33	20:35	19:24	18:51 (WEA-3 E-160)	17:18	62	16:31 (WEA-1)	16:31	11:45 (WEA-01)
27	05:47	06:35	07:25	18:27 (WEA-3 E-160)	07:17	08:10	15:27 (WEA-2 E-138)	16:23	09:16 (WEA05)
	21:31	20:33	19:22	18:49 (WEA-3 E-160)	17:16	63	16:31 (WEA-1)	16:30	11:46 (WEA-01)
28	05:48	06:37	07:27	18:29 (WEA-3 E-160)	07:18	08:12	15:27 (WEA-2 E-138)	16:23	09:17 (WEA05)
	21:30	20:31	19:19	18:47 (WEA-3 E-160)	17:14	63	16:31 (WEA-1)	16:29	11:47 (WEA-01)
29	05:49	06:39	07:29	18:31 (WEA-3 E-160)	07:20	08:13	16:30 (WEA-1)	16:28	09:17 (WEA05)
	21:28	20:28	19:17	18:45 (WEA-3 E-160)	17:12	70	16:30 (WEA-1)	16:28	11:47 (WEA-01)
30	05:51	06:40	07:30	18:35 (WEA-3 E-160)	07:22	08:15	08:17 (WEA04)	08:15	09:17 (WEA05)
	21:27	20:26	19:15	18:40 (WEA-3 E-160)	17:10	74	16:30 (WEA-1)	16:27	11:47 (WEA-01)
31	05:52	06:42	07:31	18:06 (WEA08)	07:24	08:16	16:29 (WEA-1)	16:27	09:18 (WEA05)
	21:25	20:24	19:14	18:06 (WEA08)	17:09	75	16:29 (WEA-1)	16:27	11:48 (WEA-01)
Sonnenscheinstunden	501	453	381	332	267	1115	244	1955	131
astr.max.mögl.Beschattung		479	1002	1121	1115	1955		1955	
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	0,23		0,15	
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84		0,84	
Reduktion Windrichtung		0,64	0,67	0,69	0,62	0,62		0,55	
Gesamte Reduktion		0,22	0,20	0,18	0,12	0,12		0,07	
Met.wahrsch.Beschattung		107	199	201	129	129		131	

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 19/1 - IP 19/1 Große Heide 20

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	10:11 (WEA09)	08:14	10:50 (WEA-01)	07:20	16:04 (WEA-2 E-138)
2	08:40	10:12 (WEA09)	08:12	10:52 (WEA-01)	07:18	16:05 (WEA-2 E-138)
3	08:40	10:14 (WEA09)	08:10	10:53 (WEA-01)	07:16	16:02 (WEA-2 E-138)
4	08:40	10:14 (WEA09)	08:10	10:53 (WEA-01)	07:16	16:05 (WEA-2 E-138)
5	08:39	10:14 (WEA-01)	08:07	11:00 (WEA-01)	07:12	16:08 (WEA-2 E-138)
6	08:39	10:14 (WEA-01)	08:05	11:14 (WEA-01)	07:09	16:11 (WEA-2 E-138)
7	08:39	10:14 (WEA-01)	08:04	11:28 (WEA-01)	07:07	16:13 (WEA-2 E-138)
8	08:38	10:14 (WEA-01)	08:02	11:42 (WEA-01)	07:05	16:16 (WEA-2 E-138)
9	08:38	10:14 (WEA-01)	08:00	11:56 (WEA-01)	07:03	16:19 (WEA-2 E-138)
10	08:37	10:14 (WEA-01)	07:58	12:10 (WEA-01)	07:01	16:22 (WEA-2 E-138)
11	08:37	10:14 (WEA-01)	07:57	12:24 (WEA-01)	06:59	16:25 (WEA-2 E-138)
12	08:36	10:14 (WEA-01)	07:55	12:38 (WEA-01)	06:57	16:28 (WEA-2 E-138)
13	08:35	10:14 (WEA-01)	07:53	12:52 (WEA-01)	06:55	16:31 (WEA-2 E-138)
14	08:35	10:14 (WEA-01)	07:51	13:06 (WEA-01)	06:53	16:34 (WEA-2 E-138)
15	08:34	10:14 (WEA-01)	07:49	13:20 (WEA-01)	06:51	16:37 (WEA-2 E-138)
16	08:33	10:14 (WEA-01)	07:47	13:34 (WEA-01)	06:49	16:40 (WEA-2 E-138)
17	08:32	10:14 (WEA-01)	07:45	13:48 (WEA-01)	06:47	16:43 (WEA-2 E-138)
18	08:31	10:14 (WEA-01)	07:43	14:02 (WEA-01)	06:45	16:46 (WEA-2 E-138)
19	08:30	10:14 (WEA-01)	07:41	14:16 (WEA-01)	06:43	16:49 (WEA-2 E-138)
20	08:29	10:14 (WEA-01)	07:39	14:30 (WEA-01)	06:41	16:52 (WEA-2 E-138)
21	08:28	10:14 (WEA-01)	07:37	14:44 (WEA-01)	06:39	16:55 (WEA-2 E-138)
22	08:27	10:14 (WEA-01)	07:35	14:58 (WEA-01)	06:37	16:58 (WEA-2 E-138)
23	08:26	10:14 (WEA-01)	07:33	15:12 (WEA-01)	06:35	17:01 (WEA-2 E-138)
24	08:25	10:14 (WEA-01)	07:31	15:26 (WEA-01)	06:33	17:04 (WEA-2 E-138)
25	08:23	10:14 (WEA-01)	07:29	15:40 (WEA-01)	06:31	17:07 (WEA-2 E-138)
26	08:22	10:14 (WEA-01)	07:27	15:54 (WEA-01)	06:29	17:10 (WEA-2 E-138)
27	08:21	10:14 (WEA-01)	07:25	16:08 (WEA-01)	06:27	17:13 (WEA-2 E-138)
28	08:19	10:14 (WEA-01)	07:23	16:22 (WEA-01)	06:25	17:16 (WEA-2 E-138)
29	08:18	10:14 (WEA-01)	07:21	16:36 (WEA-01)	06:23	17:19 (WEA-2 E-138)
30	08:17	10:14 (WEA-01)	07:19	16:50 (WEA-01)	06:21	17:22 (WEA-2 E-138)
31	08:15	10:14 (WEA-01)	07:17	17:04 (WEA-01)	06:19	17:25 (WEA-2 E-138)
	17:18	11:24 (WEA-01)	08:09	17:18 (WEA-01)	06:17	17:28 (WEA-2 E-138)
	17:18	11:24 (WEA-01)	08:09	17:18 (WEA-01)	06:17	17:28 (WEA-2 E-138)
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	1793	1487	768	1053	179	46
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,84	0,84
Reduktion Betriebsdauer	0,84	0,69	0,68	0,67	0,62	0,62
Reduktion Windrichtung	0,56	0,17	0,17	0,22	0,23	0,23
Gesamte Reduktion	0,09	0,17	0,17	0,22	0,23	0,23
Met.wahrsch.Beschattung	162	256	127	235	42	42

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:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 19/1 - IP 19/1 Große Heide 20

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember				
1	05:18	05:54	06:43	07:39 (WEA08)	07:32	08:06 (WEA03)	07:26	07:58 (WEA04)	08:16	08:48 (WEA05)
	21:55	21:23	20:22	19:13	18:27 (WEA03)	17:07	16:29 (WEA-1)	15:42 (WEA-2 E-138)	14:57	14:09 (WEA-01)
2	05:18	05:55	06:45	07:39 (WEA08)	07:34	08:07 (WEA03)	07:27	08:07 (WEA03)	08:18	08:51 (WEA05)
	21:55	21:22	20:19	19:10	18:26 (WEA03)	17:05	16:04 (WEA-2 E-138)	15:44 (WEA-2 E-138)	14:57	14:09 (WEA-01)
3	05:19	05:57	06:47	07:39 (WEA08)	07:35	08:07 (WEA03)	07:29	08:07 (WEA03)	08:19	10:18 (WEA-01)
	21:54	21:20	20:08 (WEA-4 E-160)	19:08	18:24 (WEA03)	17:03	16:02 (WEA-2 E-138)	15:48 (WEA-2 E-138)	14:57	14:09 (WEA-01)
4	05:20	05:59	06:48	07:40 (WEA08)	07:37	08:09 (WEA03)	07:31	08:09 (WEA03)	08:20	10:19 (WEA-01)
	21:54	21:18	20:13 (WEA-4 E-160)	19:06	18:23 (WEA03)	17:01	15:58 (WEA-2 E-138)	15:48 (WEA-2 E-138)	14:57	14:09 (WEA-01)
5	05:21	06:00	06:50	07:41 (WEA08)	07:39	08:12 (WEA03)	07:33	08:12 (WEA03)	08:22	10:19 (WEA-01)
	21:53	21:17	20:14 (WEA-4 E-160)	19:03	18:20 (WEA03)	17:00	16:24 (WEA-2 E-138)	15:44 (WEA-2 E-138)	14:57	14:09 (WEA-01)
6	05:21	06:02	06:51	07:42 (WEA08)	07:40	08:20 (WEA03)	07:34	08:20 (WEA03)	08:23	10:20 (WEA-01)
	21:53	21:15	20:16 (WEA-4 E-160)	19:01	18:18 (WEA-2 E-138)	16:58	16:24 (WEA-2 E-138)	15:44 (WEA-2 E-138)	14:57	14:09 (WEA-01)
7	05:22	06:03	06:53	07:43 (WEA08)	07:42	08:24 (WEA03)	07:36	08:24 (WEA03)	08:24	10:21 (WEA-01)
	21:52	21:13	20:17 (WEA-4 E-160)	19:08	18:25 (WEA-2 E-138)	17:06	16:32 (WEA-2 E-138)	15:56	15:11	14:26 (WEA-01)
8	05:23	06:05	06:55	07:45 (WEA08)	07:44	08:26 (WEA03)	07:38	08:26 (WEA03)	08:26	10:21 (WEA-01)
	21:52	21:11	20:18 (WEA-4 E-160)	19:08	18:27 (WEA-2 E-138)	17:06	16:32 (WEA-2 E-138)	15:56	15:11	14:26 (WEA-01)
9	05:24	06:06	06:56	07:48 (WEA08)	07:45	08:28 (WEA03)	07:40	08:28 (WEA03)	08:27	10:22 (WEA09)
	21:51	21:09	20:20 (WEA-4 E-160)	19:04	18:24 (WEA-2 E-138)	17:04	16:30 (WEA-2 E-138)	15:56	15:11	14:26 (WEA-01)
10	05:25	06:08	06:58	07:49 (WEA08)	07:47	08:30 (WEA03)	07:42	08:30 (WEA03)	08:28	10:21 (WEA09)
	21:50	21:08	20:21 (WEA-4 E-160)	19:01	18:22 (WEA-2 E-138)	17:03	16:31 (WEA-2 E-138)	15:57	15:11	14:26 (WEA-01)
11	05:26	06:10	07:00	07:49 (WEA08)	07:49	08:31 (WEA03)	07:43	08:31 (WEA03)	08:29	10:22 (WEA09)
	21:50	21:06	20:19 (WEA-4 E-160)	19:01	18:20 (WEA-2 E-138)	17:02	16:30 (WEA-2 E-138)	15:56	15:11	14:26 (WEA-01)
12	05:27	06:11	07:01	07:50 (WEA08)	07:51	08:32 (WEA03)	07:45	08:32 (WEA03)	08:30	10:22 (WEA09)
	21:49	21:04	20:20 (WEA-4 E-160)	19:01	18:20 (WEA-2 E-138)	17:02	16:30 (WEA-2 E-138)	15:56	15:11	14:26 (WEA-01)
13	05:28	06:13	07:03	07:51 (WEA08)	07:52	08:33 (WEA03)	07:47	08:33 (WEA03)	08:31	10:21 (WEA09)
	21:48	21:02	20:19 (WEA-4 E-160)	19:01	18:20 (WEA-2 E-138)	17:02	16:30 (WEA-2 E-138)	15:56	15:11	14:26 (WEA-01)
14	05:30	06:14	07:04	07:52 (WEA08)	07:54	08:34 (WEA03)	07:49	08:34 (WEA03)	08:32	10:21 (WEA09)
	21:47	21:06	20:20 (WEA-4 E-160)	19:02	18:21 (WEA-2 E-138)	17:03	16:31 (WEA-2 E-138)	15:57	15:11	14:26 (WEA-01)
15	05:31	06:16	07:06	07:53 (WEA08)	07:56	08:35 (WEA03)	07:50	08:35 (WEA03)	08:33	10:21 (WEA09)
	21:46	20:58	20:19 (WEA-4 E-160)	19:00	18:21 (WEA-2 E-138)	17:02	16:31 (WEA-2 E-138)	15:57	15:11	14:26 (WEA-01)
16	05:32	06:18	07:08	07:54 (WEA08)	07:57	08:36 (WEA03)	07:52	08:36 (WEA03)	08:34	10:21 (WEA09)
	21:45	20:56	20:19 (WEA-4 E-160)	19:00	18:21 (WEA-2 E-138)	17:02	16:31 (WEA-2 E-138)	15:57	15:11	14:26 (WEA-01)
17	05:33	06:19	07:09	07:55 (WEA08)	07:59	08:37 (WEA03)	07:54	08:37 (WEA03)	08:34	10:21 (WEA09)
	21:44	20:54	20:18 (WEA-4 E-160)	19:00	18:22 (WEA-2 E-138)	17:03	16:32 (WEA-2 E-138)	15:58	15:11	14:26 (WEA-01)
18	05:34	06:21	07:11	07:56 (WEA08)	08:01	08:38 (WEA03)	07:56	08:38 (WEA03)	08:35	10:22 (WEA09)
	21:43	20:52	20:18 (WEA-4 E-160)	19:00	18:23 (WEA-2 E-138)	17:04	16:33 (WEA-2 E-138)	15:59	15:11	14:26 (WEA-01)
19	05:36	06:22	07:12	07:57 (WEA08)	08:03	08:39 (WEA03)	07:57	08:39 (WEA03)	08:36	10:22 (WEA09)
	21:42	20:50	20:17 (WEA-4 E-160)	19:00	18:24 (WEA-2 E-138)	17:05	16:34 (WEA-2 E-138)	16:00	15:12	14:27 (WEA-01)
20	05:37	06:24	07:14	07:58 (WEA08)	08:04	08:40 (WEA03)	07:59	08:40 (WEA03)	08:37	10:23 (WEA09)
	21:41	20:48	20:16 (WEA-4 E-160)	19:00	18:25 (WEA-2 E-138)	17:06	16:35 (WEA-2 E-138)	16:01	15:13	14:27 (WEA-01)
21	05:38	06:26	07:16	07:59 (WEA08)	08:06	08:41 (WEA03)	08:01	08:41 (WEA03)	08:37	10:23 (WEA09)
	21:39	20:46	20:14 (WEA-4 E-160)	19:00	18:26 (WEA-2 E-138)	17:07	16:36 (WEA-2 E-138)	16:02	15:14	14:27 (WEA-01)
22	05:40	06:27	07:17	08:00 (WEA08)	08:08	08:42 (WEA03)	08:02	08:42 (WEA03)	08:38	10:23 (WEA09)
	21:38	20:44	20:13 (WEA-4 E-160)	19:00	18:27 (WEA-2 E-138)	17:08	16:37 (WEA-2 E-138)	16:03	15:15	14:27 (WEA-01)
23	05:41	06:29	07:19	08:01 (WEA08)	08:10	08:43 (WEA03)	08:04	08:43 (WEA03)	08:38	10:23 (WEA09)
	21:37	20:41	20:10 (WEA-4 E-160)	19:00	18:28 (WEA-2 E-138)	17:09	16:38 (WEA-2 E-138)	16:04	15:16	14:27 (WEA-01)
24	05:42	06:30	07:21	08:02 (WEA08)	08:11	08:44 (WEA03)	08:06	08:44 (WEA03)	08:39	10:24 (WEA09)
	21:35	20:39	20:07 (WEA-4 E-160)	19:00	18:29 (WEA-2 E-138)	17:10	16:39 (WEA-2 E-138)	16:05	15:17	14:27 (WEA-01)
25	05:44	06:32	07:22	08:03 (WEA08)	08:13	08:45 (WEA03)	08:07	08:45 (WEA03)	08:39	10:24 (WEA09)
	21:34	20:37	20:06 (WEA-4 E-160)	19:00	18:30 (WEA-2 E-138)	17:11	16:40 (WEA-2 E-138)	16:06	15:18	14:27 (WEA-01)
26	05:45	06:34	07:24	08:04 (WEA08)	08:15	08:46 (WEA03)	08:09	08:46 (WEA03)	08:39	10:25 (WEA09)
	21:33	20:35	20:05 (WEA-4 E-160)	19:00	18:31 (WEA-2 E-138)	17:12	16:41 (WEA-2 E-138)	16:07	15:19	14:27 (WEA-01)
27	05:47	06:35	07:25	08:05 (WEA08)	08:17	08:47 (WEA03)	08:10	08:47 (WEA03)	08:40	10:25 (WEA09)
	21:31	20:33	20:04 (WEA-4 E-160)	19:00	18:32 (WEA-2 E-138)	17:13	16:42 (WEA-2 E-138)	16:08	15:20	14:27 (WEA-01)
28	05:48	06:37	07:27	08:06 (WEA08)	08:19	08:48 (WEA03)	08:12	08:48 (WEA03)	08:40	10:26 (WEA09)
	21:30	20:31	20:03 (WEA-4 E-160)	19:00	18:33 (WEA-2 E-138)	17:14	16:43 (WEA-2 E-138)	16:09	15:21	14:27 (WEA-01)
29	05:49	06:39	07:29	08:07 (WEA08)	08:21	08:49 (WEA03)	08:13	08:49 (WEA03)	08:40	10:26 (WEA09)
	21:28	20:28	20:02 (WEA-4 E-160)	19:00	18:34 (WEA-2 E-138)	17:15	16:44 (WEA-2 E-138)	16:10	15:22	14:27 (WEA-01)
30	05:51	06:40	07:30	08:08 (WEA08)	08:22	08:50 (WEA03)	08:15	08:50 (WEA03)	08:40	10:27 (WEA09)
	21:27	20:26	20:01 (WEA-4 E-160)	19:00	18:35 (WEA-2 E-138)	17:16	16:45 (WEA-2 E-138)	16:11	15:23	14:27 (WEA-01)
31	05:52	06:42	07:31 (WEA08)	08:23 (WEA08)	08:24	08:51 (WEA03)	08:16	08:51 (WEA03)	08:40	10:27 (WEA09)
	21:25	20:24	20:00 (WEA-4 E-160)	19:00	18:36 (WEA-2 E-138)	17:17	16:46 (WEA-2 E-138)	16:12	15:24	14:27 (WEA-01)
Sonnenscheinstunden	501	453	381	332	267	214	162	110	64	30
astr.max.mögl.Beschattung		871	857	828	799	770	741	712	683	654
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,29	0,26	0,23	0,20	0,17	0,15
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung		0,65	0,67	0,70	0,73	0,76	0,79	0,82	0,85	0,88
Gesamte Reduktion		0,23	0,20	0,18	0,16	0,14	0,12	0,10	0,08	0,07
Met.wahrsch.Beschattung		198	171	144	117	90	63	36	9	127

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

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

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 19/2 - IP 19/2 Große Heide 22

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40 16:32	10:01 (WEA09) 08:14 11:15 (WEA-01) 17:20	09:02 (WEA05) 07:20 11:26 (WEA-01) 18:11	16:13 (WEA-2 E-138) 07:10 17:09 (WEA-1) 20:05	18:57 (WEA-3 E-160) 06:06 19:27 (WEA-3 E-160) 20:56	07:27 (WEA08) 05:21 20:18 (WEA-4 E-160) 21:41
2	08:40 16:33	10:03 (WEA09) 08:12 11:16 (WEA-01) 17:22	09:04 (WEA05) 07:18 11:25 (WEA-01) 18:13	16:13 (WEA-2 E-138) 07:08 17:06 (WEA-1) 20:07	18:56 (WEA-3 E-160) 06:04 19:26 (WEA-3 E-160) 20:57	07:28 (WEA08) 05:20 20:18 (WEA-4 E-160) 21:42
3	08:40 16:34	10:03 (WEA09) 08:10 11:17 (WEA-01) 17:24	09:06 (WEA05) 07:16 11:24 (WEA-01) 18:15	16:12 (WEA-2 E-138) 07:06 16:12 (WEA-2 E-138) 20:08	18:56 (WEA-3 E-160) 06:02 19:26 (WEA-3 E-160) 20:59	07:30 (WEA08) 05:19 20:18 (WEA-4 E-160) 21:43
4	08:40 16:36	10:04 (WEA09) 08:09 11:17 (WEA-01) 17:25	10:39 (WEA-01) 07:14 11:23 (WEA-01) 18:17	16:12 (WEA-2 E-138) 07:03 16:12 (WEA-2 E-138) 20:10	18:56 (WEA-3 E-160) 06:00 19:26 (WEA-3 E-160) 21:01	07:33 (WEA08) 05:18 20:18 (WEA-4 E-160) 21:44
5	08:39 16:37	10:05 (WEA09) 08:07 11:18 (WEA-01) 17:27	10:41 (WEA-01) 07:12 11:23 (WEA-01) 18:18	16:13 (WEA-2 E-138) 07:01 16:16 (WEA-2 E-138) 20:12	18:56 (WEA-3 E-160) 05:58 19:25 (WEA-3 E-160) 21:02	19:52 (WEA-4 E-160) 05:18 20:18 (WEA-4 E-160) 21:45
6	08:39 16:38	10:06 (WEA09) 08:05 11:19 (WEA-01) 17:29	10:42 (WEA-01) 07:09 11:21 (WEA-01) 18:20	16:14 (WEA-2 E-138) 06:59 16:16 (WEA-2 E-138) 20:13	18:56 (WEA-3 E-160) 05:56 19:24 (WEA-3 E-160) 21:04	19:52 (WEA-4 E-160) 05:17 20:17 (WEA-4 E-160) 21:46
7	08:39 16:39	10:07 (WEA09) 08:04 11:19 (WEA-01) 17:31	10:43 (WEA-01) 07:07 11:20 (WEA-01) 18:22	16:15 (WEA-2 E-138) 06:56 16:14 (WEA-2 E-138) 20:15	18:57 (WEA-3 E-160) 05:55 19:23 (WEA-3 E-160) 21:05	19:52 (WEA-4 E-160) 05:16 20:16 (WEA-4 E-160) 21:47
8	08:38 16:41	10:08 (WEA09) 08:02 11:19 (WEA-01) 17:33	10:44 (WEA-01) 07:05 11:18 (WEA-01) 18:24	16:14 (WEA-2 E-138) 06:54 16:16 (WEA-2 E-138) 20:17	18:58 (WEA-3 E-160) 05:53 19:22 (WEA-3 E-160) 21:07	19:53 (WEA-4 E-160) 05:16 20:16 (WEA-4 E-160) 21:48
9	08:38 16:42	10:10 (WEA09) 08:00 11:21 (WEA-01) 17:35	10:46 (WEA-01) 07:03 11:16 (WEA-01) 18:25	16:16 (WEA-2 E-138) 06:52 16:16 (WEA-2 E-138) 20:19	18:59 (WEA-3 E-160) 05:51 19:20 (WEA-3 E-160) 21:09	19:53 (WEA-4 E-160) 05:15 20:15 (WEA-4 E-160) 21:49
10	08:37 16:43	10:12 (WEA09) 07:58 11:21 (WEA-01) 17:37	10:49 (WEA-01) 07:01 11:13 (WEA-01) 18:27	16:16 (WEA-2 E-138) 06:50 16:51 (WEA-2 E-138) 20:20	19:20 (WEA-3 E-160) 05:49 19:18 (WEA-3 E-160) 21:10	19:54 (WEA-4 E-160) 05:15 20:15 (WEA-4 E-160) 21:50
11	08:37 16:45	10:29 (WEA-01) 07:57 11:21 (WEA-01) 17:38	10:53 (WEA-01) 06:59 11:11 (WEA-01) 18:29	16:18 (WEA-2 E-138) 06:47 16:49 (WEA-2 E-138) 20:22	19:18 (WEA-3 E-160) 05:48 19:15 (WEA-3 E-160) 21:12	20:15 (WEA-4 E-160) 05:15 20:13 (WEA-4 E-160) 21:50
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14	08:35 16:49	10:30 (WEA-01) 07:51 11:24 (WEA-01) 17:44	16:31 (WEA-2 E-138) 06:51 17:09 (WEA-1) 18:34	16:24 (WEA-2 E-138) 06:41 16:42 (WEA-2 E-138) 20:27	19:11 (WEA-3 E-160) 05:44 19:11 (WEA-3 E-160) 21:17	20:01 (WEA-4 E-160) 05:14 20:08 (WEA-4 E-160) 21:52
15	08:34 16:51	10:30 (WEA-01) 07:49 11:24 (WEA-01) 17:46	16:27 (WEA-2 E-138) 06:49 17:11 (WEA-1) 18:36	16:36 (WEA-2 E-138) 06:39 07:20 (WEA03) 20:29	19:11 (WEA-3 E-160) 05:43 19:11 (WEA-3 E-160) 21:18	20:01 (WEA-4 E-160) 05:14 20:08 (WEA-4 E-160) 21:53
16	08:33 16:52	10:31 (WEA-01) 07:47 11:25 (WEA-01) 17:48	16:27 (WEA-2 E-138) 06:47 17:13 (WEA-1) 18:38	16:36 (WEA-2 E-138) 06:36 07:17 (WEA03) 20:30	19:11 (WEA-3 E-160) 05:42 19:11 (WEA-3 E-160) 21:20	20:01 (WEA-4 E-160) 05:13 20:08 (WEA-4 E-160) 21:53
17	08:32 16:54	09:03 (WEA05) 07:45 11:25 (WEA-01) 17:49	16:27 (WEA-2 E-138) 06:45 17:14 (WEA-1) 18:39	16:36 (WEA-2 E-138) 06:34 07:33 (WEA03) 20:32	19:11 (WEA-3 E-160) 05:41 19:11 (WEA-3 E-160) 21:21	20:01 (WEA-4 E-160) 05:13 20:08 (WEA-4 E-160) 21:54
18	08:31 16:55	09:01 (WEA05) 07:43 11:26 (WEA-01) 17:51	16:27 (WEA-2 E-138) 06:42 17:14 (WEA-1) 18:41	16:36 (WEA-2 E-138) 06:32 07:34 (WEA03) 20:34	19:11 (WEA-3 E-160) 05:40 19:11 (WEA-3 E-160) 21:23	20:01 (WEA-4 E-160) 05:13 20:08 (WEA-4 E-160) 21:54
19	08:30 16:57	08:59 (WEA05) 07:41 11:25 (WEA-01) 17:53	16:27 (WEA-2 E-138) 06:40 17:14 (WEA-1) 18:43	16:36 (WEA-2 E-138) 06:30 07:35 (WEA03) 20:35	19:11 (WEA-3 E-160) 05:39 19:11 (WEA-3 E-160) 21:24	20:01 (WEA-4 E-160) 05:13 20:08 (WEA-4 E-160) 21:55
20	08:29 16:59	08:59 (WEA05) 07:39 11:26 (WEA-01) 17:55	16:27 (WEA-2 E-138) 06:38 17:15 (WEA-1) 18:45	16:36 (WEA-2 E-138) 06:28 07:12 (WEA03) 20:37	19:11 (WEA-3 E-160) 05:38 19:11 (WEA-3 E-160) 21:26	20:01 (WEA-4 E-160) 05:13 20:08 (WEA-4 E-160) 21:55
21	08:28 17:00	08:59 (WEA05) 07:37 11:26 (WEA-01) 17:57	16:27 (WEA-2 E-138) 06:35 17:15 (WEA-1) 18:46	16:36 (WEA-2 E-138) 06:26 07:11 (WEA03) 20:39	19:11 (WEA-3 E-160) 05:37 19:11 (WEA-3 E-160) 21:27	20:01 (WEA-4 E-160) 05:13 20:08 (WEA-4 E-160) 21:55
22	08:27 17:02	08:59 (WEA05) 07:35 11:27 (WEA-01) 17:59	16:27 (WEA-2 E-138) 06:33 17:15 (WEA-1) 18:48	16:36 (WEA-2 E-138) 06:24 07:11 (WEA03) 20:40	19:11 (WEA-3 E-160) 05:36 19:11 (WEA-3 E-160) 21:28	20:01 (WEA-4 E-160) 05:14 20:08 (WEA-4 E-160) 21:56
23	08:26 17:04	08:58 (WEA05) 07:33 11:27 (WEA-01) 18:00	16:27 (WEA-2 E-138) 06:31 17:15 (WEA-1) 18:50	16:36 (WEA-2 E-138) 06:22 07:11 (WEA03) 20:42	19:11 (WEA-3 E-160) 05:35 20:11 (WEA-4 E-160) 21:30	20:01 (WEA-4 E-160) 05:14 20:08 (WEA-4 E-160) 21:56
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25	08:23 17:07	08:57 (WEA05) 07:29 11:27 (WEA-01) 18:04	16:27 (WEA-2 E-138) 06:26 17:15 (WEA-1) 18:53	16:36 (WEA-2 E-138) 06:17 18:22 (WEA-3 E-160) 20:46	19:11 (WEA-3 E-160) 05:33 20:15 (WEA-4 E-160) 21:33	20:01 (WEA-4 E-160) 05:15 20:08 (WEA-4 E-160) 21:56
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27	08:21 17:11	08:59 (WEA05) 07:25 11:27 (WEA-01) 18:08	16:27 (WEA-2 E-138) 06:22 17:13 (WEA-1) 18:56	16:36 (WEA-2 E-138) 06:13 18:25 (WEA-3 E-160) 20:49	19:11 (WEA-3 E-160) 05:31 20:17 (WEA-4 E-160) 21:35	20:01 (WEA-4 E-160) 05:15 20:08 (WEA-4 E-160) 21:56
28	08:19 17:13	08:59 (WEA05) 07:23 11:27 (WEA-01) 18:09	16:27 (WEA-2 E-138) 06:19 17:11 (WEA-1) 18:58	16:36 (WEA-2 E-138) 06:11 18:26 (WEA-3 E-160) 20:51	19:11 (WEA-3 E-160) 05:30 20:17 (WEA-4 E-160) 21:36	20:01 (WEA-4 E-160) 05:16 20:08 (WEA-4 E-160) 21:56
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31	08:15 17:18	09:01 (WEA05) 07:17 11:26 (WEA-01) 18:09	16:27 (WEA-2 E-138) 06:13 17:12 (WEA-1) 19:00	16:36 (WEA-2 E-138) 06:06 18:26 (WEA-3 E-160) 20:54	19:11 (WEA-3 E-160) 05:27 20:17 (WEA-4 E-160) 21:39	20:01 (WEA-4 E-160) 05:17 20:08 (WEA-4 E-160) 21:56
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	2000	1453	984	1063	871	371
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	0,46
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,57	0,66	0,69	0,68	0,63	0,63
Gesamte Reduktion	0,09	0,16	0,17	0,23	0,24	0,24
Met.wahrsch.Beschattung	182	238	167	241	88	

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 19/2 - IP 19/2 Große Heide 22

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	1 Juli	August	September	Oktober	November	Dezember
1 05:18	05:54	20:07 (WEA-4 E-160) 06:43	07:34 (WEA08) 07:32	16:59 (WEA-2 E-138) 07:26	10:18 (WEA-01) 08:16	10:11 (WEA-01)
21:55	21:23	17 20:24 (WEA-4 E-160) 20:22	30 19:14 (WEA-3 E-160) 19:13	27 17:26 (WEA-2 E-138) 17:07	25 10:43 (WEA-01) 16:27	53 11:04 (WEA-01)
2 05:18	05:55	20:05 (WEA-4 E-160) 06:45	07:37 (WEA08) 07:34	16:57 (WEA-2 E-138) 07:27	10:16 (WEA-01) 08:18	09:56 (WEA09)
21:55	21:22	19 20:24 (WEA-4 E-160) 20:19	29 19:17 (WEA-3 E-160) 19:10	30 17:27 (WEA-2 E-138) 17:05	30 10:46 (WEA-01) 16:26	57 11:04 (WEA-01)
3 05:19	05:57	20:04 (WEA-4 E-160) 06:47	21 18:56 (WEA-3 E-160) 07:35	16:54 (WEA-2 E-138) 07:29	10:14 (WEA-01) 08:19	09:53 (WEA09)
21:54	21:20	20:01 (WEA-4 E-160) 06:43	21 19:17 (WEA-3 E-160) 07:32	34 17:28 (WEA-2 E-138) 17:03	34 10:48 (WEA-01) 16:25	62 11:04 (WEA-01)
4 05:20	05:59	20:03 (WEA-4 E-160) 06:48	24 18:55 (WEA-3 E-160) 07:37	16:53 (WEA-2 E-138) 07:31	10:12 (WEA-01) 08:20	09:53 (WEA09)
21:54	21:18	23 20:26 (WEA-4 E-160) 20:15	24 19:19 (WEA-3 E-160) 19:06	36 17:29 (WEA-2 E-138) 17:01	38 10:50 (WEA-01) 16:25	64 11:05 (WEA-01)
5 05:21	06:00	20:02 (WEA-4 E-160) 06:50	24 18:54 (WEA-3 E-160) 07:39	16:52 (WEA-2 E-138) 07:33	10:11 (WEA-01) 08:22	09:52 (WEA09)
21:53	21:17	24 20:26 (WEA-4 E-160) 20:13	26 19:20 (WEA-3 E-160) 19:03	38 17:30 (WEA-2 E-138) 17:00	40 10:51 (WEA-01) 16:24	64 11:04 (WEA-01)
6 05:21	06:02	20:02 (WEA-4 E-160) 06:51	28 18:52 (WEA-3 E-160) 07:40	16:51 (WEA-2 E-138) 07:34	10:10 (WEA-01) 08:23	09:52 (WEA09)
21:53	21:15	25 20:27 (WEA-4 E-160) 20:10	28 19:20 (WEA-3 E-160) 19:01	40 17:31 (WEA-2 E-138) 16:58	43 10:53 (WEA-01) 16:24	65 11:04 (WEA-01)
7 05:22	06:03	20:01 (WEA-4 E-160) 06:53	30 19:19 (WEA-3 E-160) 18:52	17:32 (WEA-2 E-138) 16:51	62 10:57 (WEA-01) 16:23	68 11:05 (WEA-01)
21:52	21:13	26 20:27 (WEA-4 E-160) 20:08	28 19:20 (WEA-3 E-160) 18:59	42 17:31 (WEA-2 E-138) 16:56	45 10:54 (WEA-01) 16:23	67 11:05 (WEA-01)
8 05:23	06:05	07:47 (WEA08) 06:55	30 19:20 (WEA-3 E-160) 18:54	43 17:31 (WEA-2 E-138) 16:54	51 10:55 (WEA-01) 16:23	66 11:05 (WEA-01)
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26 05:45	06:34	07:28 (WEA08) 07:24	21 08:17 (WEA03) 17:20	61 16:43 (WEA-1) 16:32	58 11:02 (WEA-01) 16:26	68 11:11 (WEA-01)
21:33	20:35	32 08:00 (WEA08) 19:24	19 08:16 (WEA03) 17:18	51 16:42 (WEA-1) 16:31	54 11:03 (WEA-01) 16:27	68 11:11 (WEA-01)
27 05:47	06:35	07:29 (WEA08) 07:25	19 08:16 (WEA03) 17:18	51 16:42 (WEA-1) 16:31	54 11:03 (WEA-01) 16:27	68 11:11 (WEA-01)
21:31	20:33	31 08:00 (WEA08) 19:22	15 08:13 (WEA03) 17:16	32 15:57 (WEA-2 E-138) 08:10	54 11:03 (WEA-01) 16:28	69 11:13 (WEA-01)
28 05:48	06:37	07:29 (WEA08) 07:27	15 08:13 (WEA03) 17:16	32 15:57 (WEA-2 E-138) 08:10	54 11:03 (WEA-01) 16:28	69 11:13 (WEA-01)
21:30	20:31	29 07:58 (WEA08) 19:19	11 08:11 (WEA03) 17:14	18 16:02 (WEA-2 E-138) 08:12	54 11:03 (WEA-01) 16:28	69 11:13 (WEA-01)
29 05:49	06:39	07:30 (WEA08) 07:29	11 08:11 (WEA03) 17:14	18 16:02 (WEA-2 E-138) 08:12	54 11:03 (WEA-01) 16:28	69 11:13 (WEA-01)
21:28	20:28	28 07:58 (WEA08) 19:17	17 17:21 (WEA-2 E-138) 17:12	8 16:38 (WEA-1) 16:30	53 11:03 (WEA-01) 16:29	68 11:14 (WEA-01)
30 05:51	20:10 (WEA-4 E-160) 06:40	07:31 (WEA08) 07:30	17 17:21 (WEA-2 E-138) 17:12	8 16:38 (WEA-1) 16:30	53 11:03 (WEA-01) 16:29	68 11:14 (WEA-01)
21:27	10 20:20 (WEA-4 E-160) 20:26	24 07:55 (WEA08) 19:15	21 17:23 (WEA-2 E-138) 17:10	8 10:34 (WEA-01) 16:27	53 11:04 (WEA-01) 16:30	69 11:14 (WEA-01)
31 05:52	20:08 (WEA-4 E-160) 06:42	07:33 (WEA08) 07:30	21 17:23 (WEA-2 E-138) 17:10	8 10:34 (WEA-01) 16:27	53 11:04 (WEA-01) 16:30	69 11:14 (WEA-01)
21:25	14 20:22 (WEA-4 E-160) 20:24	26 19:11 (WEA-3 E-160) 07:33	17 07:24 (WEA08) 07:24	19 10:40 (WEA-01) 16:27	53 11:04 (WEA-01) 16:30	69 11:14 (WEA-01)
Sonnenscheinstunden 501		453	381	302	267	244
astr.max.mögl.Beschattung 24		1108	785	1572	1723	2064
Red.Sonnenscheinwahrsch. 0,41		0,43	0,36	0,32	0,23	0,15
Reduktion Betriebsdauer 0,84		0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung 0,62		0,66	0,67	0,70	0,57	0,57
Gesamte Reduktion 0,21		0,23	0,20	0,18	0,11	0,07
Met.wahrsch.Beschattung 5		257	156	287	183	141

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 20 - IP 20 Große Heide 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	09:16 (WEA04)	08:14	08:50 (WEA03)	07:20	07:10
1	16:32	09:32 (WEA04)	17:20	16:46 (WEA-1)	18:11	20:05
2	08:40	09:17 (WEA04)	08:12	08:48 (WEA03)	07:18	13
2	16:33	09:33 (WEA04)	17:22	16:47 (WEA-1)	18:13	17
3	08:40	09:17 (WEA04)	08:10	08:46 (WEA03)	07:16	20
3	16:34	09:34 (WEA04)	17:24	16:47 (WEA-1)	18:15	20
4	08:40	09:17 (WEA04)	08:09	08:45 (WEA03)	07:14	22
4	16:36	09:34 (WEA04)	17:25	16:48 (WEA-1)	18:17	22
5	08:39	09:17 (WEA04)	08:07	08:45 (WEA03)	07:12	23
5	16:37	09:35 (WEA04)	17:27	16:49 (WEA-1)	18:18	23
6	08:39	09:18 (WEA04)	08:05	08:44 (WEA03)	07:09	24
6	16:38	09:36 (WEA04)	17:29	16:49 (WEA-1)	18:20	24
7	08:39	09:18 (WEA04)	08:04	08:43 (WEA03)	07:07	25
7	16:39	09:37 (WEA04)	17:31	16:48 (WEA-1)	18:22	25
8	08:38	09:18 (WEA04)	08:02	08:43 (WEA03)	07:05	25
8	16:41	09:37 (WEA04)	17:33	16:48 (WEA-1)	18:24	25
9	08:38	09:18 (WEA04)	08:00	08:43 (WEA03)	07:03	25
9	16:42	09:38 (WEA04)	17:35	16:48 (WEA-1)	18:25	25
10	08:37	09:18 (WEA04)	07:58	08:43 (WEA03)	07:01	24
10	16:43	09:38 (WEA04)	17:37	16:47 (WEA-1)	18:27	24
11	08:37	09:18 (WEA04)	07:57	08:44 (WEA03)	06:58	22
11	16:45	09:38 (WEA04)	17:38	16:47 (WEA-1)	18:29	22
12	08:36	09:19 (WEA04)	07:55	08:44 (WEA03)	06:56	21
12	16:46	09:39 (WEA04)	17:40	16:46 (WEA-1)	18:31	21
13	08:35	09:20 (WEA04)	07:53	08:44 (WEA03)	06:54	18
13	16:48	09:40 (WEA04)	17:42	16:43 (WEA-1)	18:32	18
14	08:35	09:20 (WEA04)	07:51	08:45 (WEA03)	06:51	16
14	16:49	09:40 (WEA04)	17:44	16:44 (WEA-1)	18:34	16
15	08:34	09:21 (WEA04)	07:49	08:46 (WEA03)	06:49	12
15	16:51	09:40 (WEA04)	17:46	09:05 (WEA03)	18:36	12
16	08:33	09:21 (WEA04)	07:47	08:47 (WEA03)	06:47	3
16	16:52	09:40 (WEA04)	17:48	09:04 (WEA03)	18:38	3
17	08:32	09:22 (WEA04)	07:45	08:49 (WEA03)	06:45	
17	16:54	09:41 (WEA04)	17:49	09:02 (WEA03)	18:39	
18	08:31	09:23 (WEA04)	07:43	08:51 (WEA03)	06:42	
18	16:55	16:04 (WEA-2 E-138)	17:51	08:58 (WEA03)	18:41	
19	08:30	09:23 (WEA04)	07:41		06:40	
19	16:57	16:06 (WEA-2 E-138)	17:53		18:43	
20	08:29	09:24 (WEA04)	07:39		06:38	
20	16:59	16:09 (WEA-2 E-138)	17:55		18:45	
21	08:28	09:25 (WEA04)	07:37		06:35	
21	17:00	16:11 (WEA-2 E-138)	17:57		18:46	
22	08:27	09:27 (WEA04)	07:35		06:33	
22	17:02	16:12 (WEA-2 E-138)	17:59		18:48	
23	08:26	09:28 (WEA04)	07:33		06:31	
23	17:04	16:13 (WEA-2 E-138)	18:00		18:50	
24	08:25	15:49 (WEA-2 E-138)	07:31		06:28	
24	17:06	16:15 (WEA-2 E-138)	18:02		18:51	
25	08:23	15:48 (WEA-2 E-138)	07:29		06:26	
25	17:07	16:15 (WEA-2 E-138)	18:04		18:53	
26	08:22	15:48 (WEA-2 E-138)	07:27		06:24	
26	17:09	16:16 (WEA-2 E-138)	18:06		18:55	
27	08:21	15:48 (WEA-2 E-138)	07:25		06:22	
27	17:11	16:18 (WEA-2 E-138)	18:08		18:56	
28	08:19	15:47 (WEA-2 E-138)	07:23		06:19	
28	17:13	16:38 (WEA-1)	18:09		18:58	
29	08:18	15:47 (WEA-2 E-138)			07:17	
29	17:14	16:41 (WEA-1)			20:00	
30	08:17	15:47 (WEA-2 E-138)			07:15	
30	17:16	16:44 (WEA-1)			20:02	
31	08:15	15:47 (WEA-2 E-138)			07:12	
31	17:18	16:45 (WEA-1)			20:03	
	Sonnenscheinstunden	259	278	367	416	498
	astr.max.mögl.Beschattung	783	969	1083	310	
	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	
	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	
	Reduktion Windrichtung	0,63	0,67	0,64	0,66	
	Gesamte Reduktion	0,10	0,17	0,16	0,23	
	Met.wahrsch.Beschattung	81	164	173	70	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 20 - IP 20 Große Heide 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember				
1	05:18 21:55	05:54 21:23	06:43 20:22	19:16 (WEA-4 E-160) 19:38 (WEA-4 E-160)	07:32 19:13	08:39 (WEA08) 18:32 (WEA-3 E-160)	07:26 17:07	08:12 (WEA03) 16:17 (WEA-1)	08:16 16:27	09:01 (WEA04) 09:21 (WEA04)
2	05:19 21:55	05:57 21:22	06:47 20:19	19:14 (WEA-4 E-160) 19:39 (WEA-4 E-160)	07:35 19:10	08:39 (WEA08) 18:32 (WEA-3 E-160)	07:29 17:05	08:13 (WEA03) 16:17 (WEA-1)	08:19 16:26	09:01 (WEA04) 09:21 (WEA04)
3	05:20 21:54	05:59 21:20	06:48 20:17	19:14 (WEA-4 E-160) 19:39 (WEA-4 E-160)	07:37 19:08	08:39 (WEA08) 18:31 (WEA-3 E-160)	07:31 17:03	08:13 (WEA03) 16:18 (WEA-1)	08:20 16:25	09:03 (WEA04) 09:22 (WEA04)
4	05:21 21:53	06:00 21:17	06:50 20:15	19:14 (WEA-4 E-160) 19:39 (WEA-4 E-160)	07:39 19:06	08:40 (WEA08) 18:31 (WEA-3 E-160)	07:33 17:01	08:14 (WEA03) 16:18 (WEA-1)	08:22 16:25	09:03 (WEA04) 09:22 (WEA04)
5	05:21 21:53	06:02 21:15	06:51 20:13	19:14 (WEA-4 E-160) 19:39 (WEA-4 E-160)	07:40 19:03	08:41 (WEA08) 18:30 (WEA-3 E-160)	07:34 16:59	08:15 (WEA03) 16:18 (WEA-1)	08:23 16:24	09:03 (WEA04) 09:22 (WEA04)
6	05:22 21:52	06:03 21:13	06:52 20:08	19:14 (WEA-4 E-160) 19:37 (WEA-4 E-160)	07:42 18:59	08:41 (WEA08) 18:27 (WEA-3 E-160)	07:36 16:56	08:16 (WEA03) 16:18 (WEA-1)	08:24 16:23	09:04 (WEA04) 09:22 (WEA04)
7	05:23 21:52	06:05 21:11	06:55 20:06	19:14 (WEA-4 E-160) 19:36 (WEA-4 E-160)	07:44 18:57	08:42 (WEA08) 18:26 (WEA-3 E-160)	07:38 16:54	08:17 (WEA03) 16:18 (WEA-1)	08:26 16:23	09:05 (WEA04) 09:22 (WEA04)
8	05:24 21:51	06:06 21:09	06:56 20:04	19:15 (WEA-4 E-160) 19:35 (WEA-4 E-160)	07:45 18:54	08:43 (WEA08) 18:24 (WEA-3 E-160)	07:40 16:53	08:19 (WEA03) 16:18 (WEA-1)	08:27 16:23	09:05 (WEA04) 09:22 (WEA04)
9	05:25 21:50	06:08 21:08	06:58 20:01	19:15 (WEA-4 E-160) 19:33 (WEA-4 E-160)	07:47 18:52	08:45 (WEA08) 18:21 (WEA-3 E-160)	07:42 16:51	08:21 (WEA03) 16:17 (WEA-1)	08:28 16:23	09:06 (WEA04) 09:22 (WEA04)
10	05:26 21:50	06:10 21:06	06:59 19:59	19:17 (WEA-4 E-160) 19:31 (WEA-4 E-160)	07:49 18:50	08:47 (WEA08) 09:03 (WEA08)	07:43 16:50	15:19 (WEA-2 E-138) 16:17 (WEA-1)	08:29 16:22	09:07 (WEA04) 09:23 (WEA04)
11	05:27 21:49	06:11 21:04	07:01 19:57	19:19 (WEA-4 E-160) 19:27 (WEA-4 E-160)	07:51 18:48	08:52 (WEA08) 08:59 (WEA08)	07:45 16:48	15:19 (WEA-2 E-138) 16:16 (WEA-1)	08:30 16:22	09:08 (WEA04) 12:11 (WEA-01)
12	05:28 21:48	06:13 21:02	07:03 19:54	07:03 18:45	07:52 18:45	07:47 16:47	16:48 41	15:19 (WEA-2 E-138) 16:13 (WEA-1)	08:31 16:22	09:09 (WEA04) 11:58 (WEA-01)
13	05:29 21:47	06:14 21:00	07:04 19:52	07:04 18:43	07:54 18:43	07:49 16:45	35	15:19 (WEA-2 E-138) 16:10 (WEA-1)	08:32 16:22	09:09 (WEA04) 12:00 (WEA-01)
14	05:31 21:46	06:16 20:58	07:06 19:50	07:06 18:41	07:56 18:41	07:50 16:44	30	15:20 (WEA-2 E-138) 15:50 (WEA-2 E-138)	08:33 16:22	09:09 (WEA04) 12:00 (WEA-01)
15	05:32 21:45	06:18 20:56	07:08 19:47	07:08 18:39	07:57 18:39	07:52 16:42	28	15:21 (WEA-2 E-138) 15:49 (WEA-2 E-138)	08:34 16:22	09:10 (WEA04) 12:01 (WEA-01)
16	05:33 21:44	06:19 20:54	07:09 19:45	07:09 18:37	07:59 18:37	07:54 16:41	27	15:22 (WEA-2 E-138) 15:49 (WEA-2 E-138)	08:34 16:23	09:11 (WEA04) 12:02 (WEA-01)
17	05:34 21:43	06:21 20:52	07:11 19:43	07:11 08:56 (WEA08)	08:01 08:01	07:56 16:40	26	15:23 (WEA-2 E-138) 15:49 (WEA-2 E-138)	08:35 16:23	09:12 (WEA04) 12:03 (WEA-01)
18	05:36 21:42	06:22 20:50	07:12 19:40	07:12 08:53 (WEA08)	08:03 08:03	07:57 16:38	32	09:03 (WEA04) 15:48 (WEA-2 E-138)	08:36 16:23	09:12 (WEA04) 12:04 (WEA-01)
19	05:37 21:41	06:24 20:48	07:14 19:38	07:14 08:50 (WEA08)	08:04 08:04	07:59 16:37	33	09:02 (WEA04) 15:47 (WEA-2 E-138)	08:37 16:24	09:13 (WEA04) 12:05 (WEA-01)
20	05:38 21:39	06:26 20:46	07:16 19:36	07:16 08:48 (WEA08)	08:06 08:06	08:01 16:36	34	09:00 (WEA04) 15:46 (WEA-2 E-138)	08:38 16:24	09:14 (WEA04) 12:06 (WEA-01)
21	05:39 21:38	06:27 20:44	07:17 19:33	07:17 08:46 (WEA08)	08:08 08:08	08:02 16:35	32	09:00 (WEA04) 15:45 (WEA-2 E-138)	08:38 16:24	09:14 (WEA04) 12:06 (WEA-01)
22	05:41 21:37	06:29 20:41	07:19 19:31	07:19 08:45 (WEA08)	08:10 08:10	08:04 16:34	29	09:00 (WEA04) 15:43 (WEA-2 E-138)	08:38 16:25	09:15 (WEA04) 12:07 (WEA-01)
23	05:42 21:35	06:30 20:39	07:21 19:29	07:21 08:44 (WEA08)	08:11 08:11	08:06 09:20 (WEA03)	08:06 25	09:00 (WEA04) 15:41 (WEA-2 E-138)	08:39 16:25	09:15 (WEA04) 12:07 (WEA-01)
24	05:44 21:34	06:32 20:37	07:22 19:26	07:22 08:42 (WEA08)	07:13 07:13	08:07 08:32 (WEA03)	19	08:59 (WEA04) 09:18 (WEA04)	08:39 16:26	09:15 (WEA04) 12:07 (WEA-01)
25	05:45 21:33	06:34 20:35	07:24 19:24	07:24 08:42 (WEA08)	07:15 07:15	08:09 08:34 (WEA03)	18	08:59 (WEA04) 08:15 (WEA03)	08:39 16:27	09:15 (WEA04) 12:06 (WEA-01)
26	05:46 21:31	06:35 20:33	07:25 19:23	07:25 08:40 (WEA08)	07:18 07:18	08:10 08:15 (WEA03)	20	09:00 (WEA04) 09:19 (WEA04)	08:40 16:28	09:16 (WEA04) 12:07 (WEA-01)
27	05:48 21:30	06:37 20:31	07:27 19:21	07:27 08:40 (WEA08)	07:20 07:20	08:12 15:42 (WEA-2 E-138)	19	09:00 (WEA04) 09:20 (WEA04)	08:40 16:28	09:16 (WEA04) 12:07 (WEA-01)
28	05:49 21:28	06:38 20:28	07:29 19:18	07:29 08:40 (WEA08)	07:22 07:22	08:13 (WEA03) 16:13 (WEA-1)	20	09:00 (WEA04) 09:20 (WEA04)	08:40 16:29	09:16 (WEA04) 12:07 (WEA-01)
29	05:51 21:27	06:40 20:26	07:30 19:17	07:30 08:39 (WEA08)	07:22 07:22	08:15 16:14 (WEA-1)	20	09:01 (WEA04) 09:21 (WEA04)	08:40 16:30	09:17 (WEA04) 12:06 (WEA-01)
30	05:52 21:25	06:42 20:24	07:31 19:17	07:31 08:39 (WEA08)	07:24 07:24	08:16 (WEA-1) 16:16 (WEA-1)	20	08:40 16:31	08:40 16:31	09:17 (WEA04) 12:06 (WEA-01)
31	Sonnenscheinstunden	501	453	381	332	267	1290	244	754	0,15
	astr.max.mögl.Beschattung			788	838		0,23		0,15	0,84
	Red.Sonnenscheinwahrsch.			0,36	0,32		0,84		0,67	0,07
	Reduktion Betriebsdauer			0,84	0,84		0,13		0,13	0,57
	Reduktion Windrichtung			0,65	0,65		165		165	0,07
	Gesamte Reduktion			0,19	0,17					
	Met.wahrsch.Beschattung			153	143					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 34 - IP 34 Marbecker Straße 114

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1	08:40 16:32	08:14 17:20	07:21 18:11	07:10 20:05	07:47 (WEA-2 E-138) 06:06	05:21 21:41	50	06:23 (WEA-3 E-160) 07:13 (WEA-3 E-160)
2	08:40 16:34	08:12 17:22	07:18 18:13	07:08 20:07	07:46 (WEA-2 E-138) 06:04	05:20 21:42	50	06:23 (WEA-3 E-160) 07:13 (WEA-3 E-160)
3	08:40 16:35	08:10 17:24	07:16 18:15	08:05 (WEA-1) 07:06	07:47 (WEA-2 E-138) 06:02	05:19 21:43	51	06:23 (WEA-3 E-160) 07:14 (WEA-3 E-160)
4	08:40 16:36	08:09 17:26	07:14 18:17	08:02 (WEA-1) 07:03	07:47 (WEA-2 E-138) 06:00	05:18 21:44	51	06:23 (WEA-3 E-160) 07:14 (WEA-3 E-160)
5	08:40 16:37	08:07 17:27	07:12 18:19	08:22 (WEA-1) 20:10	08:11 (WEA-2 E-138) 20:59	05:18 21:45	52	06:23 (WEA-3 E-160) 07:15 (WEA-3 E-160)
6	08:39 16:38	08:06 17:29	07:10 18:20	07:35 (WEA02) 07:01	07:48 (WEA-2 E-138) 05:58	05:17 21:46	52	06:23 (WEA-3 E-160) 07:16 (WEA-3 E-160)
7	08:39 16:39	08:04 17:31	07:07 18:22	08:26 (WEA-1) 20:14	08:08 (WEA-2 E-138) 21:06	05:16 21:47	53	06:23 (WEA-3 E-160) 07:16 (WEA-3 E-160)
8	08:38 16:41	08:02 17:33	07:05 18:24	07:30 (WEA02) 06:57	07:49 (WEA-2 E-138) 05:55	05:16 21:48	53	06:23 (WEA-3 E-160) 07:16 (WEA-3 E-160)
9	08:38 16:42	08:00 17:35	07:03 18:26	08:28 (WEA-1) 20:19	08:04 (WEA-2 E-138) 21:07	05:15 21:49	54	06:23 (WEA-3 E-160) 07:17 (WEA-3 E-160)
10	08:37 16:43	07:59 17:37	07:01 18:27	07:53 (WEA-1) 06:50	08:01 (WEA-2 E-138) 05:49	05:15 21:50	54	06:23 (WEA-3 E-160) 07:17 (WEA-3 E-160)
11	08:37 16:45	07:57 17:39	06:58 18:29	08:30 (WEA-1) 20:20	07:51 (WEA-1) 06:48	05:15 21:51	54	06:23 (WEA-3 E-160) 07:17 (WEA-3 E-160)
12	08:36 16:46	07:55 17:40	06:56 18:31	08:29 (WEA-1) 20:22	07:51 (WEA-1) 06:45	05:14 21:51	54	06:23 (WEA-3 E-160) 07:17 (WEA-3 E-160)
13	08:36 16:48	07:53 17:42	06:54 18:33	08:30 (WEA-1) 20:25	07:50 (WEA-1) 06:43	05:14 21:52	55	06:23 (WEA-3 E-160) 07:18 (WEA-3 E-160)
14	08:35 16:49	07:51 17:44	06:52 18:34	07:49 (WEA-1) 06:41	08:30 (WEA-1) 20:24	05:14 21:53	54	06:24 (WEA-3 E-160) 07:18 (WEA-3 E-160)
15	08:34 16:51	07:49 17:46	06:49 18:36	08:29 (WEA-1) 20:29	07:49 (WEA-1) 06:39	05:14 21:53	55	06:24 (WEA-3 E-160) 07:19 (WEA-3 E-160)
16	08:33 16:52	07:47 17:48	06:47 18:38	08:29 (WEA-1) 20:30	07:49 (WEA-1) 06:37	05:14 21:54	55	06:24 (WEA-3 E-160) 07:19 (WEA-3 E-160)
17	08:32 16:54	07:45 17:50	06:45 18:39	08:29 (WEA-1) 20:30	07:48 (WEA-1) 06:34	05:13 21:54	55	06:24 (WEA-3 E-160) 07:19 (WEA-3 E-160)
18	08:31 16:56	07:43 17:51	06:42 18:41	08:28 (WEA-1) 20:32	07:49 (WEA-1) 06:32	05:13 21:54	55	06:24 (WEA-3 E-160) 07:19 (WEA-3 E-160)
19	08:30 16:57	07:41 17:53	06:40 18:43	08:28 (WEA-1) 20:34	07:49 (WEA-1) 06:30	05:13 21:54	55	06:25 (WEA-3 E-160) 07:19 (WEA-3 E-160)
20	08:29 16:59	07:39 17:55	06:38 18:45	07:49 (WEA-1) 06:28	08:27 (WEA-1) 20:36	05:13 21:55	54	06:25 (WEA-3 E-160) 07:19 (WEA-3 E-160)
21	08:28 17:01	07:37 17:57	06:36 18:46	07:49 (WEA-1) 06:26	07:49 (WEA-1) 06:28	05:14 21:55	55	06:25 (WEA-3 E-160) 07:20 (WEA-3 E-160)
22	08:27 17:02	07:35 17:59	06:33 18:48	07:49 (WEA-1) 06:24	08:26 (WEA-1) 20:37	05:14 21:55	55	06:25 (WEA-3 E-160) 07:20 (WEA-3 E-160)
23	08:26 17:04	07:33 18:01	06:31 18:50	07:50 (WEA-1) 06:22	07:49 (WEA-1) 06:26	05:14 21:55	54	06:26 (WEA-3 E-160) 07:20 (WEA-3 E-160)
24	08:25 17:06	07:31 18:02	06:29 18:51	07:52 (WEA-1) 06:20	08:25 (WEA-1) 20:39	05:14 21:56	55	06:26 (WEA-3 E-160) 07:20 (WEA-3 E-160)
25	08:23 17:07	07:29 18:04	06:26 18:53	08:20 (WEA-1) 20:44	07:50 (WEA-1) 06:22	05:15 21:56	55	06:26 (WEA-3 E-160) 07:20 (WEA-3 E-160)
26	08:22 17:09	07:27 18:06	06:24 18:55	06:56 (WEA-2 E-138) 06:18	08:18 (WEA-1) 20:46	05:15 21:56	55	06:26 (WEA-3 E-160) 07:21 (WEA-3 E-160)
27	08:21 17:11	07:25 18:08	06:22 18:57	06:54 (WEA-2 E-138) 06:16	08:16 (WEA-1) 20:47	05:15 21:56	55	06:26 (WEA-3 E-160) 07:21 (WEA-3 E-160)
28	08:19 17:13	07:23 18:10	06:19 18:58	06:51 (WEA-2 E-138) 06:14	08:11 (WEA-1) 20:49	05:16 21:56	55	06:26 (WEA-3 E-160) 07:21 (WEA-3 E-160)
29	08:18 17:15	07:21 18:12	06:17 19:00	06:50 (WEA-2 E-138) 06:12	08:20 (WEA-1) 20:44	05:16 21:56	54	06:27 (WEA-3 E-160) 07:21 (WEA-3 E-160)
30	08:17 17:16	07:20 18:11	06:16 19:01	07:12 (WEA-2 E-138) 20:51	07:49 (WEA-2 E-138) 06:10	05:17 21:56	54	06:27 (WEA-3 E-160) 07:21 (WEA-3 E-160)
31	08:15 17:18	07:18 18:13	06:14 19:02	08:13 (WEA-2 E-138) 20:52	08:13 (WEA-2 E-138) 06:08	05:17 21:56	55	06:27 (WEA-3 E-160) 07:22 (WEA-3 E-160)
	Sonnenscheinstunden	260	278	367	416	485	498	
	astr.max.mögl.Beschattung			954	178	636	1613	
	Red.Sonnenscheinwahrsch.			0,30	0,41	0,46	0,36	
	Reduktion Betriebsdauer			0,84	0,84	0,84	0,84	
	Reduktion Windrichtung			0,63	0,67	0,71	0,71	
	Gesamte Reduktion			0,16	0,23	0,27	0,22	
	Met.wahrsch.Beschattung			149	41	174	348	

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 34 - IP 34 Marbecker Straße 114

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	06:27 (WEA-3 E-160)	05:54	06:43		07:32		08:29 (WEA-1)	07:26	08:16	
	21:55	54 07:21 (WEA-3 E-160)	21:24	20:22		19:13	40	09:09 (WEA-1)	17:07	16:27	
2	05:18	06:28 (WEA-3 E-160)	05:56	06:45		07:34		08:30 (WEA-1)	07:27	08:18	
	21:55	53 07:21 (WEA-3 E-160)	21:22	20:20		19:10	38	09:08 (WEA-1)	17:05	16:26	
3	05:19	06:28 (WEA-3 E-160)	05:57	06:47		07:52 (WEA-2 E-138)	07:35	08:30 (WEA-1)	07:29	08:19	
	21:54	54 07:22 (WEA-3 E-160)	21:20	20:17	7	07:59 (WEA-2 E-138)	19:08	09:08 (WEA-1)	17:03	16:25	
4	05:20	06:28 (WEA-3 E-160)	05:59	06:48		07:48 (WEA-2 E-138)	07:37	08:30 (WEA-1)	07:31	08:21	
	21:54	53 07:21 (WEA-3 E-160)	21:18	20:15	13	08:01 (WEA-2 E-138)	19:06	09:06 (WEA-1)	17:01	16:25	
5	05:21	06:28 (WEA-3 E-160)	06:00	06:50		07:46 (WEA-2 E-138)	07:39	08:31 (WEA-1)	07:33	08:22	
	21:54	53 07:21 (WEA-3 E-160)	21:17	20:13	17	08:03 (WEA-2 E-138)	19:03	09:05 (WEA-1)	17:00	16:24	
6	05:22	06:29 (WEA-3 E-160)	06:02	06:52		07:44 (WEA-2 E-138)	07:40	08:32 (WEA-1)	07:35	08:23	
	21:53	53 07:22 (WEA-3 E-160)	21:15	20:11	20	08:04 (WEA-2 E-138)	19:01	09:04 (WEA-1)	16:58	16:24	
7	05:22	06:29 (WEA-3 E-160)	06:03	06:53		07:43 (WEA-2 E-138)	07:42	08:07 (WEA02)	07:36	08:24	
	21:52	53 07:22 (WEA-3 E-160)	21:13	20:08	22	08:05 (WEA-2 E-138)	18:59	09:02 (WEA-1)	16:56	16:24	
8	05:23	06:30 (WEA-3 E-160)	06:05	06:55		07:41 (WEA-2 E-138)	07:44	08:09 (WEA02)	07:38	08:26	
	21:52	52 07:22 (WEA-3 E-160)	21:11	20:06	24	08:05 (WEA-2 E-138)	18:57	09:01 (WEA-1)	16:55	16:23	
9	05:24	06:30 (WEA-3 E-160)	06:06	06:56		07:41 (WEA-2 E-138)	07:46	08:35 (WEA-1)	07:40	08:27	
	21:51	52 07:22 (WEA-3 E-160)	21:10	20:04	24	08:05 (WEA-2 E-138)	18:54	08:59 (WEA-1)	16:53	16:23	
10	05:25	06:31 (WEA-3 E-160)	06:08	06:58		07:40 (WEA-2 E-138)	07:47	08:38 (WEA-1)	07:42	08:28	
	21:50	51 07:22 (WEA-3 E-160)	21:08	20:01	25	08:05 (WEA-2 E-138)	18:52	08:56 (WEA-1)	16:51	16:23	
11	05:26	06:31 (WEA-3 E-160)	06:10	07:00		07:40 (WEA-2 E-138)	07:49	08:41 (WEA-1)	07:43	08:29	
	21:50	51 07:22 (WEA-3 E-160)	21:06	19:59	25	08:05 (WEA-2 E-138)	18:50	08:51 (WEA-1)	16:50	16:23	
12	05:27	06:32 (WEA-3 E-160)	06:11	07:01		07:40 (WEA-2 E-138)	07:51		07:45	08:30	
	21:49	50 07:22 (WEA-3 E-160)	21:04	19:57	25	08:05 (WEA-2 E-138)	18:48		16:48	16:22	
13	05:29	06:32 (WEA-3 E-160)	06:13	07:03		07:39 (WEA-2 E-138)	07:52		07:47	08:31	
	21:48	49 07:21 (WEA-3 E-160)	21:02	19:54	25	08:04 (WEA-2 E-138)	18:46		16:47	16:22	
14	05:30	06:33 (WEA-3 E-160)	06:14	07:04		07:40 (WEA-2 E-138)	07:54		07:49	08:32	
	21:47	48 07:21 (WEA-3 E-160)	21:00	19:52	23	08:03 (WEA-2 E-138)	18:43		16:45	16:22	
15	05:31	06:33 (WEA-3 E-160)	06:16	07:06		07:39 (WEA-2 E-138)	07:56		07:50	08:33	
	21:46	48 07:21 (WEA-3 E-160)	20:58	19:50	23	08:02 (WEA-2 E-138)	18:41		16:44	16:22	
16	05:32	06:34 (WEA-3 E-160)	06:18	07:08		07:41 (WEA-2 E-138)	07:57		07:52	08:34	
	21:45	46 07:20 (WEA-3 E-160)	20:56	19:47	30	08:59 (WEA-1)	18:39		16:42	16:23	
17	05:33	06:34 (WEA-3 E-160)	06:19	07:09		07:41 (WEA-2 E-138)	07:59		07:54	08:35	
	21:44	45 07:19 (WEA-3 E-160)	20:54	19:45	35	09:02 (WEA-1)	18:37		16:41	16:23	
18	05:34	06:35 (WEA-3 E-160)	06:21	07:11		07:43 (WEA-2 E-138)	08:01		07:56	08:35	
	21:43	44 07:19 (WEA-3 E-160)	20:52	19:43	37	09:05 (WEA-1)	18:35		16:40	16:23	
19	05:36	06:35 (WEA-3 E-160)	06:22	07:13		07:47 (WEA-2 E-138)	08:03		07:57	08:36	
	21:42	43 07:18 (WEA-3 E-160)	20:50	19:40	33	09:07 (WEA-1)	18:33		16:38	16:23	
20	05:37	06:37 (WEA-3 E-160)	06:24	07:14		08:37 (WEA-1)	08:04		07:59	08:37	
	21:41	41 07:18 (WEA-3 E-160)	20:48	19:38	31	09:08 (WEA-1)	18:31		16:37	16:24	
21	05:38	06:38 (WEA-3 E-160)	06:26	07:16		08:36 (WEA-1)	08:06		08:01	08:37	
	21:39	39 07:17 (WEA-3 E-160)	20:46	19:36	33	09:09 (WEA-1)	18:28		16:36	16:24	
22	05:40	06:38 (WEA-3 E-160)	06:27	07:17		08:34 (WEA-1)	08:08		08:02	08:38	
	21:38	38 07:16 (WEA-3 E-160)	20:44	19:33	35	09:09 (WEA-1)	18:26		16:35	16:25	
23	05:41	06:39 (WEA-3 E-160)	06:29	07:19		08:33 (WEA-1)	08:10		08:04	08:38	
	21:37	36 07:15 (WEA-3 E-160)	20:41	19:31	37	09:10 (WEA-1)	18:24		16:34	16:25	
24	05:42	06:41 (WEA-3 E-160)	06:31	07:21		08:33 (WEA-1)	08:11		08:06	08:39	
	21:36	33 07:14 (WEA-3 E-160)	20:39	19:29	38	09:11 (WEA-1)	18:22		16:33	16:26	
25	05:44	06:42 (WEA-3 E-160)	06:32	07:22		08:31 (WEA-1)	07:13		08:07	08:39	
	21:34	31 07:13 (WEA-3 E-160)	20:37	19:26	39	09:10 (WEA-1)	17:20		16:32	16:26	
26	05:45	06:44 (WEA-3 E-160)	06:34	07:24		08:31 (WEA-1)	07:15		08:09	08:39	
	21:33	27 07:11 (WEA-3 E-160)	20:35	19:24	40	09:11 (WEA-1)	17:18		16:31	16:27	
27	05:47	06:46 (WEA-3 E-160)	06:35	07:26		08:31 (WEA-1)	07:17		08:10	08:40	
	21:31	23 07:09 (WEA-3 E-160)	20:33	19:22	40	09:11 (WEA-1)	17:16		16:30	16:28	
28	05:48	06:48 (WEA-3 E-160)	06:37	07:27		08:30 (WEA-1)	07:18		08:12	08:40	
	21:30	19 07:07 (WEA-3 E-160)	20:31	19:20	40	09:10 (WEA-1)	17:14		16:29	16:28	
29	05:50	06:52 (WEA-3 E-160)	06:39	07:29		08:30 (WEA-1)	07:20		08:13	08:40	
	21:28	10 07:02 (WEA-3 E-160)	20:28	19:17	40	09:10 (WEA-1)	17:12		16:28	16:29	
30	05:51		06:40	07:31		08:30 (WEA-1)	07:22		08:15	08:40	
	21:27		20:26	19:15	40	09:10 (WEA-1)	17:11		16:27	16:30	
31	05:53		06:42				07:24			08:40	
	21:25		20:24				17:09			16:31	
Sonnenscheinstunden	501		453		381		332		267	244	
astr.max.mögl.Beschattung	1249				821		333				
Red.Sonnenscheinwahrsch.	0,41				0,36		0,32				
Reduktion Betriebsdauer	0,84				0,84		0,84				
Reduktion Windrichtung	0,71				0,64		0,62				
Gesamte Reduktion	0,25				0,19		0,16				
Met.wahrsch.Beschattung	309				158		54				

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 35 - IP 35 Windbrake 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März		April		Mai	Juni	
1	08:40	08:14	07:20		08:37 (WEA-1)	07:10	07:52 (WEA-2 E-138)	06:06	05:21
	16:32	17:20	18:11	50	09:27 (WEA-1)	20:05	08:24 (WEA-2 E-138)	20:56	21:41
2	08:40	08:12	07:18		07:42 (WEA02)	07:08	07:51 (WEA-2 E-138)	06:04	05:20
	16:34	17:22	18:13	55	09:28 (WEA-1)	20:07	08:23 (WEA-2 E-138)	20:57	21:42
3	08:40	08:10	07:16		07:39 (WEA02)	07:06	07:28 (WEA03)	06:02	05:19
	16:35	17:24	18:15	59	09:28 (WEA-1)	20:08	08:23 (WEA-2 E-138)	20:59	21:43
4	08:40	08:09	07:14		07:37 (WEA02)	07:03	07:26 (WEA03)	06:00	05:18
	16:36	17:26	18:17	61	09:29 (WEA-1)	20:10	08:23 (WEA-2 E-138)	21:01	21:44
5	08:40	08:07	07:12		07:38 (WEA02)	07:01	07:51 (WEA-2 E-138)	05:58	05:18
	16:37	17:27	18:18	60	09:30 (WEA-1)	20:12	08:23 (WEA-2 E-138)	21:02	21:45
6	08:39	08:06	07:10		08:33 (WEA-1)	06:59	07:50 (WEA-2 E-138)	05:56	05:17
	16:38	17:29	18:20	57	09:30 (WEA-1)	20:14	08:22 (WEA-2 E-138)	21:04	21:46
7	08:39	08:04	07:07		08:31 (WEA-1)	06:57	07:50 (WEA-2 E-138)	05:55	05:16
	16:39	17:31	18:22	59	09:30 (WEA-1)	20:15	08:21 (WEA-2 E-138)	21:06	21:47
8	08:38	08:02	07:05		08:31 (WEA-1)	06:54	07:50 (WEA-2 E-138)	05:53	05:16
	16:41	17:33	18:24	59	09:30 (WEA-1)	20:17	08:21 (WEA-2 E-138)	21:07	21:48
9	08:38	08:00	07:03		08:31 (WEA-1)	06:52	07:51 (WEA-2 E-138)	05:51	05:15
	16:42	17:35	18:26	59	09:30 (WEA-1)	20:19	08:20 (WEA-2 E-138)	21:09	21:49
10	08:37	07:59	07:01		08:31 (WEA-1)	06:50	07:52 (WEA-2 E-138)	05:49	05:15
	16:43	17:37	18:27	59	09:30 (WEA-1)	20:20	08:19 (WEA-2 E-138)	21:10	21:50
11	08:37	07:57	06:58		08:30 (WEA-1)	06:48	07:52 (WEA-2 E-138)	05:48	05:15
	16:45	17:38	18:29	59	09:29 (WEA-1)	20:22	08:16 (WEA-2 E-138)	21:12	21:51
12	08:36	07:55	06:56		08:30 (WEA-1)	06:45	07:53 (WEA-2 E-138)	05:46	05:14
	16:46	17:40	18:31	59	09:29 (WEA-1)	20:24	08:15 (WEA-2 E-138)	21:14	21:51
13	08:35	07:53	06:54		07:17 (WEA05)	06:43	07:55 (WEA-2 E-138)	05:44	05:14
	16:48	17:42	18:33	60	09:29 (WEA-1)	20:25	08:13 (WEA-2 E-138)	21:15	21:52
14	08:35	07:51	06:52		07:14 (WEA05)	06:41	07:57 (WEA-2 E-138)	05:43	05:14
	16:49	17:44	18:34	60	09:28 (WEA-1)	20:27	08:10 (WEA-2 E-138)	21:17	21:52
15	08:34	07:49	06:49		08:29 (WEA-1)	06:39		05:41	05:14
	16:51	17:46	18:36	58	09:27 (WEA-1)	20:29		21:18	21:53
16	08:33	07:47	06:47		08:29 (WEA-1)	06:37		05:40	05:13
	16:52	17:48	18:38	58	09:27 (WEA-1)	20:30		21:20	21:54
17	08:32	07:45	06:45		08:29 (WEA-1)	06:34		05:38	05:13
	16:54	17:50	18:39	56	09:25 (WEA-1)	20:32		21:21	21:54
18	08:31	07:43	06:42		08:29 (WEA-1)	06:32		05:37	05:13
	16:56	17:51	18:41	55	09:24 (WEA-1)	20:34		21:23	21:54
19	08:30	07:41	06:40		08:30 (WEA-1)	06:30		05:35	05:13
	16:57	17:53	18:43	54	09:24 (WEA-1)	20:36		21:24	21:55
20	08:29	07:39	09:01 (WEA-1)	06:38	08:30 (WEA-1)	06:28		05:34	05:14
	16:59	17:55	09:04 (WEA-1)	18:45	09:22 (WEA-1)	20:37		21:26	21:55
21	08:28	07:37	08:53 (WEA-1)	06:35	08:31 (WEA-1)	06:26		05:33	05:14
	17:01	17:57	09:12 (WEA-1)	18:46	09:21 (WEA-1)	20:39		21:27	21:55
22	08:27	07:35	08:50 (WEA-1)	06:33	08:32 (WEA-1)	06:24		05:31	05:14
	17:02	17:59	09:16 (WEA-1)	18:48	09:19 (WEA-1)	20:41		21:28	21:56
23	08:26	07:33	08:47 (WEA-1)	06:31	08:32 (WEA-1)	06:22		05:30	05:14
	17:04	18:01	09:19 (WEA-1)	18:50	09:17 (WEA-1)	20:42		21:30	21:56
24	08:25	07:31	08:45 (WEA-1)	06:29	06:51 (WEA04)	06:20		05:29	05:14
	17:06	18:02	09:21 (WEA-1)	18:51	09:15 (WEA-1)	20:44		21:31	21:56
25	08:23	07:29	08:43 (WEA-1)	06:26	07:06 (WEA-2 E-138)	06:18		05:28	05:15
	17:07	18:04	09:23 (WEA-1)	18:53	09:13 (WEA-1)	20:46		21:33	21:56
26	08:22	07:27	08:41 (WEA-1)	06:24	07:01 (WEA-2 E-138)	06:16		05:27	05:15
	17:09	18:06	09:24 (WEA-1)	18:55	09:10 (WEA-1)	20:47		21:34	21:56
27	08:21	07:25	08:39 (WEA-1)	06:22	06:59 (WEA-2 E-138)	06:14		05:26	05:16
	17:11	18:08	09:25 (WEA-1)	18:57	09:08 (WEA-1)	20:49		21:35	21:56
28	08:19	07:23	08:38 (WEA-1)	06:19	06:57 (WEA-2 E-138)	06:12		05:24	05:16
	17:13	18:10	09:26 (WEA-1)	18:58	09:04 (WEA-1)	20:51		21:36	21:56
29	08:18		07:17		07:56 (WEA-2 E-138)	06:10		05:23	05:17
	17:15		20:00	43	10:00 (WEA-1)	20:52		21:38	21:56
30	08:17		07:15		07:54 (WEA-2 E-138)	06:08		05:23	05:17
	17:16		20:02	29	08:23 (WEA-2 E-138)	20:54		21:39	21:55
31	08:15		07:12		07:53 (WEA-2 E-138)			05:22	
	17:18		20:03	30	08:23 (WEA-2 E-138)			21:40	
Sonnenscheinstunden	260	278	367		416		485	498	
astr.max.mögl.Beschattung		293	1636		390				
Red.Sonnenscheinwahrsch.		0,30	0,30		0,41				
Reduktion Betriebsdauer		0,84	0,84		0,84				
Reduktion Windrichtung		0,60	0,61		0,67				
Gesamte Reduktion		0,15	0,15		0,23				
Met.wahrsch.Beschattung		45	248		89				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 35 - IP 35 Windbrake 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1	05:18	05:54	06:43	07:51 (WEA-2 E-138) 07:32	09:08 (WEA-1) 07:26	08:16	
	21:55	21:24	20:22	08:15 (WEA-2 E-138) 19:13	10:08 (WEA-1) 17:07	16:27	
2	05:18	05:56	06:45	07:50 (WEA-2 E-138) 07:34	09:08 (WEA-1) 07:27	08:18	
	21:55	21:22	20:20	08:17 (WEA-2 E-138) 19:10	10:08 (WEA-1) 17:05	16:26	
3	05:19	05:57	06:47	07:49 (WEA-2 E-138) 07:35	09:08 (WEA-1) 07:29	08:19	
	21:54	21:20	20:17	08:18 (WEA-2 E-138) 19:08	10:08 (WEA-1) 17:03	16:25	
4	05:20	05:59	06:48	07:48 (WEA-2 E-138) 07:37	09:08 (WEA-1) 07:31	08:21	
	21:54	21:18	20:15	08:18 (WEA-2 E-138) 19:06	10:07 (WEA-1) 17:01	16:25	
5	05:21	06:00	06:50	07:47 (WEA-2 E-138) 07:39	09:08 (WEA-1) 07:33	08:22	
	21:54	21:17	20:13	08:18 (WEA-2 E-138) 19:03	10:07 (WEA-1) 17:00	16:24	
6	05:22	06:02	06:52	07:46 (WEA-2 E-138) 07:40	09:08 (WEA-1) 07:35	08:23	
	21:53	21:15	20:10	08:18 (WEA-2 E-138) 19:01	10:07 (WEA-1) 16:58	16:24	
7	05:22	06:03	06:53	07:46 (WEA-2 E-138) 07:42	09:07 (WEA-1) 07:36	08:24	
	21:52	21:13	20:08	08:18 (WEA-2 E-138) 18:59	10:05 (WEA-1) 16:56	16:24	
8	05:23	06:05	06:55	07:20 (WEA03) 07:44	09:08 (WEA-1) 07:38	08:26	
	21:52	21:11	20:06	08:17 (WEA-2 E-138) 18:57	10:05 (WEA-1) 16:55	16:23	
9	05:24	06:06	06:56	07:22 (WEA03) 07:46	08:11 (WEA02) 07:40	08:27	
	21:51	21:10	20:04	08:17 (WEA-2 E-138) 18:54	10:04 (WEA-1) 16:53	16:23	
10	05:25	06:08	06:58	07:44 (WEA-2 E-138) 07:47	08:13 (WEA02) 07:42	08:28	
	21:50	21:08	20:01	08:16 (WEA-2 E-138) 18:52	10:04 (WEA-1) 16:51	16:23	
11	05:26	06:10	07:00	07:45 (WEA-2 E-138) 07:49	08:14 (WEA02) 07:43	08:29	
	21:50	21:06	19:59	08:16 (WEA-2 E-138) 18:50	10:02 (WEA-1) 16:50	16:23	
12	05:27	06:11	07:01	07:45 (WEA-2 E-138) 07:51	08:16 (WEA02) 07:45	08:30	
	21:49	21:04	19:57	08:16 (WEA-2 E-138) 18:48	10:01 (WEA-1) 16:48	16:22	
13	05:28	06:13	07:03	07:45 (WEA-2 E-138) 07:52	09:11 (WEA-1) 07:47	08:31	
	21:48	21:02	19:54	08:14 (WEA-2 E-138) 18:46	10:00 (WEA-1) 16:47	16:22	
14	05:30	06:14	07:04	07:46 (WEA-2 E-138) 07:54	09:12 (WEA-1) 07:49	08:32	
	21:47	21:00	19:52	09:49 (WEA-1) 18:43	09:59 (WEA-1) 16:45	16:22	
15	05:31	06:16	07:06	07:46 (WEA-2 E-138) 07:56	09:12 (WEA-1) 07:50	08:33	
	21:46	20:58	19:50	09:53 (WEA-1) 18:41	09:57 (WEA-1) 16:44	16:22	
16	05:32	06:18	07:08	07:48 (WEA-2 E-138) 07:57	09:13 (WEA-1) 07:52	08:34	
	21:45	20:56	19:47	09:56 (WEA-1) 18:39	09:55 (WEA-1) 16:42	16:23	
17	05:33	06:19	07:09	07:49 (WEA-2 E-138) 07:59	09:15 (WEA-1) 07:54	08:35	
	21:44	20:54	19:45	09:58 (WEA-1) 18:37	09:54 (WEA-1) 16:41	16:23	
18	05:34	06:21	07:11	07:52 (WEA-2 E-138) 08:01	09:17 (WEA-1) 07:56	08:35	
	21:43	20:52	19:43	10:00 (WEA-1) 18:35	09:52 (WEA-1) 16:40	16:23	
19	05:36	06:22	07:13	07:38 (WEA04) 08:03	09:19 (WEA-1) 07:57	08:36	
	21:42	20:50	19:40	10:02 (WEA-1) 18:33	09:49 (WEA-1) 16:38	16:23	
20	05:37	06:24	07:14	09:18 (WEA-1) 08:04	09:22 (WEA-1) 07:59	08:37	
	21:41	20:48	19:38	10:03 (WEA-1) 18:31	09:46 (WEA-1) 16:37	16:24	
21	05:38	06:26	07:16	09:17 (WEA-1) 08:06	09:25 (WEA-1) 08:01	08:37	
	21:39	20:46	19:36	10:04 (WEA-1) 18:28	09:41 (WEA-1) 16:36	16:24	
22	05:40	06:27	07:17	09:15 (WEA-1) 08:08		08:02	08:38
	21:38	20:44	19:33	10:05 (WEA-1) 18:26		16:35	16:25
23	05:41	06:29	07:19	09:15 (WEA-1) 08:10		08:04	08:38
	21:37	20:41	19:31	10:06 (WEA-1) 18:24		16:34	16:25
24	05:42	06:31	07:21	09:14 (WEA-1) 08:11		08:06	08:39
	21:36	20:39	19:29	10:07 (WEA-1) 18:22		16:33	16:26
25	05:44	06:32	07:22	09:12 (WEA-1) 07:13		08:07	08:39
	21:34	20:37	19:26	10:07 (WEA-1) 17:20		16:32	16:26
26	05:45	06:34	07:24	09:12 (WEA-1) 07:15		08:09	08:39
	21:33	20:35	19:24	10:08 (WEA-1) 17:18		16:31	16:27
27	05:47	06:35	07:26	09:11 (WEA-1) 07:17		08:10	08:40
	21:31	20:33	19:22	10:08 (WEA-1) 17:16		16:30	16:28
28	05:48	06:37	07:27	09:10 (WEA-1) 07:18		08:12	08:40
	21:30	20:31	19:20	10:08 (WEA-1) 17:14		16:29	16:28
29	05:50	06:39	07:29	07:54 (WEA05) 07:20		08:13	08:40
	21:28	20:28	13 08:11 (WEA-2 E-138) 19:17	10:08 (WEA-1) 17:12		16:28	16:29
30	05:51	06:40	07:30	07:55 (WEA-2 E-138) 07:22		08:15	08:40
	21:27	20:26	18 08:13 (WEA-2 E-138) 19:15	10:09 (WEA-1) 17:11		16:27	16:30
31	05:53	06:42	07:33 (WEA-2 E-138)				08:40
	21:25	20:24	22 08:15 (WEA-2 E-138)				16:31
Sonnenscheinstunden	501	453	381	332	267	244	
astr.max.mögl.Beschattung		53	1269		1032		
Red.Sonnenscheinwahrsch.		0,43	0,36		0,32		
Reduktion Betriebsdauer		0,84	0,84		0,84		
Reduktion Windrichtung		0,67	0,63		0,60		
Gesamte Reduktion		0,24	0,19		0,16		
Met.wahrsch.Beschattung		13	240		164		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/1 - IP 36/1 Greven Esch 15

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni							
1	08:40		07:20	14:25 (WEA-1)	07:10	09:05 (WEA-2 E-138)	06:06	08:19 (WEA-2 E-138)	05:21				08:26 (WEA-2 E-138)
	16:32	17:20	18:11	83 15:48 (WEA-1)	20:05	16 09:21 (WEA-2 E-138)	20:56	89 09:48 (WEA-2 E-138)	21:41	65			09:31 (WEA-2 E-138)
2	08:40	08:12	07:18	14:24 (WEA-1)	07:08		08:57 (WEA-2 E-138)	06:04					08:26 (WEA-2 E-138)
	16:33	17:22	18:13	85 15:49 (WEA-1)	20:07	29 09:26 (WEA-2 E-138)	20:57	90 09:48 (WEA-2 E-138)	21:42	64			09:30 (WEA-2 E-138)
3	08:40	08:10	07:16	14:23 (WEA-1)	07:06		08:53 (WEA-2 E-138)	06:02					08:28 (WEA-2 E-138)
	16:35	17:24	18:15	85 15:48 (WEA-1)	20:08	38 09:31 (WEA-2 E-138)	20:59	89 09:47 (WEA-2 E-138)	21:43	62			09:30 (WEA-2 E-138)
4	08:40	08:09	07:14	14:23 (WEA-1)	07:03		07:26 (WEA03)	06:00					08:28 (WEA-2 E-138)
	16:36	17:25	18:17	85 15:48 (WEA-1)	20:10	45 09:34 (WEA-2 E-138)	21:01	89 09:47 (WEA-2 E-138)	21:44	61			09:29 (WEA-2 E-138)
5	08:39	08:07	07:12	14:23 (WEA-1)	07:01		07:24 (WEA03)	05:58					08:29 (WEA-2 E-138)
	16:37	17:27	18:18	85 15:48 (WEA-1)	20:12	53 09:36 (WEA-2 E-138)	21:02	89 09:47 (WEA-2 E-138)	21:45	60			09:29 (WEA-2 E-138)
6	08:39	08:06	07:10	14:23 (WEA-1)	06:59		07:21 (WEA03)	05:56					08:29 (WEA-2 E-138)
	16:38	17:29	21 15:18 (WEA-1)	18:20	86 15:49 (WEA-1)	20:13	60 09:38 (WEA-2 E-138)	21:04	88 09:46 (WEA-2 E-138)	21:46	60		09:29 (WEA-2 E-138)
7	08:39	08:04	07:07	14:53 (WEA-1)	07:07		07:19 (WEA03)	05:55					08:30 (WEA-2 E-138)
	16:39	17:31	29 15:22 (WEA-1)	18:22	87 15:48 (WEA-1)	20:15	66 09:40 (WEA-2 E-138)	21:06	88 09:46 (WEA-2 E-138)	21:47	59		09:29 (WEA-2 E-138)
8	08:38	08:02	07:05	14:49 (WEA-1)	07:05		07:17 (WEA03)	05:53					08:30 (WEA-2 E-138)
	16:41	17:33	36 15:25 (WEA-1)	18:24	90 15:49 (WEA-1)	20:17	71 09:42 (WEA-2 E-138)	21:07	87 09:45 (WEA-2 E-138)	21:48	58		09:28 (WEA-2 E-138)
9	08:38	08:00	07:03	14:47 (WEA-1)	07:03		07:18 (WEA03)	05:51					08:31 (WEA-2 E-138)
	16:42	17:35	40 15:27 (WEA-1)	18:26	92 15:48 (WEA-1)	20:19	72 09:43 (WEA-2 E-138)	21:09	86 09:44 (WEA-2 E-138)	21:49	57		09:28 (WEA-2 E-138)
10	08:37	07:59	07:01	14:44 (WEA-1)	07:01		08:36 (WEA-2 E-138)	05:49					08:30 (WEA-2 E-138)
	16:43	17:37	46 15:30 (WEA-1)	18:27	103 15:47 (WEA-1)	20:20	67 09:43 (WEA-2 E-138)	21:10	86 09:44 (WEA-2 E-138)	21:50	57		09:27 (WEA-2 E-138)
11	08:37	07:57	06:58	14:43 (WEA-1)	06:58		08:34 (WEA-2 E-138)	05:48					08:31 (WEA-2 E-138)
	16:45	17:38	50 15:33 (WEA-1)	18:29	107 15:47 (WEA-1)	20:22	71 09:45 (WEA-2 E-138)	21:12	85 09:43 (WEA-2 E-138)	21:50	56		09:27 (WEA-2 E-138)
12	08:36	07:55	06:56	14:41 (WEA-1)	06:56		08:33 (WEA-2 E-138)	05:46					08:32 (WEA-2 E-138)
	16:46	17:40	53 15:34 (WEA-1)	18:31	102 15:46 (WEA-1)	20:24	73 09:46 (WEA-2 E-138)	21:14	84 09:43 (WEA-2 E-138)	21:51	55		09:27 (WEA-2 E-138)
13	08:35	07:53	06:54	14:40 (WEA-1)	06:54		08:32 (WEA-2 E-138)	05:44					08:33 (WEA-2 E-138)
	16:48	17:42	56 15:36 (WEA-1)	18:33	103 15:46 (WEA-1)	20:25	75 09:47 (WEA-2 E-138)	21:15	84 09:42 (WEA-2 E-138)	21:52	54		09:27 (WEA-2 E-138)
14	08:35	09:04 (WEA10)	07:51	14:38 (WEA-1)	06:52		08:30 (WEA-2 E-138)	05:43					08:33 (WEA-2 E-138)
	16:49	1 09:05 (WEA10)	17:44	60 15:38 (WEA-1)	18:34	104 15:45 (WEA-1)	20:27	77 09:47 (WEA-2 E-138)	21:17	83 09:42 (WEA-2 E-138)	21:52	54	09:27 (WEA-2 E-138)
15	08:34	09:03 (WEA10)	07:49	14:37 (WEA-1)	06:49		08:29 (WEA-2 E-138)	05:41					08:34 (WEA-2 E-138)
	16:51	5 09:08 (WEA10)	17:46	62 15:39 (WEA-1)	18:36	104 15:44 (WEA-1)	20:29	79 09:48 (WEA-2 E-138)	21:18	82 09:41 (WEA-2 E-138)	21:53	53	09:27 (WEA-2 E-138)
16	08:33	09:02 (WEA10)	07:47	14:35 (WEA-1)	06:47		07:00 (WEA08)	05:40					08:34 (WEA-2 E-138)
	16:52	7 09:09 (WEA10)	17:48	65 15:40 (WEA-1)	18:38	103 15:44 (WEA-1)	20:30	90 09:49 (WEA-2 E-138)	21:20	81 09:40 (WEA-2 E-138)	21:54	53	09:27 (WEA-2 E-138)
17	08:32	09:01 (WEA10)	07:45	08:10 (WEA02)	06:45		07:23 (WEA-01)	06:34					08:34 (WEA-2 E-138)
	16:54	9 09:10 (WEA10)	17:50	77 15:41 (WEA-1)	18:39	101 15:42 (WEA-1)	20:32	93 09:48 (WEA-2 E-138)	21:21	80 09:40 (WEA-2 E-138)	21:54	53	09:27 (WEA-2 E-138)
18	08:31	09:00 (WEA10)	07:43	08:08 (WEA02)	06:42		07:23 (WEA-01)	06:32					08:35 (WEA-2 E-138)
	16:56	11 09:11 (WEA10)	17:51	83 15:43 (WEA-1)	18:41	100 15:42 (WEA-1)	20:34	98 09:49 (WEA-2 E-138)	21:23	79 09:39 (WEA-2 E-138)	21:54	52	09:27 (WEA-2 E-138)
19	08:30	08:58 (WEA10)	07:41	08:05 (WEA02)	06:40		07:23 (WEA-01)	06:30					08:35 (WEA-2 E-138)
	16:57	13 09:11 (WEA10)	17:53	88 15:43 (WEA-1)	18:43	97 15:41 (WEA-1)	20:35	99 09:49 (WEA-2 E-138)	21:24	78 09:38 (WEA-2 E-138)	21:55	52	09:27 (WEA-2 E-138)
20	08:29	08:58 (WEA10)	07:39	08:03 (WEA02)	06:38		07:22 (WEA-01)	06:28					08:35 (WEA-2 E-138)
	16:59	14 09:12 (WEA10)	17:55	93 15:44 (WEA-1)	18:45	95 15:39 (WEA-1)	20:37	101 09:49 (WEA-2 E-138)	21:26	77 09:38 (WEA-2 E-138)	21:55	52	09:27 (WEA-2 E-138)
21	08:28	08:58 (WEA10)	07:37	08:03 (WEA02)	06:35		06:58 (WEA04)	06:26					08:35 (WEA-2 E-138)
	17:01	15 09:13 (WEA10)	17:57	94 15:44 (WEA-1)	18:46	91 15:38 (WEA-1)	20:39	103 09:50 (WEA-2 E-138)	21:27	77 09:38 (WEA-2 E-138)	21:55	52	09:27 (WEA-2 E-138)
22	08:27	08:59 (WEA10)	07:35	08:03 (WEA02)	06:33		06:56 (WEA04)	06:24					08:35 (WEA-2 E-138)
	17:02	15 09:14 (WEA10)	17:59	95 15:45 (WEA-1)	18:48	89 15:37 (WEA-1)	20:41	103 09:50 (WEA-2 E-138)	21:28	75 09:36 (WEA-2 E-138)	21:56	52	09:27 (WEA-2 E-138)
23	08:26	08:59 (WEA10)	07:33	08:04 (WEA02)	06:31		06:53 (WEA04)	06:22					08:36 (WEA-2 E-138)
	17:04	14 09:13 (WEA10)	18:01	96 15:46 (WEA-1)	18:50	86 15:35 (WEA-1)	20:42	103 09:50 (WEA-2 E-138)	21:30	75 09:36 (WEA-2 E-138)	21:56	52	09:28 (WEA-2 E-138)
24	08:25	08:59 (WEA10)	07:31	08:05 (WEA02)	06:29		06:51 (WEA04)	06:20					08:36 (WEA-2 E-138)
	17:06	15 09:14 (WEA10)	18:02	97 15:47 (WEA-1)	18:51	82 15:33 (WEA-1)	20:44	102 09:50 (WEA-2 E-138)	21:31	73 09:35 (WEA-2 E-138)	21:56	52	09:28 (WEA-2 E-138)
25	08:23	09:00 (WEA10)	07:29	08:07 (WEA02)	06:26		06:50 (WEA04)	06:18					08:35 (WEA-2 E-138)
	17:07	14 09:14 (WEA10)	18:04	94 15:47 (WEA-1)	18:53	74 15:32 (WEA-1)	20:46	98 09:49 (WEA-2 E-138)	21:33	73 09:35 (WEA-2 E-138)	21:56	53	09:28 (WEA-2 E-138)
26	08:22	09:01 (WEA10)	07:27	08:08 (WEA02)	06:24		06:51 (WEA04)	06:16					08:36 (WEA-2 E-138)
	17:09	12 09:13 (WEA10)	18:06	92 15:47 (WEA-1)	18:55	56 15:29 (WEA-1)	20:47	96 09:49 (WEA-2 E-138)	21:34	71 09:34 (WEA-2 E-138)	21:56	53	09:29 (WEA-2 E-138)
27	08:21	09:02 (WEA10)	07:25	08:12 (WEA02)	06:22		14:45 (WEA-1)	06:14					08:36 (WEA-2 E-138)
	17:11	11 09:13 (WEA10)	18:08	85 15:47 (WEA-1)	18:57	41 15:26 (WEA-1)	20:49	90 09:49 (WEA-2 E-138)	21:35	70 09:33 (WEA-2 E-138)	21:56	53	09:29 (WEA-2 E-138)
28	08:19	09:03 (WEA10)	07:23	14:25 (WEA-1)	06:19		14:49 (WEA-1)	06:12					08:36 (WEA-2 E-138)
	17:13	8 09:11 (WEA10)	18:10	83 15:48 (WEA-1)	18:58	35 15:24 (WEA-1)	20:51	90 09:49 (WEA-2 E-138)	21:36	69 09:33 (WEA-2 E-138)	21:56	54	09:30 (WEA-2 E-138)
29	08:18	09:07 (WEA10)		07:17			15:54 (WEA-1)	06:10					08:36 (WEA-2 E-138)
	17:15	2 09:09 (WEA10)		20:00			26 20:00 (WEA-1)	20:52					09:30 (WEA-2 E-138)
30	08:17			07:15			16:01 (WEA-1)	06:08					08:36 (WEA-2 E-138)
	17:16			20:02			11 16:12 (WEA-1)	20:54					09:31 (WEA-2 E-138)
31	08:15			07:12									
	17:18			20:03									
Sonnenscheinstunden	260	278	367	416	485	498	498	498	498	498	498	498	1667
astr.max.mögl.Beschattung	166	1595	2488	2337	2476	1667	1667	1667	1667	1667	1667	1667	1667
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,57	0,69	0,69	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64
Gesamte Reduktion	0,09	0,18	0,17	0,22	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25
Met.wahrsch.Beschattung	16	281	430	519	614	327	327	327	327	327	327	327	327

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/1 - IP 36/1 Greven Esch 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18	08:36 (WEA-2 E-138)	05:54	08:29 (WEA-2 E-138)	06:43	08:33 (WEA-2 E-138)	07:32	08:06 (WEA-01)	07:26	14:14 (WEA-1)	08:16	
	21:55	09:31 (WEA-2 E-138)	21:23	09:54 (WEA-2 E-138)	20:22	09:44 (WEA-2 E-138)	19:13	16:25 (WEA-1)	17:07	45	14:59 (WEA-1)	16:27
2	05:18	08:36 (WEA-2 E-138)	05:56	08:28 (WEA-2 E-138)	06:45	08:35 (WEA-2 E-138)	07:34	08:03 (WEA05)	07:27		14:17 (WEA-1)	08:18
	21:55	09:32 (WEA-2 E-138)	21:22	09:54 (WEA-2 E-138)	20:20	09:42 (WEA-2 E-138)	19:10	16:25 (WEA-1)	17:05	40	14:57 (WEA-1)	16:26
3	05:19	08:36 (WEA-2 E-138)	05:57	08:29 (WEA-2 E-138)	06:47	07:16 (WEA03)	07:35	08:01 (WEA05)	07:29		14:20 (WEA-1)	08:20
	21:54	09:33 (WEA-2 E-138)	21:20	09:55 (WEA-2 E-138)	20:17	09:41 (WEA-2 E-138)	19:08	16:25 (WEA-1)	17:03	34	14:54 (WEA-1)	16:25
4	05:20	08:35 (WEA-2 E-138)	05:59	08:28 (WEA-2 E-138)	06:48	07:14 (WEA03)	07:37	08:02 (WEA05)	07:31		14:23 (WEA-1)	08:20
	21:54	09:33 (WEA-2 E-138)	21:18	09:55 (WEA-2 E-138)	20:15	09:39 (WEA-2 E-138)	19:06	16:25 (WEA-1)	17:01	28	14:51 (WEA-1)	16:25
5	05:21	08:35 (WEA-2 E-138)	06:00	08:27 (WEA-2 E-138)	06:50	07:16 (WEA03)	07:39	08:04 (WEA05)	07:33		14:28 (WEA-1)	08:22
	21:54	09:34 (WEA-2 E-138)	21:17	09:55 (WEA-2 E-138)	20:13	09:37 (WEA-2 E-138)	19:03	16:25 (WEA-1)	17:00	19	14:47 (WEA-1)	16:24
6	05:22	08:35 (WEA-2 E-138)	06:02	08:28 (WEA-2 E-138)	06:52	07:17 (WEA03)	07:40	08:06 (WEA05)	07:35			08:23
	21:53	09:35 (WEA-2 E-138)	21:15	09:56 (WEA-2 E-138)	20:10	09:34 (WEA-2 E-138)	19:01	16:25 (WEA-1)	16:58			16:24
7	05:22	08:35 (WEA-2 E-138)	06:03	08:27 (WEA-2 E-138)	06:53	07:19 (WEA03)	07:42	08:07 (WEA05)	07:36			08:24
	21:52	09:36 (WEA-2 E-138)	21:13	09:55 (WEA-2 E-138)	20:08	09:32 (WEA-2 E-138)	18:59	16:24 (WEA-1)	16:56			16:23
8	05:23	08:35 (WEA-2 E-138)	06:05	08:28 (WEA-2 E-138)	06:55	07:20 (WEA03)	07:44	14:58 (WEA-1)	07:38			08:26
	21:52	09:36 (WEA-2 E-138)	21:11	09:56 (WEA-2 E-138)	20:06	09:28 (WEA-2 E-138)	18:57	16:24 (WEA-1)	16:54			16:23
9	05:24	08:35 (WEA-2 E-138)	06:06	08:27 (WEA-2 E-138)	06:56	08:47 (WEA-2 E-138)	07:45	14:58 (WEA-1)	07:40			08:27
	21:51	09:37 (WEA-2 E-138)	21:09	09:56 (WEA-2 E-138)	20:04	09:25 (WEA-2 E-138)	18:54	16:23 (WEA-1)	16:53			16:23
10	05:25	08:35 (WEA-2 E-138)	06:08	08:27 (WEA-2 E-138)	06:58	08:50 (WEA-2 E-138)	07:47	14:58 (WEA-1)	07:42			08:28
	21:50	09:38 (WEA-2 E-138)	21:08	09:57 (WEA-2 E-138)	20:01	09:20 (WEA-2 E-138)	18:52	16:23 (WEA-1)	16:51			16:23
11	05:26	08:35 (WEA-2 E-138)	06:10	08:27 (WEA-2 E-138)	07:00	08:27 (WEA-2 E-138)	07:49	14:57 (WEA-1)	07:43			08:29
	21:50	09:39 (WEA-2 E-138)	21:06	09:56 (WEA-2 E-138)	19:59	09:14 (WEA-2 E-138)	18:50	16:22 (WEA-1)	16:50			16:22
12	05:27	08:34 (WEA-2 E-138)	06:11	08:27 (WEA-2 E-138)	07:01	08:27 (WEA-2 E-138)	07:51	14:58 (WEA-1)	07:45			08:30
	21:49	09:40 (WEA-2 E-138)	21:04	09:57 (WEA-2 E-138)	19:57		18:48	16:22 (WEA-1)	16:48			16:22
13	05:28	08:35 (WEA-2 E-138)	06:13	08:27 (WEA-2 E-138)	07:03	15:54 (WEA-1)	07:52	14:58 (WEA-1)	07:47		08:37 (WEA10)	08:31
	21:48	09:40 (WEA-2 E-138)	21:02	09:56 (WEA-2 E-138)	19:54	16:02 (WEA-1)	18:46	16:21 (WEA-1)	16:47	3	08:40 (WEA10)	16:22
14	05:30	08:34 (WEA-2 E-138)	06:14	08:27 (WEA-2 E-138)	07:04	15:45 (WEA-1)	07:54	14:58 (WEA-1)	07:49		08:35 (WEA10)	08:32
	21:47	09:41 (WEA-2 E-138)	21:00	09:57 (WEA-2 E-138)	19:52	16:09 (WEA-1)	18:43	16:21 (WEA-1)	16:45	8	08:43 (WEA10)	16:22
15	05:31	08:33 (WEA-2 E-138)	06:16	08:27 (WEA-2 E-138)	07:06	15:39 (WEA-1)	07:56	08:42 (WEA09)	07:50		08:34 (WEA10)	08:33
	21:46	09:42 (WEA-2 E-138)	20:58	09:56 (WEA-2 E-138)	19:50	16:12 (WEA-1)	18:41	16:19 (WEA-1)	16:44	11	08:45 (WEA10)	16:22
16	05:32	08:33 (WEA-2 E-138)	06:18	08:27 (WEA-2 E-138)	07:08	15:35 (WEA-1)	07:57	08:40 (WEA09)	07:52		08:34 (WEA10)	08:34
	21:45	09:42 (WEA-2 E-138)	20:56	09:57 (WEA-2 E-138)	19:47	16:15 (WEA-1)	18:39	16:19 (WEA-1)	16:42	12	08:46 (WEA10)	16:23
17	05:33	08:33 (WEA-2 E-138)	06:19	07:04 (WEA08)	07:09	07:40 (WEA04)	07:59	08:37 (WEA02)	07:54		08:33 (WEA10)	08:34
	21:44	09:43 (WEA-2 E-138)	20:54	09:56 (WEA-2 E-138)	19:45	16:17 (WEA-1)	18:37	16:18 (WEA-1)	16:41	14	08:47 (WEA10)	16:23
18	05:34	08:32 (WEA-2 E-138)	06:21	07:03 (WEA08)	07:11	07:38 (WEA04)	08:01	08:36 (WEA02)	07:56		08:33 (WEA10)	08:35
	21:43	09:44 (WEA-2 E-138)	20:52	09:56 (WEA-2 E-138)	19:43	16:19 (WEA-1)	18:35	16:18 (WEA-1)	16:40	15	08:48 (WEA10)	16:23
19	05:36	08:32 (WEA-2 E-138)	06:22	07:01 (WEA08)	07:12	07:38 (WEA04)	08:03	08:35 (WEA02)	07:57		08:34 (WEA10)	08:36
	21:42	09:44 (WEA-2 E-138)	20:50	09:55 (WEA-2 E-138)	19:40	16:20 (WEA-1)	18:33	16:17 (WEA-1)	16:38	14	08:48 (WEA10)	16:23
20	05:37	08:32 (WEA-2 E-138)	06:24	07:01 (WEA08)	07:14	07:39 (WEA04)	08:04	08:34 (WEA02)	07:59		08:34 (WEA10)	08:37
	21:41	09:46 (WEA-2 E-138)	20:48	09:55 (WEA-2 E-138)	19:38	16:21 (WEA-1)	18:31	16:16 (WEA-1)	16:37	15	08:49 (WEA10)	16:24
21	05:38	08:32 (WEA-2 E-138)	06:26	07:00 (WEA08)	07:16	07:41 (WEA04)	08:06	08:33 (WEA02)	08:01		08:33 (WEA10)	08:37
	21:39	09:46 (WEA-2 E-138)	20:46	09:54 (WEA-2 E-138)	19:36	16:22 (WEA-1)	18:28	16:15 (WEA-1)	16:36	15	08:48 (WEA10)	16:24
22	05:40	08:31 (WEA-2 E-138)	06:27	07:00 (WEA08)	07:17	07:42 (WEA04)	08:08	08:34 (WEA02)	08:02		08:34 (WEA10)	08:38
	21:38	09:47 (WEA-2 E-138)	20:44	09:54 (WEA-2 E-138)	19:33	16:22 (WEA-1)	18:26	16:14 (WEA-1)	16:35	14	08:48 (WEA10)	16:24
23	05:41	08:31 (WEA-2 E-138)	06:29	07:00 (WEA08)	07:19	08:07 (WEA-01)	08:10	08:36 (WEA02)	08:04		08:35 (WEA10)	08:38
	21:37	09:47 (WEA-2 E-138)	20:41	09:54 (WEA-2 E-138)	19:31	16:23 (WEA-1)	18:24	16:13 (WEA-1)	16:34	13	08:48 (WEA10)	16:25
24	05:42	08:31 (WEA-2 E-138)	06:30	06:59 (WEA08)	07:21	08:07 (WEA-01)	08:11	08:38 (WEA02)	08:06		08:37 (WEA10)	08:39
	21:35	09:49 (WEA-2 E-138)	20:39	09:53 (WEA-2 E-138)	19:29	16:24 (WEA-1)	18:22	16:12 (WEA-1)	16:33	11	08:48 (WEA10)	16:26
25	05:44	08:30 (WEA-2 E-138)	06:32	07:00 (WEA08)	07:22	08:05 (WEA-01)	07:13	07:40 (WEA02)	08:07		08:38 (WEA10)	08:39
	21:34	09:49 (WEA-2 E-138)	20:37	09:52 (WEA-2 E-138)	19:26	16:24 (WEA-1)	17:20	15:11 (WEA-1)	16:32	9	08:47 (WEA10)	16:26
26	05:45	08:30 (WEA-2 E-138)	06:34	07:01 (WEA08)	07:24	08:05 (WEA-01)	07:15	14:05 (WEA-1)	08:09		08:40 (WEA10)	08:39
	21:33	09:49 (WEA-2 E-138)	20:35	09:51 (WEA-2 E-138)	19:24	16:25 (WEA-1)	17:18	15:09 (WEA-1)	16:31	7	08:47 (WEA10)	16:27
27	05:47	08:30 (WEA-2 E-138)	06:35	07:02 (WEA08)	07:26	08:06 (WEA-01)	07:17	14:07 (WEA-1)	08:10		08:42 (WEA10)	08:40
	21:31	09:51 (WEA-2 E-138)	20:33	09:51 (WEA-2 E-138)	19:22	16:25 (WEA-1)	17:16	15:08 (WEA-1)	16:30	5	08:47 (WEA10)	16:28
28	05:48	08:30 (WEA-2 E-138)	06:37	08:30 (WEA-2 E-138)	07:27	08:05 (WEA-01)	07:18	14:08 (WEA-1)	08:12		08:44 (WEA10)	08:40
	21:30	09:51 (WEA-2 E-138)	20:31	09:49 (WEA-2 E-138)	19:19	16:25 (WEA-1)	17:14	15:07 (WEA-1)	16:29	2	08:46 (WEA10)	16:28
29	05:50	08:29 (WEA-2 E-138)	06:39	08:31 (WEA-2 E-138)	07:29	08:05 (WEA-01)	07:20	14:10 (WEA-1)	08:13			08:40
	21:28	09:51 (WEA-2 E-138)	20:28	09:48 (WEA-2 E-138)	19:17	16:25 (WEA-1)	17:12	15:05 (WEA-1)	16:28			16:29
30	05:51	08:29 (WEA-2 E-138)	06:40	08:31 (WEA-2 E-138)	07:30	08:05 (WEA-01)	07:22	14:10 (WEA-1)	08:15			08:40
	21:27	09:52 (WEA-2 E-138)	20:26	09:47 (WEA-2 E-138)	19:15	16:25 (WEA-1)	17:10	15:03 (WEA-1)	16:27			16:30
31	05:52	08:29 (WEA-2 E-138)	06:42	08:33 (WEA-2 E-138)			07:24	14:12 (WEA-1)				08:40
	21:25	09:53 (WEA-2 E-138)	20:24	09:46 (WEA-2 E-138)			17:09	15:01 (WEA-1)				16:31
Sonnenscheinstunden	501		453		381		332		267		244	
astr.max.mögl.Beschattung	2154		2800		1969		2602		334			
Red. Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32		0,23			
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84			
Reduktion Windrichtung	0,64		0,64		0,67		0,69		0,63			
Gesamte Reduktion	0,22		0,23		0,20		0,18		0,12			
Met. wahrsch. Beschattung	483		649		401		478		41			

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/2 - IP 36/2 Greven Esch 15a

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni			
1	08:40	08:14	07:20	14:29 (WEA-1)	07:10	06:06	08:19 (WEA-2 E-138)	05:21	08:25 (WEA-2 E-138)
	16:32	17:20	18:11	83 15:52 (WEA-1)	20:05	20:56	92 09:51 (WEA-2 E-138)	21:41	70 09:35 (WEA-2 E-138)
2	08:40	08:12	07:18	14:29 (WEA-1)	07:08	06:04	08:19 (WEA-2 E-138)	05:20	08:26 (WEA-2 E-138)
	16:33	17:22	18:13	83 15:52 (WEA-1)	20:07	20:57	91 09:50 (WEA-2 E-138)	21:42	68 09:34 (WEA-2 E-138)
3	08:40	08:10	07:16	14:28 (WEA-1)	07:06	06:02	08:19 (WEA-2 E-138)	05:19	08:27 (WEA-2 E-138)
	16:35	17:24	18:15	83 15:51 (WEA-1)	20:08	20:59	91 09:50 (WEA-2 E-138)	21:43	67 09:34 (WEA-2 E-138)
4	08:40	08:09	07:14	14:28 (WEA-1)	07:03	06:00	08:19 (WEA-2 E-138)	05:18	08:27 (WEA-2 E-138)
	16:36	17:25	18:17	84 15:52 (WEA-1)	20:10	21:01	91 09:50 (WEA-2 E-138)	21:44	66 09:33 (WEA-2 E-138)
5	08:39	08:07	07:12	14:28 (WEA-1)	07:01	05:58	08:19 (WEA-2 E-138)	05:18	08:28 (WEA-2 E-138)
	16:37	17:27	18:18	84 15:52 (WEA-1)	20:12	21:02	90 09:49 (WEA-2 E-138)	21:45	66 09:34 (WEA-2 E-138)
6	08:39	08:06	07:10	14:28 (WEA-1)	06:59	05:56	08:18 (WEA-2 E-138)	05:17	08:28 (WEA-2 E-138)
	16:38	17:29	18:20	84 15:52 (WEA-1)	20:13	21:04	91 09:49 (WEA-2 E-138)	21:46	65 09:33 (WEA-2 E-138)
7	08:39	08:04	07:07	07:30 (WEA05)	06:57	05:55	08:19 (WEA-2 E-138)	05:16	08:29 (WEA-2 E-138)
	16:39	17:31	18:22	86 15:51 (WEA-1)	20:15	21:06	90 09:49 (WEA-2 E-138)	21:47	64 09:33 (WEA-2 E-138)
8	08:38	08:02	07:05	07:28 (WEA05)	06:54	05:53	08:18 (WEA-2 E-138)	05:16	08:29 (WEA-2 E-138)
	16:41	17:33	18:24	89 15:51 (WEA-1)	20:17	21:07	90 09:48 (WEA-2 E-138)	21:48	63 09:32 (WEA-2 E-138)
9	08:38	08:00	07:03	07:26 (WEA05)	06:52	05:51	08:18 (WEA-2 E-138)	05:15	08:30 (WEA-2 E-138)
	16:42	17:35	18:26	90 15:51 (WEA-1)	20:19	21:09	89 09:47 (WEA-2 E-138)	21:49	62 09:32 (WEA-2 E-138)
10	08:37	07:59	07:01	07:23 (WEA05)	06:50	05:49	08:19 (WEA-2 E-138)	05:15	08:29 (WEA-2 E-138)
	16:43	17:37	18:27	103 15:50 (WEA-1)	20:20	21:10	88 09:47 (WEA-2 E-138)	21:50	62 09:31 (WEA-2 E-138)
11	08:37	07:57	06:58	07:23 (WEA05)	06:48	05:48	08:18 (WEA-2 E-138)	05:15	08:30 (WEA-2 E-138)
	16:45	17:38	18:29	105 15:50 (WEA-1)	20:22	21:12	88 09:46 (WEA-2 E-138)	21:50	62 09:32 (WEA-2 E-138)
12	08:36	07:55	06:56	14:47 (WEA-1)	06:45	05:46	08:19 (WEA-2 E-138)	05:14	08:31 (WEA-2 E-138)
	16:46	17:40	18:31	102 15:50 (WEA-1)	20:24	21:14	87 09:46 (WEA-2 E-138)	21:51	61 09:32 (WEA-2 E-138)
13	08:35	07:53	06:54	14:45 (WEA-1)	06:43	05:44	08:19 (WEA-2 E-138)	05:14	08:31 (WEA-2 E-138)
	16:48	17:42	18:33	103 15:50 (WEA-1)	20:25	21:15	86 09:45 (WEA-2 E-138)	21:52	61 09:32 (WEA-2 E-138)
14	08:35	07:51	06:52	07:25 (WEA-1)	06:41	05:43	08:19 (WEA-2 E-138)	05:14	08:32 (WEA-2 E-138)
	16:49	17:44	18:34	103 15:48 (WEA-1)	20:27	21:17	86 09:45 (WEA-2 E-138)	21:52	60 09:32 (WEA-2 E-138)
15	08:34	07:49	06:49	07:24 (WEA-1)	06:39	05:41	08:19 (WEA-2 E-138)	05:14	08:32 (WEA-2 E-138)
	16:51	17:46	18:36	104 15:48 (WEA-1)	20:29	21:18	85 09:44 (WEA-2 E-138)	21:53	60 09:32 (WEA-2 E-138)
16	08:33	07:47	06:47	07:24 (WEA-1)	06:37	05:40	08:19 (WEA-2 E-138)	05:13	08:33 (WEA-2 E-138)
	16:52	17:48	18:38	102 15:47 (WEA-1)	20:30	21:20	85 09:44 (WEA-2 E-138)	21:54	59 09:32 (WEA-2 E-138)
17	08:32	07:45	06:45	07:22 (WEA-1)	06:34	05:38	08:20 (WEA-2 E-138)	05:13	08:33 (WEA-2 E-138)
	16:54	17:50	18:39	102 15:46 (WEA-1)	20:32	21:21	83 09:43 (WEA-2 E-138)	21:54	59 09:32 (WEA-2 E-138)
18	08:31	07:43	06:42	07:23 (WEA-1)	06:32	05:37	08:20 (WEA-2 E-138)	05:13	08:33 (WEA-2 E-138)
	16:56	17:51	18:41	100 15:45 (WEA-1)	20:34	21:23	82 09:42 (WEA-2 E-138)	21:54	59 09:32 (WEA-2 E-138)
19	08:30	07:41	06:40	08:05 (WEA02)	06:30	05:35	08:20 (WEA-2 E-138)	05:13	08:33 (WEA-2 E-138)
	16:57	17:53	18:43	98 15:45 (WEA-1)	20:35	21:24	82 09:42 (WEA-2 E-138)	21:55	59 09:32 (WEA-2 E-138)
20	08:29	07:39	06:38	07:22 (WEA-1)	06:28	05:34	08:21 (WEA-2 E-138)	05:13	08:34 (WEA-2 E-138)
	16:59	17:55	18:45	95 15:43 (WEA-1)	20:37	21:26	80 09:41 (WEA-2 E-138)	21:55	58 09:32 (WEA-2 E-138)
21	08:28	07:37	06:35	06:58 (WEA04)	06:26	05:33	08:21 (WEA-2 E-138)	05:14	08:34 (WEA-2 E-138)
	17:01	17:57	18:46	92 15:42 (WEA-1)	20:39	21:27	80 09:41 (WEA-2 E-138)	21:55	58 09:32 (WEA-2 E-138)
22	08:27	07:35	06:33	06:56 (WEA04)	06:24	05:31	08:21 (WEA-2 E-138)	05:14	08:34 (WEA-2 E-138)
	17:02	17:59	18:48	90 15:41 (WEA-1)	20:41	21:28	79 09:40 (WEA-2 E-138)	21:56	58 09:32 (WEA-2 E-138)
23	08:26	07:33	06:31	06:53 (WEA04)	06:22	05:30	08:21 (WEA-2 E-138)	05:14	08:35 (WEA-2 E-138)
	17:04	18:01	18:50	87 15:39 (WEA-1)	20:42	21:30	78 09:39 (WEA-2 E-138)	21:56	58 09:33 (WEA-2 E-138)
24	08:25	07:31	06:29	06:51 (WEA04)	06:20	05:29	08:22 (WEA-2 E-138)	05:14	08:34 (WEA-2 E-138)
	17:06	18:02	18:51	82 15:37 (WEA-1)	20:44	21:31	77 09:39 (WEA-2 E-138)	21:56	59 09:33 (WEA-2 E-138)
25	08:23	07:29	06:26	06:50 (WEA04)	06:18	05:28	08:22 (WEA-2 E-138)	05:15	08:34 (WEA-2 E-138)
	17:07	18:04	18:53	75 15:36 (WEA-1)	20:46	21:33	76 09:38 (WEA-2 E-138)	21:56	59 09:33 (WEA-2 E-138)
26	08:22	07:27	06:24	06:50 (WEA04)	06:16	05:27	08:23 (WEA-2 E-138)	05:15	08:35 (WEA-2 E-138)
	17:09	18:06	18:55	60 15:33 (WEA-1)	20:47	21:34	75 09:38 (WEA-2 E-138)	21:56	59 09:34 (WEA-2 E-138)
27	08:21	07:25	06:22	14:48 (WEA-1)	06:14	05:25	08:23 (WEA-2 E-138)	05:16	08:34 (WEA-2 E-138)
	17:11	18:08	18:57	43 15:31 (WEA-1)	20:49	21:35	74 09:37 (WEA-2 E-138)	21:56	60 09:34 (WEA-2 E-138)
28	08:19	07:23	06:19	14:52 (WEA-1)	06:12	05:24	08:23 (WEA-2 E-138)	05:16	08:35 (WEA-2 E-138)
	17:13	18:10	18:58	36 15:51 (WEA-1)	20:51	21:36	73 09:36 (WEA-2 E-138)	21:56	60 09:35 (WEA-2 E-138)
29	08:18	07:17	06:10	15:56 (WEA-1)	06:10	05:23	08:24 (WEA-2 E-138)	05:17	08:35 (WEA-2 E-138)
	17:15	18:12	19:00	28 16:24 (WEA-1)	20:52	21:38	72 09:36 (WEA-2 E-138)	21:56	60 09:35 (WEA-2 E-138)
30	08:17	07:15	06:08	16:02 (WEA-1)	06:08	05:22	08:25 (WEA-2 E-138)	05:17	08:35 (WEA-2 E-138)
	17:16	18:13	19:01	16 16:18 (WEA-1)	20:54	21:39	71 09:36 (WEA-2 E-138)	21:55	61 09:36 (WEA-2 E-138)
31	08:15	07:12	06:03	16:18 (WEA-1)	20:54	21:39	70 09:35 (WEA-2 E-138)	21:55	61 09:36 (WEA-2 E-138)
	17:18	18:15	19:03			485		498	1843
Sonnenscheinstunden	260	278	367	416	416	485	2572	498	1843
astr.max.mögl.Beschattung	168	1531	2492	2314	2314	2572	1843	1843	1843
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,41	0,46	0,36	0,36	0,36
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,56	0,69	0,69	0,64	0,64	0,64	0,64	0,64	0,64
Gesamte Reduktion	0,09	0,18	0,17	0,22	0,22	0,25	0,25	0,25	0,25
Met.wahrsch.Beschattung	16	269	431	513	513	637	637	637	637

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/2 - IP 36/2 Greven Esch 15a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember					
1	05:18		08:34 (WEA-2 E-138)	05:54	08:29 (WEA-2 E-138)	06:43	08:35 (WEA-2 E-138)	07:32	08:07 (WEA-01)	07:26	14:20 (WEA-1)	08:16				
	21:55	62	09:36 (WEA-2 E-138)	21:23	88	09:57 (WEA-2 E-138)	20:22	70	09:45 (WEA-2 E-138)	19:13	102	16:29 (WEA-1)	17:07	41	15:01 (WEA-1)	16:27
2	05:18		08:35 (WEA-2 E-138)	05:56	08:29 (WEA-2 E-138)	06:45	07:18 (WEA03)	07:34	08:03 (WEA05)	07:27		14:23 (WEA-1)	08:18			
	21:55	61	09:36 (WEA-2 E-138)	21:22	88	09:57 (WEA-2 E-138)	20:20	69	09:44 (WEA-2 E-138)	19:10	105	16:29 (WEA-1)	17:05	36	14:59 (WEA-1)	16:26
3	05:19		08:35 (WEA-2 E-138)	05:57	08:29 (WEA-2 E-138)	06:47	07:16 (WEA03)	07:35	08:01 (WEA05)	07:29		14:26 (WEA-1)	08:19			
	21:54	62	09:37 (WEA-2 E-138)	21:20	89	09:58 (WEA-2 E-138)	20:17	71	09:42 (WEA-2 E-138)	19:08	106	16:29 (WEA-1)	17:03	29	14:55 (WEA-1)	16:25
4	05:20		08:34 (WEA-2 E-138)	05:59	08:29 (WEA-2 E-138)	06:48	07:14 (WEA03)	07:37	08:02 (WEA05)	07:31		14:30 (WEA-1)	08:20			
	21:54	63	09:37 (WEA-2 E-138)	21:18	89	09:58 (WEA-2 E-138)	20:15	70	09:40 (WEA-2 E-138)	19:06	97	16:28 (WEA-1)	17:01	21	14:51 (WEA-1)	16:25
5	05:21		08:34 (WEA-2 E-138)	06:00	08:28 (WEA-2 E-138)	06:50	07:16 (WEA03)	07:39	08:04 (WEA05)	07:33		14:39 (WEA-1)	08:22			
	21:54	64	09:38 (WEA-2 E-138)	21:17	90	09:58 (WEA-2 E-138)	20:13	65	09:38 (WEA-2 E-138)	19:03	90	16:28 (WEA-1)	17:00	4	14:43 (WEA-1)	16:24
6	05:22		08:34 (WEA-2 E-138)	06:02	08:28 (WEA-2 E-138)	06:52	07:17 (WEA03)	07:40	08:06 (WEA05)	07:35		14:43 (WEA-1)	08:23			
	21:53	65	09:39 (WEA-2 E-138)	21:15	91	09:59 (WEA-2 E-138)	20:10	59	09:35 (WEA-2 E-138)	19:01	88	16:28 (WEA-1)	16:58		16:24	
7	05:22		08:34 (WEA-2 E-138)	06:03	08:28 (WEA-2 E-138)	06:53	07:19 (WEA03)	07:42	08:07 (WEA05)	07:36		16:27 (WEA-1)	07:36		16:24	
	21:52	66	09:40 (WEA-2 E-138)	21:13	90	09:58 (WEA-2 E-138)	20:08	51	09:32 (WEA-2 E-138)	18:59	85	16:27 (WEA-1)	16:56		16:23	
8	05:23		08:34 (WEA-2 E-138)	06:05	08:28 (WEA-2 E-138)	06:55	07:20 (WEA03)	07:44	15:03 (WEA-1)	07:38		16:27 (WEA-1)	07:38		16:26	
	21:52	67	09:41 (WEA-2 E-138)	21:11	91	09:59 (WEA-2 E-138)	20:06	42	09:28 (WEA-2 E-138)	18:57	84	16:27 (WEA-1)	16:54		16:23	
9	05:24		08:34 (WEA-2 E-138)	06:06	08:28 (WEA-2 E-138)	06:56	08:51 (WEA-2 E-138)	07:45	15:03 (WEA-1)	07:40		16:27 (WEA-1)	07:40		16:27	
	21:51	67	09:41 (WEA-2 E-138)	21:09	91	09:59 (WEA-2 E-138)	20:04	34	09:25 (WEA-2 E-138)	18:54	84	16:27 (WEA-1)	16:53		16:23	
10	05:25		08:34 (WEA-2 E-138)	06:08	08:28 (WEA-2 E-138)	06:58	08:54 (WEA-2 E-138)	07:47	15:03 (WEA-1)	07:42		16:27 (WEA-1)	07:42		16:28	
	21:50	68	09:42 (WEA-2 E-138)	21:08	91	09:59 (WEA-2 E-138)	20:01	25	09:19 (WEA-2 E-138)	18:52	84	16:27 (WEA-1)	16:51		16:23	
11	05:26		08:34 (WEA-2 E-138)	06:10	08:28 (WEA-2 E-138)	07:00	09:19 (WEA-2 E-138)	18:52	15:02 (WEA-1)	07:43		16:27 (WEA-1)	07:43		16:29	
	21:50	69	09:43 (WEA-2 E-138)	21:06	91	09:59 (WEA-2 E-138)	19:59	6	09:04 (WEA-2 E-138)	18:50	83	16:25 (WEA-1)	16:50		16:22	
12	05:27		08:34 (WEA-2 E-138)	06:11	08:28 (WEA-2 E-138)	07:01	09:10 (WEA-2 E-138)	18:50	15:02 (WEA-1)	07:45		16:25 (WEA-1)	07:45		16:30	
	21:49	70	09:44 (WEA-2 E-138)	21:04	91	09:59 (WEA-2 E-138)	19:57		07:51	18:48	83	16:25 (WEA-1)	16:48		16:22	
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	21:48	70	09:44 (WEA-2 E-138)	21:02	91	09:59 (WEA-2 E-138)	19:54	13	16:08 (WEA-1)	18:46	83	16:25 (WEA-1)	16:47		16:22	
14	05:30		08:33 (WEA-2 E-138)	06:14	08:28 (WEA-2 E-138)	07:04	16:08 (WEA-1)	18:46	15:48 (WEA-1)	07:54		16:25 (WEA-1)	16:47		16:22	
	21:47	72	09:45 (WEA-2 E-138)	21:00	91	09:59 (WEA-2 E-138)	19:52	26	16:14 (WEA-1)	18:43	81	16:24 (WEA-1)	16:45	8	08:44 (WEA10)	16:22
15	05:31		08:33 (WEA-2 E-138)	06:16	08:28 (WEA-2 E-138)	07:06	15:42 (WEA-1)	07:56	16:14 (WEA-1)	18:43	81	16:24 (WEA-1)	16:45		08:35 (WEA10)	16:33
	21:46	73	09:46 (WEA-2 E-138)	20:58	91	09:59 (WEA-2 E-138)	19:50	35	16:17 (WEA-1)	18:41	87	16:23 (WEA-1)	16:44	10	08:45 (WEA10)	16:22
16	05:32		08:33 (WEA-2 E-138)	06:18	07:08 (WEA08)	07:08	15:38 (WEA-1)	07:57	16:17 (WEA-1)	18:41	87	16:23 (WEA-1)	16:44		08:34 (WEA10)	16:34
	21:45	73	09:46 (WEA-2 E-138)	20:56	92	09:59 (WEA-2 E-138)	19:47	42	16:20 (WEA-1)	18:39	91	16:22 (WEA-1)	16:42	12	08:46 (WEA10)	16:23
17	05:33		08:32 (WEA-2 E-138)	06:19	07:04 (WEA08)	07:09	16:20 (WEA04)	07:59	16:20 (WEA-1)	18:39	91	16:22 (WEA-1)	16:42		08:34 (WEA10)	16:34
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	21:43	75	09:47 (WEA-2 E-138)	20:52	102	09:58 (WEA-2 E-138)	19:43	74	16:23 (WEA-1)	18:35	95	16:21 (WEA-1)	16:40	14	08:48 (WEA10)	16:23
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	21:41	77	09:49 (WEA-2 E-138)	20:48	103	09:57 (WEA-2 E-138)	19:38	86	16:25 (WEA-1)	18:31	94	16:19 (WEA-1)	16:37	15	08:49 (WEA10)	16:24
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	21:38	79	09:50 (WEA-2 E-138)	20:44	103	09:56 (WEA-2 E-138)	19:33	91	16:26 (WEA-1)	18:26	90	16:17 (WEA-1)	16:35	15	08:49 (WEA10)	16:24
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	21:35	81	09:52 (WEA-2 E-138)	20:39	100	09:55 (WEA-2 E-138)	19:29	96	16:28 (WEA-1)	18:22	80	16:15 (WEA-1)	16:33	12	08:49 (WEA10)	16:26
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	21:34	83	09:53 (WEA-2 E-138)	20:37	97	09:54 (WEA-2 E-138)	19:26	99	16:28 (WEA-1)	17:20	74	15:14 (WEA-1)	16:32	10	08:48 (WEA10)	16:26
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	21:30	84	09:54 (WEA-2 E-138)	20:31	79	09:51 (WEA-2 E-138)	19:19	103	16:28 (WEA-1)	17:14	56	15:09 (WEA-1)	16:29	3	08:47 (WEA10)	16:28
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	21:27	86	09:56 (WEA-2 E-138)	20:26	75	09:48 (WEA-2 E-138)	19:15	104	16:28 (WEA-1)	17:10	49	15:07 (WEA-1)	16:27		16:30	
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	21:25	87	09:56 (WEA-2 E-138)	20:24	72	09:47 (WEA-2 E-138)	19:13	104	16:28 (WEA-1)	17:09	45	15:03 (WEA-1)	16:27		16:31	
Sonnenscheinstunden	</															

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/3 - IP 36/3 Greven Esch 15d

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni											
1	08:40		07:20	15:01 (WEA-1)	07:10		06:06		08:33 (WEA-2 E-138)	05:21		08:31 (WEA-2 E-138)					
	16:32	17:20	18:11	73 16:14 (WEA-1)	20:05		20:56	105	10:18 (WEA-2 E-138)	21:41	99	10:10 (WEA-2 E-138)					
2	08:40	08:12	07:18	15:01 (WEA-1)	07:08		06:04		08:33 (WEA-2 E-138)	05:20		08:31 (WEA-2 E-138)					
	16:33	17:22	18:13	74 16:15 (WEA-1)	20:07		20:57	105	10:18 (WEA-2 E-138)	21:42	98	10:09 (WEA-2 E-138)					
3	08:40	08:10	07:16	14:59 (WEA-1)	07:06		06:02		08:32 (WEA-2 E-138)	05:19		08:32 (WEA-2 E-138)					
	16:35	17:24	18:15	75 16:14 (WEA-1)	20:08		20:59	106	10:18 (WEA-2 E-138)	21:43	98	10:10 (WEA-2 E-138)					
4	08:40	08:09	07:14	14:59 (WEA-1)	07:03		06:00		08:32 (WEA-2 E-138)	05:18		08:31 (WEA-2 E-138)					
	16:36	17:25	18:17	76 16:15 (WEA-1)	20:10		21:01	107	10:19 (WEA-2 E-138)	21:44	98	10:09 (WEA-2 E-138)					
5	08:39	08:07	07:12	14:59 (WEA-1)	07:01		05:58		07:24 (WEA03)	05:58		08:32 (WEA-2 E-138)					
	16:37	17:27	18:18	76 16:15 (WEA-1)	20:12	23	09:44 (WEA-2 E-138)	21:02	106	10:18 (WEA-2 E-138)	21:45	97	10:09 (WEA-2 E-138)				
6	08:39	08:06	07:10	07:33 (WEA05)	06:59		07:21 (WEA03)	05:56		08:31 (WEA-2 E-138)	05:17		08:32 (WEA-2 E-138)				
	16:38	17:29	18:20	77 16:15 (WEA-1)	20:13	38	09:49 (WEA-2 E-138)	21:04	107	10:18 (WEA-2 E-138)	21:46	97	10:09 (WEA-2 E-138)				
7	08:39	08:04	07:07	07:30 (WEA05)	06:57		07:19 (WEA03)	05:55		08:31 (WEA-2 E-138)	05:16		08:33 (WEA-2 E-138)				
	16:39	17:31	18:22	81 16:15 (WEA-1)	20:15	49	09:53 (WEA-2 E-138)	21:06	107	10:18 (WEA-2 E-138)	21:47	96	10:09 (WEA-2 E-138)				
8	08:38	08:02	07:05	07:30 (WEA05)	06:54		07:17 (WEA03)	05:53		08:30 (WEA-2 E-138)	05:16		08:32 (WEA-2 E-138)				
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9	08:38	08:00	07:03	07:26 (WEA05)	06:52		07:16 (WEA03)	05:51		08:30 (WEA-2 E-138)	05:15		08:33 (WEA-2 E-138)				
	16:42	17:35	18:26	91 16:15 (WEA-1)	20:19	65	10:00 (WEA-2 E-138)	21:09	107	10:17 (WEA-2 E-138)	21:49	96	10:09 (WEA-2 E-138)				
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	16:43	17:37	18:27	99 16:14 (WEA-1)	20:20	67	10:01 (WEA-2 E-138)	21:10	107	10:17 (WEA-2 E-138)	21:50	95	10:08 (WEA-2 E-138)				
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	16:45	4 09:10 (WEA10)	17:38	14 15:46 (WEA-1)	18:29	101	16:14 (WEA-1)	20:22	65	10:04 (WEA-2 E-138)	21:12	108	10:17 (WEA-2 E-138)	21:50	95	10:08 (WEA-2 E-138)	
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	16:46	6 09:11 (WEA10)	17:40	25 15:52 (WEA-1)	18:31	97	16:14 (WEA-1)	20:24	70	10:06 (WEA-2 E-138)	21:14	107	10:17 (WEA-2 E-138)	21:51	94	10:08 (WEA-2 E-138)	
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	16:48	8 09:13 (WEA10)	17:42	32 15:55 (WEA-1)	18:33	98	16:13 (WEA-1)	20:25	73	10:07 (WEA-2 E-138)	21:15	107	10:16 (WEA-2 E-138)	21:52	95	10:09 (WEA-2 E-138)	
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19	08:30	09:02 (WEA10)	07:41	08:06 (WEA02)	06:40		07:25 (WEA01)	06:30		06:55 (WEA08)	05:35		08:29 (WEA-2 E-138)	05:13		08:36 (WEA-2 E-138)	
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	17:04	14 09:18 (WEA10)	18:00	81 16:11 (WEA-1)	18:50	85	16:10 (WEA-1)	20:42	112	10:16 (WEA-2 E-138)	21:30	103	10:12 (WEA-2 E-138)	21:56	93	10:09 (WEA-2 E-138)	
24	08:25	09:05 (WEA10)	07:31	08:11 (WEA02)	06:29		06:51 (WEA04)	06:20		06:53 (WEA08)	05:29		08:29 (WEA-2 E-138)	05:14		08:37 (WEA-2 E-138)	
	17:06	13 09:18 (WEA10)	18:02	81 16:12 (WEA-1)	18:51	82	16:02 (WEA-1)	20:44	114	10:17 (WEA-2 E-138)	21:31	103	10:12 (WEA-2 E-138)	21:56	93	10:10 (WEA-2 E-138)	
25	08:23	09:06 (WEA10)	07:29	08:12 (WEA09)	06:26		06:50 (WEA04)	06:18		06:53 (WEA08)	05:28		08:29 (WEA-2 E-138)	05:15		08:37 (WEA-2 E-138)	
	17:07	12 09:18 (WEA10)	18:04	80 16:13 (WEA-1)	18:53	74	16:00 (WEA-1)	20:46	114	10:17 (WEA-2 E-138)	21:33	103	10:12 (WEA-2 E-138)	21:56	93	10:10 (WEA-2 E-138)	
26	08:22	09:07 (WEA10)	07:27	08:14 (WEA09)	06:24		06:50 (WEA04)	06:16		06:54 (WEA08)	05:27		08:29 (WEA-2 E-138)	05:15		08:37 (WEA-2 E-138)	
	17:09	9 09:16 (WEA10)	18:06	76 16:12 (WEA-1)	18:55	62	15:57 (WEA-1)	20:47	113	10:17 (WEA-2 E-138)	21:34	102	10:11 (WEA-2 E-138)	21:56	94	10:11 (WEA-2 E-138)	
27	08:21	09:10 (WEA10)	07:25	15:02 (WEA-1)	06:22		15:15 (WEA-1)	06:14		06:55 (WEA08)	05:25		08:30 (WEA-2 E-138)	05:15		08:35 (WEA-2 E-138)	
	17:11	5 09:15 (WEA10)	18:08	71 16:13 (WEA-1)	18:57	40	15:55 (WEA-1)	20:49	111	10:17 (WEA-2 E-138)	21:35	101	10:11 (WEA-2 E-138)	21:56	94	10:11 (WEA-2 E-138)	
28	08:19	07:23	06:19	15:01 (WEA-1)	06:19		15:19 (WEA-1)	06:12		06:57 (WEA08)	05:24		08:30 (WEA-2 E-138)	05:16		08:38 (WEA-2 E-138)	
	17:13	18:10	73 16:14 (WEA-1)	18:58	34 15:53 (WEA-1)	06:10	109	10:18 (WEA-2 E-138)	21:36	101	10:11 (WEA-2 E-138)	21:56	94	10:12 (WEA-2 E-138)		08:37 (WEA-2 E-138)	
29	08:18		07:17				07:15	06:10		08:35 (WEA-2 E-138)	05:23		08:30 (WEA-2 E-138)	05:17		08:37 (WEA-2 E-138)	
	17:15		20:00				27 16:50 (WEA-1)	20:52	104	10:19 (WEA-2 E-138)	21:38	100	10:10 (WEA-2 E-138)	21:56	95	10:12 (WEA-2 E-138)	
30	08:17		07:15				16:27 (WEA-1)	06:08		08:34 (WEA-2 E-138)	05:22		08:31 (WEA-2 E-138)	05:17		08:38 (WEA-2 E-138)	
	17:16		20:02				17 16:44 (WEA-1)	20:54	104	10:18 (WEA-2 E-138)	21:39	100	10:11 (WEA-2 E-138)	21:55	95	10:13 (WEA-2 E-138)	
31	08:15		07:12							05:22			08:31 (WEA-2 E-138)				
	17:18		20:03							21:40	99	10:10 (WEA-2 E-138)					
Sonnenscheinstunden	260	278	367	416	485	572	645	730	814	899	984	1069	1154				

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/3 - IP 36/3 Greven Esch 15d

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	08:38 (WEA-2 E-138)	05:54	08:40 (WEA-2 E-138)	06:43	08:58 (WEA-2 E-138)	07:32	08:08 (WEA-01)	07:26	08:16	08:48 (WEA10)
	21:55	10:12 (WEA-2 E-138)	21:23	10:27 (WEA-2 E-138)	20:22	10:03 (WEA-2 E-138)	19:13	16:52 (WEA-1)	17:07	16:27	4 08:52 (WEA10)
2	05:18	08:38 (WEA-2 E-138)	05:56	08:40 (WEA-2 E-138)	06:45	07:15 (WEA03)	07:34	08:05 (WEA05)	07:27	08:18	
	21:55	10:13 (WEA-2 E-138)	21:22	10:27 (WEA-2 E-138)	20:20	10:00 (WEA-2 E-138)	19:10	16:53 (WEA-1)	17:05	16:26	
3	05:19	08:38 (WEA-2 E-138)	05:57	08:41 (WEA-2 E-138)	06:47	07:14 (WEA03)	07:35	08:03 (WEA05)	07:29	08:19	
	21:54	10:14 (WEA-2 E-138)	21:20	10:28 (WEA-2 E-138)	20:17	09:58 (WEA-2 E-138)	19:08	16:53 (WEA-1)	17:03	16:25	
4	05:20	08:38 (WEA-2 E-138)	05:59	08:40 (WEA-2 E-138)	06:48	07:14 (WEA03)	07:37	08:02 (WEA05)	07:31	08:20	
	21:54	10:14 (WEA-2 E-138)	21:18	10:27 (WEA-2 E-138)	20:15	09:54 (WEA-2 E-138)	19:06	16:52 (WEA-1)	17:01	16:25	
5	05:21	08:38 (WEA-2 E-138)	06:00	08:40 (WEA-2 E-138)	06:50	07:16 (WEA03)	07:39	08:04 (WEA05)	07:33	08:22	
	21:54	10:14 (WEA-2 E-138)	21:17	10:27 (WEA-2 E-138)	20:13	09:51 (WEA-2 E-138)	19:03	16:52 (WEA-1)	17:00	16:24	
6	05:22	08:38 (WEA-2 E-138)	06:02	08:41 (WEA-2 E-138)	06:51	07:17 (WEA03)	07:40	08:06 (WEA05)	07:35	08:23	
	21:53	10:15 (WEA-2 E-138)	21:15	10:28 (WEA-2 E-138)	20:10	09:45 (WEA-2 E-138)	19:01	16:52 (WEA-1)	16:58	16:24	
7	05:22	08:39 (WEA-2 E-138)	06:03	08:40 (WEA-2 E-138)	06:53	07:19 (WEA03)	07:42	08:07 (WEA05)	07:36	08:24	
	21:52	10:16 (WEA-2 E-138)	21:13	10:27 (WEA-2 E-138)	20:08	09:39 (WEA-2 E-138)	18:59	16:50 (WEA-1)	16:56	16:23	
8	05:23	08:39 (WEA-2 E-138)	06:05	08:41 (WEA-2 E-138)	06:55		07:44	15:34 (WEA-1)	07:38	08:26	
	21:52	10:16 (WEA-2 E-138)	21:14	10:28 (WEA-2 E-138)	20:06		18:57	16:50 (WEA-1)	16:54	16:23	
9	05:24	08:39 (WEA-2 E-138)	06:06	08:41 (WEA-2 E-138)	06:56		07:45	15:34 (WEA-1)	07:40	08:27	
	21:51	10:17 (WEA-2 E-138)	21:09	10:27 (WEA-2 E-138)	20:04		18:54	16:50 (WEA-1)	16:53	16:23	
10	05:25	08:39 (WEA-2 E-138)	06:08	08:42 (WEA-2 E-138)	06:58		07:47	15:34 (WEA-1)	07:42	08:28	
	21:50	10:17 (WEA-2 E-138)	21:08	10:27 (WEA-2 E-138)	20:01		18:52	16:50 (WEA-1)	16:51	16:23	
11	05:26	08:39 (WEA-2 E-138)	06:10	08:41 (WEA-2 E-138)	07:00		07:49	15:34 (WEA-1)	07:43	08:29	
	21:50	10:18 (WEA-2 E-138)	21:06	10:27 (WEA-2 E-138)	19:59		18:50	16:48 (WEA-1)	16:50	16:22	
12	05:27	08:39 (WEA-2 E-138)	06:11	08:42 (WEA-2 E-138)	07:01		07:51	15:34 (WEA-1)	07:45	08:30	
	21:49	10:19 (WEA-2 E-138)	21:04	10:27 (WEA-2 E-138)	19:57		18:48	16:48 (WEA-1)	16:48	16:22	
13	05:28	08:39 (WEA-2 E-138)	06:13	08:42 (WEA-2 E-138)	07:03		16:20 (WEA-1)	15:34 (WEA-1)	07:47	08:31	
	21:48	10:19 (WEA-2 E-138)	21:02	10:26 (WEA-2 E-138)	19:54	14	16:34 (WEA-1)	18:46	16:47	16:22	
14	05:30	08:39 (WEA-2 E-138)	06:14	08:43 (WEA-2 E-138)	07:04		16:14 (WEA-1)	07:54	15:35 (WEA-1)	07:49	08:32
	21:47	10:20 (WEA-2 E-138)	21:00	10:26 (WEA-2 E-138)	19:52	25	16:39 (WEA-1)	18:43	16:47 (WEA-1)	16:45	16:22
15	05:31	08:39 (WEA-2 E-138)	06:16	07:04 (WEA08)	07:06		16:09 (WEA-1)	07:56	15:34 (WEA-1)	07:50	08:33
	21:46	10:20 (WEA-2 E-138)	20:58	10:25 (WEA-2 E-138)	19:50	33	16:42 (WEA-1)	18:41	16:45 (WEA-1)	16:44	5 08:42 (WEA10)
16	05:32	08:39 (WEA-2 E-138)	06:18	07:02 (WEA08)	07:08		16:05 (WEA-1)	07:57	08:45 (WEA09)	07:52	08:40 (WEA10)
	21:45	10:20 (WEA-2 E-138)	20:56	10:25 (WEA-2 E-138)	19:47	39	16:44 (WEA-1)	18:39	16:44 (WEA-1)	16:42	9 08:49 (WEA10)
17	05:33	08:39 (WEA-2 E-138)	06:19	07:00 (WEA08)	07:09		07:39 (WEA04)	07:59	08:43 (WEA09)	07:54	08:39 (WEA10)
	21:44	10:21 (WEA-2 E-138)	20:54	10:24 (WEA-2 E-138)	19:45	58	16:45 (WEA-1)	18:37	16:44 (WEA-1)	16:41	12 08:51 (WEA10)
18	05:34	08:39 (WEA-2 E-138)	06:21	07:00 (WEA08)	07:11		07:37 (WEA04)	08:01	08:41 (WEA02)	07:56	08:39 (WEA10)
	21:43	10:21 (WEA-2 E-138)	20:52	10:24 (WEA-2 E-138)	19:43	72	16:47 (WEA-1)	18:35	16:43 (WEA-1)	16:40	13 08:52 (WEA10)
19	05:36	08:39 (WEA-2 E-138)	06:22	06:58 (WEA08)	07:12		07:38 (WEA04)	08:03	08:40 (WEA02)	07:57	08:39 (WEA10)
	21:42	10:21 (WEA-2 E-138)	20:50	10:22 (WEA-2 E-138)	19:40	80	16:49 (WEA-1)	18:33	16:42 (WEA-1)	16:38	14 08:53 (WEA10)
20	05:37	08:40 (WEA-2 E-138)	06:24	06:58 (WEA08)	07:14		07:39 (WEA04)	08:04	08:39 (WEA02)	07:59	08:39 (WEA10)
	21:41	10:23 (WEA-2 E-138)	20:48	10:22 (WEA-2 E-138)	19:38	84	16:49 (WEA-1)	18:30	16:41 (WEA-1)	16:37	14 08:53 (WEA10)
21	05:38	08:39 (WEA-2 E-138)	06:26	06:58 (WEA08)	07:16		07:41 (WEA04)	08:06	08:37 (WEA02)	08:01	08:38 (WEA10)
	21:39	10:23 (WEA-2 E-138)	20:46	10:20 (WEA-2 E-138)	19:36	88	16:50 (WEA-1)	18:28	16:39 (WEA-1)	16:36	15 08:53 (WEA10)
22	05:40	08:39 (WEA-2 E-138)	06:27	06:58 (WEA08)	07:17		07:42 (WEA04)	08:08	08:37 (WEA02)	08:02	08:38 (WEA10)
	21:38	10:23 (WEA-2 E-138)	20:44	10:20 (WEA-2 E-138)	19:33	87	16:50 (WEA-1)	18:26	16:37 (WEA-1)	16:35	16 08:54 (WEA10)
23	05:41	08:39 (WEA-2 E-138)	06:29	06:59 (WEA08)	07:19		08:09 (WEA-01)	08:10	08:37 (WEA02)	08:04	08:39 (WEA10)
	21:37	10:23 (WEA-2 E-138)	20:41	10:19 (WEA-2 E-138)	19:31	90	16:51 (WEA-1)	18:24	16:36 (WEA-1)	16:34	15 08:54 (WEA10)
24	05:42	08:40 (WEA-2 E-138)	06:30	06:59 (WEA08)	07:21		08:09 (WEA-01)	08:11	08:38 (WEA02)	08:06	08:40 (WEA10)
	21:35	10:25 (WEA-2 E-138)	20:39	10:17 (WEA-2 E-138)	19:29	92	16:52 (WEA-1)	18:22	16:35 (WEA-1)	16:33	14 08:54 (WEA10)
25	05:44	08:39 (WEA-2 E-138)	06:32	07:00 (WEA08)	07:22		08:08 (WEA-01)	07:13	07:40 (WEA02)	08:07	08:39 (WEA10)
	21:34	10:25 (WEA-2 E-138)	20:37	10:17 (WEA-2 E-138)	19:26	95	16:52 (WEA-1)	17:20	15:33 (WEA-1)	16:32	15 08:54 (WEA10)
26	05:45	08:39 (WEA-2 E-138)	06:34	07:02 (WEA08)	07:24		08:08 (WEA-01)	07:15	07:42 (WEA02)	08:09	08:40 (WEA10)
	21:33	10:25 (WEA-2 E-138)	20:35	10:15 (WEA-2 E-138)	19:24	96	16:52 (WEA-1)	17:18	15:31 (WEA-1)	16:31	14 08:54 (WEA10)
27	05:47	08:40 (WEA-2 E-138)	06:35	08:51 (WEA-2 E-138)	07:26		08:08 (WEA-01)	07:17	07:44 (WEA02)	08:10	08:42 (WEA10)
	21:31	10:26 (WEA-2 E-138)	20:33	10:13 (WEA-2 E-138)	19:22	98	16:53 (WEA-1)	17:16	15:29 (WEA-1)	16:30	12 08:54 (WEA10)
28	05:48	08:40 (WEA-2 E-138)	06:37	08:52 (WEA-2 E-138)	07:27		08:07 (WEA-01)	07:18	14:51 (WEA-1)	08:12	08:44 (WEA10)
	21:30	10:26 (WEA-2 E-138)	20:31	10:11 (WEA-2 E-138)	19:19	98	16:52 (WEA-1)	17:14	15:27 (WEA-1)	16:29	10 08:54 (WEA10)
29	05:50	08:39 (WEA-2 E-138)	06:39	08:54 (WEA-2 E-138)	07:29		08:08 (WEA-01)	07:20	14:54 (WEA-1)	08:13	08:45 (WEA10)
	21:28	10:26 (WEA-2 E-138)	20:28	10:10 (WEA-2 E-138)	19:17	99	16:53 (WEA-1)	17:12	15:24 (WEA-1)	16:28	8 08:53 (WEA10)
30	05:51	08:40 (WEA-2 E-138)	06:40	08:54 (WEA-2 E-138)	07:30		08:07 (WEA-01)	07:22	14:56 (WEA-1)	08:15	08:47 (WEA10)
	21:27	10:27 (WEA-2 E-138)	20:26	10:07 (WEA-2 E-138)	19:15	99	16:52 (WEA-1)	17:10	15:19 (WEA-1)	16:27	6 08:53 (WEA10)
31	05:52	08:40 (WEA-2 E-138)	06:42	08:56 (WEA-2 E-138)				07:24	15:02 (WEA-1)		08:40
	21:25	10:27 (WEA-2 E-138)	20:24	10:06 (WEA-2 E-138)				17:09	15:13 (WEA-1)		16:31
Sonnenscheinstunden	501		453		381		332		267		244
astr. max. mögl. Beschattung	3137		3161		1715		2195		192		4
Red. Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32		0,23		0,15
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84		0,84
Reduktion Windrichtung	0,63		0,63		0,68		0,70		0,56		0,56
Gesamte Reduktion	0,22		0,23		0,21		0,19		0,11		0,07
Met. wahrsch. Beschattung	693		723		353		407		21		0

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/4 - IP 36/4 Greven Esch 15b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni			
1	08:40		08:14		07:20		14:34 (WEA-1) 07:10		06:06		08:20 (WEA-2 E-138) 05:21		08:24 (WEA-2 E-138)
	16:32		17:20		18:11	81	15:55 (WEA-1) 20:05		20:56	94	09:54 (WEA-2 E-138) 21:41	75	09:39 (WEA-2 E-138)
2	08:40		08:12		07:18		14:34 (WEA-1) 07:08		06:04		08:20 (WEA-2 E-138) 05:20		08:24 (WEA-2 E-138)
	16:33		17:22		18:13	82	15:56 (WEA-1) 20:07	8	09:11 (WEA-2 E-138) 20:57	93	09:53 (WEA-2 E-138) 21:42	74	09:38 (WEA-2 E-138)
3	08:40		08:10		07:16		14:33 (WEA-1) 07:06		06:02		08:19 (WEA-2 E-138) 05:19		08:26 (WEA-2 E-138)
	16:35		17:24		18:15	82	15:55 (WEA-1) 20:08	26	09:28 (WEA-2 E-138) 20:59	94	09:53 (WEA-2 E-138) 21:43	73	09:39 (WEA-2 E-138)
4	08:40		08:09		07:14		14:33 (WEA-1) 07:03		06:00		08:20 (WEA-2 E-138) 05:18		08:26 (WEA-2 E-138)
	16:36		17:25		18:17	83	15:56 (WEA-1) 20:10	36	09:33 (WEA-2 E-138) 21:01	93	09:53 (WEA-2 E-138) 21:44	72	09:38 (WEA-2 E-138)
5	08:39		08:07		07:12		14:33 (WEA-1) 07:01		05:58		08:19 (WEA-2 E-138) 05:18		08:27 (WEA-2 E-138)
	16:37		17:27		18:18	83	15:56 (WEA-1) 20:12	45	09:36 (WEA-2 E-138) 21:02	93	09:52 (WEA-2 E-138) 21:45	71	09:38 (WEA-2 E-138)
6	08:39		08:06		07:10		14:33 (WEA-1) 06:59		05:56		08:19 (WEA-2 E-138) 05:17		08:27 (WEA-2 E-138)
	16:38		17:29		18:20	83	15:56 (WEA-1) 20:13	54	09:38 (WEA-2 E-138) 21:04	93	09:52 (WEA-2 E-138) 21:46	70	09:37 (WEA-2 E-138)
7	08:39		08:04		07:07		07:30 (WEA05) 06:57		05:55		08:19 (WEA-2 E-138) 05:16		08:27 (WEA-2 E-138)
	16:39		17:31	9	15:20 (WEA-1) 18:22	85	15:55 (WEA-1) 20:15	62	09:41 (WEA-2 E-138) 21:06	93	09:52 (WEA-2 E-138) 21:47	71	09:38 (WEA-2 E-138)
8	08:38		08:02		07:05		07:28 (WEA05) 06:54		05:53		08:19 (WEA-2 E-138) 05:16		08:27 (WEA-2 E-138)
	16:41		17:33	23	15:27 (WEA-1) 18:24	88	15:55 (WEA-1) 20:17	67	09:43 (WEA-2 E-138) 21:07	92	09:51 (WEA-2 E-138) 21:48	70	09:37 (WEA-2 E-138)
9	08:38		08:00		07:03		07:26 (WEA05) 06:52		05:51		08:18 (WEA-2 E-138) 05:15		08:28 (WEA-2 E-138)
	16:42		17:35	31	15:31 (WEA-1) 18:26	90	15:55 (WEA-1) 20:19	70	09:45 (WEA-2 E-138) 21:09	92	09:50 (WEA-2 E-138) 21:49	69	09:37 (WEA-2 E-138)
10	08:37		07:59		07:01		07:25 (WEA05) 06:50		05:49		08:19 (WEA-2 E-138) 05:15		08:28 (WEA-2 E-138)
	16:43		17:37	37	15:34 (WEA-1) 18:27	101	15:54 (WEA-1) 20:20	69	09:45 (WEA-2 E-138) 21:10	91	09:50 (WEA-2 E-138) 21:50	68	09:36 (WEA-2 E-138)
11	08:37		07:57		06:58		07:23 (WEA05) 06:48		05:48		08:18 (WEA-2 E-138) 05:15		08:28 (WEA-2 E-138)
	16:45		17:38	42	15:37 (WEA-1) 18:29	105	15:54 (WEA-1) 20:22	69	09:47 (WEA-2 E-138) 21:12	91	09:49 (WEA-2 E-138) 21:50	68	09:36 (WEA-2 E-138)
12	08:36		07:55		06:56		07:28 (WEA-01) 06:45		05:46		08:19 (WEA-2 E-138) 05:14		08:29 (WEA-2 E-138)
	16:46		17:40	46	15:38 (WEA-1) 18:31	101	15:54 (WEA-1) 20:24	71	09:48 (WEA-2 E-138) 21:14	90	09:49 (WEA-2 E-138) 21:51	67	09:36 (WEA-2 E-138)
13	08:35		07:53		06:54		07:27 (WEA-01) 06:43		05:44		08:19 (WEA-2 E-138) 05:14		08:30 (WEA-2 E-138)
	16:48		17:42	50	15:41 (WEA-1) 18:33	103	15:54 (WEA-1) 20:25	74	09:49 (WEA-2 E-138) 21:15	89	09:48 (WEA-2 E-138) 21:52	67	09:37 (WEA-2 E-138)
14	08:35		07:51		06:52		07:25 (WEA-01) 06:41		05:43		08:19 (WEA-2 E-138) 05:14		08:30 (WEA-2 E-138)
	16:49	4	09:08 (WEA10) 17:44	54	15:43 (WEA-1) 18:34	103	15:52 (WEA-1) 20:27	76	09:50 (WEA-2 E-138) 21:17	89	09:48 (WEA-2 E-138) 21:52	67	09:37 (WEA-2 E-138)
15	08:34		07:49		06:49		07:25 (WEA-01) 06:39		05:41		08:19 (WEA-2 E-138) 05:14		08:31 (WEA-2 E-138)
	16:51	6	09:09 (WEA10) 17:46	57	15:45 (WEA-1) 18:36	103	15:52 (WEA-1) 20:29	78	09:51 (WEA-2 E-138) 21:18	88	09:47 (WEA-2 E-138) 21:53	66	09:37 (WEA-2 E-138)
16	08:33		07:47		06:47		07:24 (WEA-01) 06:37		05:40		08:19 (WEA-2 E-138) 05:13		08:31 (WEA-2 E-138)
	16:52	8	09:10 (WEA10) 17:48	64	15:46 (WEA-1) 18:38	104	15:52 (WEA-1) 20:30	86	09:52 (WEA-2 E-138) 21:20	88	09:47 (WEA-2 E-138) 21:54	66	09:37 (WEA-2 E-138)
17	08:32		07:45		06:45		07:22 (WEA-01) 06:34		05:38		08:20 (WEA-2 E-138) 05:13		08:31 (WEA-2 E-138)
	16:54	11	09:12 (WEA10) 17:50	72	15:47 (WEA-1) 18:39	102	15:50 (WEA-1) 20:32	93	09:52 (WEA-2 E-138) 21:21	87	09:47 (WEA-2 E-138) 21:54	66	09:37 (WEA-2 E-138)
18	08:31		07:43		06:42		07:23 (WEA-01) 06:32		05:37		08:19 (WEA-2 E-138) 05:13		08:32 (WEA-2 E-138)
	16:56	13	09:13 (WEA10) 17:51	79	15:49 (WEA-1) 18:41	101	15:50 (WEA-1) 20:34	97	09:52 (WEA-2 E-138) 21:23	87	09:46 (WEA-2 E-138) 21:54	65	09:37 (WEA-2 E-138)
19	08:30		07:41		06:40		07:23 (WEA-01) 06:30		05:35		08:20 (WEA-2 E-138) 05:13		08:32 (WEA-2 E-138)
	16:57	13	09:12 (WEA10) 17:53	85	15:49 (WEA-1) 18:43	98	15:49 (WEA-1) 20:35	101	09:53 (WEA-2 E-138) 21:24	85	09:45 (WEA-2 E-138) 21:55	65	09:37 (WEA-2 E-138)
20	08:29		07:39		06:38		07:22 (WEA-01) 06:28		05:34		08:20 (WEA-2 E-138) 05:13		08:32 (WEA-2 E-138)
	16:59	14	09:13 (WEA10) 17:55	90	15:50 (WEA-1) 18:45	95	15:47 (WEA-1) 20:37	101	09:53 (WEA-2 E-138) 21:26	85	09:45 (WEA-2 E-138) 21:55	65	09:37 (WEA-2 E-138)
21	08:28		07:37		06:35		06:58 (WEA04) 06:26		05:33		08:21 (WEA-2 E-138) 05:14		08:32 (WEA-2 E-138)
	17:01	15	09:14 (WEA10) 17:57	92	15:51 (WEA-1) 18:46	92	15:46 (WEA-1) 20:39	104	09:54 (WEA-2 E-138) 21:27	84	09:45 (WEA-2 E-138) 21:55	65	09:37 (WEA-2 E-138)
22	08:27		07:35		06:33		06:56 (WEA04) 06:24		05:31		08:20 (WEA-2 E-138) 05:14		08:32 (WEA-2 E-138)
	17:02	15	09:15 (WEA10) 17:59	92	15:52 (WEA-1) 18:48	91	15:45 (WEA-1) 20:41	105	09:54 (WEA-2 E-138) 21:28	83	09:43 (WEA-2 E-138) 21:56	65	09:37 (WEA-2 E-138)
23	08:26		07:33		06:31		06:53 (WEA04) 06:22		05:30		08:21 (WEA-2 E-138) 05:14		08:33 (WEA-2 E-138)
	17:04	15	09:14 (WEA10) 18:01	94	15:53 (WEA-1) 18:50	88	15:43 (WEA-1) 20:42	105	09:54 (WEA-2 E-138) 21:30	82	09:43 (WEA-2 E-138) 21:56	65	09:38 (WEA-2 E-138)
24	08:25		07:31		06:29		06:51 (WEA04) 06:20		05:29		08:21 (WEA-2 E-138) 05:14		08:33 (WEA-2 E-138)
	17:06	14	09:14 (WEA10) 18:02	93	15:53 (WEA-1) 18:51	84	15:42 (WEA-1) 20:44	105	09:54 (WEA-2 E-138) 21:31	82	09:43 (WEA-2 E-138) 21:56	65	09:38 (WEA-2 E-138)
25	08:23		07:29		06:26		06:49 (WEA04) 06:18		05:28		08:21 (WEA-2 E-138) 05:15		08:32 (WEA-2 E-138)
	17:07	14	09:15 (WEA10) 18:04	90	15:54 (WEA-1) 18:53	77	15:40 (WEA-1) 20:46	103	09:54 (WEA-2 E-138) 21:33	81	09:42 (WEA-2 E-138) 21:56	66	09:38 (WEA-2 E-138)
26	08:22		07:27		06:24		06:50 (WEA04) 06:16		05:27		08:22 (WEA-2 E-138) 05:15		08:33 (WEA-2 E-138)
	17:09	12	09:14 (WEA10) 18:06	89	15:54 (WEA-1) 18:55	64	15:38 (WEA-1) 20:47	101	09:54 (WEA-2 E-138) 21:34	80	09:42 (WEA-2 E-138) 21:56	66	09:39 (WEA-2 E-138)
27	08:21		07:25		06:22		14:51 (WEA-1) 06:14		05:25		08:22 (WEA-2 E-138) 05:16		08:33 (WEA-2 E-138)
	17:11	10	09:13 (WEA10) 18:08	81	15:54 (WEA-1) 18:57	45	15:36 (WEA-1) 20:49	96	09:54 (WEA-2 E-138) 21:35	79	09:41 (WEA-2 E-138) 21:56	66	09:39 (WEA-2 E-138)
28	08:19		07:23		06:19		14:34 (WEA-1) 06:12		05:24		08:22 (WEA-2 E-138) 05:16		08:33 (WEA-2 E-138)
	17:13	7	09:12 (WEA10) 18:10	81	15:55 (WEA-1) 18:58	38	15:33 (WEA-1) 20:51	93	09:54 (WEA-2 E-138) 21:36	79	09:41 (WEA-2 E-138) 21:56	67	09:40 (WEA-2 E-138)
29	08:18				07:17		15:59 (WEA-1) 06:10		05:23		08:23 (WEA-2 E-138) 05:17		08:33 (WEA-2 E-138)
	17:15				20:00	31	16:30 (WEA-1) 20:52	93	09:54 (WEA-2 E-138) 21:38	77	09:40 (WEA-2 E-138) 21:56	67	09:40 (WEA-2 E-138)
30	08:17				07:15		16:03 (WEA-1) 06:08		05:22		08:24 (WEA-2 E-138) 05:17		08:33 (WEA-2 E-138)
	17:16				20:02	22	16:25 (WEA-1) 20:54	93	09:54 (WEA-2 E-138) 21:39	76	09:40 (WEA-2 E-138) 21:55	68	09:41 (WEA-2 E-138)
31	08:15				07:12				05:22		08:24 (WEA-2 E-138)		
	17:18				20:03				21:40	76	09:40 (WEA-2 E-138)		
Sonnenscheinstunden	260		278		367		416		485		498		2035
astr.max.mögl.Beschattung	171		1451		2505		2281		2686				0,36
Red.Sonnenscheinwahrsch.	0,20		0,30		0,30		0,41		0,46				0,84
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84				0,64
Reduktion Windrichtung	0,56		0,69		0,69		0,65		0,64				0,20
Gesamte Reduktion	0,09		0,18		0,17		0,22		0,25				0,25
Met.wahrsch.Beschattung	16		255		433		506		666				399

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/4 - IP 36/4 Greven Esch 15b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18	08:33 (WEA-2 E-138)	05:54	08:29 (WEA-2 E-138)	06:43	08:37 (WEA-2 E-138)	07:32	08:07 (WEA-01)	07:26	14:27 (WEA-1)	08:16	
	21:55	09:40 (WEA-2 E-138)	21:23	10:00 (WEA-2 E-138)	20:22	09:46 (WEA-2 E-138)	19:13	16:33 (WEA-1)	17:07	36	15:03 (WEA-1)	16:27
2	05:18	08:33 (WEA-2 E-138)	05:56	08:29 (WEA-2 E-138)	06:45	08:29 (WEA-2 E-138)	07:34	08:03 (WEA05)	07:27		14:30 (WEA-1)	08:18
	21:55	09:41 (WEA-2 E-138)	21:22	10:00 (WEA-2 E-138)	20:20	09:44 (WEA-2 E-138)	19:10	16:33 (WEA-1)	17:05	30	15:00 (WEA-1)	16:26
3	05:19	08:33 (WEA-2 E-138)	05:57	08:29 (WEA-2 E-138)	06:47	07:15 (WEA03)	07:35	08:01 (WEA05)	07:29		14:35 (WEA-1)	08:19
	21:54	09:42 (WEA-2 E-138)	21:20	10:01 (WEA-2 E-138)	20:17	09:43 (WEA-2 E-138)	19:08	16:33 (WEA-1)	17:03	21	14:56 (WEA-1)	16:25
4	05:20	08:33 (WEA-2 E-138)	05:59	08:29 (WEA-2 E-138)	06:48	07:14 (WEA03)	07:37	08:02 (WEA05)	07:31		14:43 (WEA-1)	08:20
	21:54	09:42 (WEA-2 E-138)	21:18	10:01 (WEA-2 E-138)	20:15	09:40 (WEA-2 E-138)	19:06	16:32 (WEA-1)	17:01	5	14:48 (WEA-1)	16:25
5	05:21	08:33 (WEA-2 E-138)	06:00	08:28 (WEA-2 E-138)	06:50	07:16 (WEA03)	07:39	08:04 (WEA05)	07:33			08:22
	21:54	09:43 (WEA-2 E-138)	21:17	10:01 (WEA-2 E-138)	20:13	09:38 (WEA-2 E-138)	19:03	16:32 (WEA-1)	17:00			16:24
6	05:22	08:33 (WEA-2 E-138)	06:02	08:29 (WEA-2 E-138)	06:52	07:17 (WEA03)	07:40	08:06 (WEA05)	07:35			08:23
	21:53	09:44 (WEA-2 E-138)	21:15	10:01 (WEA-2 E-138)	20:10	09:34 (WEA-2 E-138)	19:01	16:32 (WEA-1)	16:58			16:24
7	05:22	08:33 (WEA-2 E-138)	06:03	08:28 (WEA-2 E-138)	06:53	07:19 (WEA03)	07:42	08:07 (WEA05)	07:36			08:24
	21:52	09:44 (WEA-2 E-138)	21:13	10:01 (WEA-2 E-138)	20:08	09:32 (WEA-2 E-138)	18:59	16:31 (WEA-1)	16:56			16:23
8	05:23	08:33 (WEA-2 E-138)	06:05	08:29 (WEA-2 E-138)	06:55	08:51 (WEA-2 E-138)	07:44	15:08 (WEA-1)	07:38			08:26
	21:52	09:45 (WEA-2 E-138)	21:11	10:02 (WEA-2 E-138)	20:06	09:27 (WEA-2 E-138)	18:57	16:31 (WEA-1)	16:54			16:23
9	05:24	08:33 (WEA-2 E-138)	06:06	08:28 (WEA-2 E-138)	06:56	08:56 (WEA-2 E-138)	07:45	15:08 (WEA-1)	07:40			08:27
	21:51	09:46 (WEA-2 E-138)	21:09	10:02 (WEA-2 E-138)	20:04	09:23 (WEA-2 E-138)	18:54	16:31 (WEA-1)	16:53			16:23
10	05:25	08:33 (WEA-2 E-138)	06:08	08:29 (WEA-2 E-138)	06:58	09:02 (WEA-2 E-138)	07:47	15:08 (WEA-1)	07:42			08:28
	21:50	09:47 (WEA-2 E-138)	21:08	10:02 (WEA-2 E-138)	20:01	09:14 (WEA-2 E-138)	18:52	16:30 (WEA-1)	16:51			16:23
11	05:26	08:33 (WEA-2 E-138)	06:10	08:28 (WEA-2 E-138)	07:00		07:49	15:07 (WEA-1)	07:43			08:29
	21:50	09:47 (WEA-2 E-138)	21:06	10:02 (WEA-2 E-138)	19:59		18:50	16:29 (WEA-1)	16:50			16:22
12	05:27	08:33 (WEA-2 E-138)	06:11	08:29 (WEA-2 E-138)	07:01		07:51	15:07 (WEA-1)	07:45			08:30
	21:49	09:48 (WEA-2 E-138)	21:04	10:02 (WEA-2 E-138)	19:57		18:48	16:29 (WEA-1)	16:48			16:22
13	05:28	08:33 (WEA-2 E-138)	06:13	08:28 (WEA-2 E-138)	07:03		15:55 (WEA-1)	15:07 (WEA-1)	07:47			08:31
	21:48	09:49 (WEA-2 E-138)	21:02	10:01 (WEA-2 E-138)	19:54		16:15 (WEA-1)	16:28 (WEA-1)	16:47			16:22
14	05:30	08:32 (WEA-2 E-138)	06:14	08:29 (WEA-2 E-138)	07:04		15:50 (WEA-1)	15:08 (WEA-1)	07:49		08:37 (WEA10)	08:32
	21:47	09:49 (WEA-2 E-138)	21:00	10:02 (WEA-2 E-138)	19:52		16:20 (WEA-1)	16:28 (WEA-1)	16:45		08:44 (WEA10)	16:22
15	05:31	08:32 (WEA-2 E-138)	06:16	08:28 (WEA-2 E-138)	07:06		15:45 (WEA-1)	15:08 (WEA09)	07:50		08:35 (WEA10)	08:33
	21:46	09:50 (WEA-2 E-138)	20:58	10:01 (WEA-2 E-138)	19:50		16:22 (WEA-1)	16:26 (WEA-1)	16:44		08:45 (WEA10)	16:22
16	05:32	08:32 (WEA-2 E-138)	06:18	07:06 (WEA08)	07:08		15:41 (WEA-1)	15:08 (WEA09)	07:52		08:35 (WEA10)	08:34
	21:45	09:50 (WEA-2 E-138)	20:56	10:01 (WEA-2 E-138)	19:47		16:25 (WEA-1)	16:26 (WEA-1)	16:42		08:47 (WEA10)	16:23
17	05:33	08:32 (WEA-2 E-138)	06:19	07:03 (WEA08)	07:09		07:39 (WEA04)	08:38 (WEA02)	07:54		08:34 (WEA10)	08:34
	21:44	09:51 (WEA-2 E-138)	20:54	10:00 (WEA-2 E-138)	19:45		16:26 (WEA-1)	16:25 (WEA-1)	16:41		08:48 (WEA10)	16:23
18	05:34	08:31 (WEA-2 E-138)	06:21	07:02 (WEA08)	07:11		07:37 (WEA04)	08:36 (WEA02)	07:56		08:34 (WEA10)	08:35
	21:43	09:51 (WEA-2 E-138)	20:52	10:01 (WEA-2 E-138)	19:43		16:27 (WEA-1)	16:25 (WEA-1)	16:40		08:48 (WEA10)	16:23
19	05:36	08:31 (WEA-2 E-138)	06:22	07:00 (WEA08)	07:12		07:38 (WEA04)	08:35 (WEA02)	07:57		08:34 (WEA10)	08:36
	21:42	09:52 (WEA-2 E-138)	20:50	10:00 (WEA-2 E-138)	19:40		16:29 (WEA-1)	16:24 (WEA-1)	16:38		08:49 (WEA10)	16:23
20	05:37	08:31 (WEA-2 E-138)	06:24	07:00 (WEA08)	07:14		07:39 (WEA04)	08:35 (WEA02)	07:59		08:35 (WEA10)	08:37
	21:41	09:53 (WEA-2 E-138)	20:48	10:00 (WEA-2 E-138)	19:38		16:29 (WEA-1)	16:23 (WEA-1)	16:37		08:50 (WEA10)	16:24
21	05:38	08:31 (WEA-2 E-138)	06:26	06:59 (WEA08)	07:16		07:41 (WEA04)	08:34 (WEA02)	08:01		08:34 (WEA10)	08:37
	21:39	09:54 (WEA-2 E-138)	20:46	09:58 (WEA-2 E-138)	19:36		16:30 (WEA-1)	16:21 (WEA-1)	16:36		08:49 (WEA10)	16:24
22	05:40	08:31 (WEA-2 E-138)	06:27	06:59 (WEA08)	07:17		07:42 (WEA04)	08:34 (WEA02)	08:02		08:35 (WEA10)	08:38
	21:38	09:54 (WEA-2 E-138)	20:44	09:58 (WEA-2 E-138)	19:33		16:31 (WEA-1)	16:20 (WEA-1)	16:35		08:49 (WEA10)	16:24
23	05:41	08:30 (WEA-2 E-138)	06:29	06:59 (WEA08)	07:19		08:07 (WEA-01)	08:10	08:36 (WEA02)	08:04	08:36 (WEA10)	08:38
	21:37	09:55 (WEA-2 E-138)	20:41	09:58 (WEA-2 E-138)	19:31		16:31 (WEA-1)	16:24	16:19 (WEA-1)	16:34	08:49 (WEA10)	16:25
24	05:42	08:31 (WEA-2 E-138)	06:30	06:59 (WEA08)	07:21		08:07 (WEA-01)	08:11	08:38 (WEA02)	08:06	08:37 (WEA10)	08:39
	21:35	09:56 (WEA-2 E-138)	20:39	09:57 (WEA-2 E-138)	19:29		16:32 (WEA-1)	16:22	16:18 (WEA-1)	16:33	08:50 (WEA10)	16:26
25	05:44	08:30 (WEA-2 E-138)	06:32	07:00 (WEA08)	07:22		08:06 (WEA-01)	07:13	07:40 (WEA02)	08:07	08:38 (WEA10)	08:39
	21:34	09:56 (WEA-2 E-138)	20:37	09:56 (WEA-2 E-138)	19:26		16:32 (WEA-1)	17:20	15:17 (WEA-1)	16:32	08:49 (WEA10)	16:26
26	05:45	08:30 (WEA-2 E-138)	06:34	07:01 (WEA08)	07:24		08:06 (WEA-01)	07:15	14:16 (WEA-1)	08:09	08:40 (WEA10)	08:39
	21:33	09:56 (WEA-2 E-138)	20:35	09:54 (WEA-2 E-138)	19:24		16:33 (WEA-01)	17:18	15:15 (WEA-1)	16:31	08:49 (WEA10)	16:27
27	05:47	08:30 (WEA-2 E-138)	06:35	07:03 (WEA08)	07:26		08:06 (WEA-01)	07:17	14:18 (WEA-1)	08:10	08:42 (WEA10)	08:40
	21:31	09:58 (WEA-2 E-138)	20:33	09:54 (WEA-2 E-138)	19:22		16:33 (WEA-1)	17:16	15:14 (WEA-1)	16:30	08:48 (WEA10)	16:28
28	05:48	08:30 (WEA-2 E-138)	06:37	08:34 (WEA-2 E-138)	07:27		08:05 (WEA-01)	07:18	14:19 (WEA-1)	08:12	08:44 (WEA10)	08:40
	21:30	09:58 (WEA-2 E-138)	20:31	09:52 (WEA-2 E-138)	19:19		16:33 (WEA-1)	17:14	15:12 (WEA-1)	16:29	08:48 (WEA10)	16:28
29	05:50	08:29 (WEA-2 E-138)	06:39	08:35 (WEA-2 E-138)	07:29		08:06 (WEA-01)	07:20	14:21 (WEA-1)	08:13		08:40
	21:28	09:58 (WEA-2 E-138)	20:28	09:51 (WEA-2 E-138)	19:17		16:33 (WEA-1)	17:12	15:10 (WEA-1)	16:28		16:29
30	05:51	08:30 (WEA-2 E-138)	06:40	08:35 (WEA-2 E-138)	07:30		08:06 (WEA-01)	07:22	14:22 (WEA-1)	08:15		08:40
	21:27	09:59 (WEA-2 E-138)	20:26	09:49 (WEA-2 E-138)	19:15		16:32 (WEA-1)	17:10	15:08 (WEA-1)	16:27		16:30
31	05:52	08:29 (WEA-2 E-138)	06:42	08:37 (WEA-2 E-138)				16:32 (WEA-1)	17:10			08:40
	21:25	09:59 (WEA-2 E-138)	20:24	09:48 (WEA-2 E-138)				17:09	14:24 (WEA-1)			16:31
			453		381		332		267			244
Sonnenscheinstunden	501		453		381		332		267			244
astr.max.mögl.Beschattung	2436		2888		1932		2501		264			
Red. Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32		0,23			
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84			
Reduktion Windrichtung	0,64		0,64		0,67		0,69		0,61			
Gesamte Reduktion	0,22		0,23		0,20		0,18		0,12			
Met. wahrsch. Beschattung	546		670		395		459		31			

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/5 - IP 36/5 Greven Esch 15c

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni							
1	08:40	08:14	07:20	14:39 (WEA-1)	07:10	06:06	08:21 (WEA-2 E-138)	05:21	08:24 (WEA-2 E-138)				
	16:32	17:20	18:11	80 15:59 (WEA-1)	20:05	20:56	95 09:56 (WEA-2 E-138)	21:41	79 09:43 (WEA-2 E-138)				
2	08:40	08:12	07:18	14:38 (WEA-1)	07:08	06:04	08:20 (WEA-2 E-138)	05:20	08:24 (WEA-2 E-138)				
	16:33	17:22	18:13	81 15:59 (WEA-1)	20:07	20:57	96 09:56 (WEA-2 E-138)	21:42	79 09:43 (WEA-2 E-138)				
3	08:40	08:10	07:16	14:37 (WEA-1)	07:06	06:02	08:20 (WEA-2 E-138)	05:19	08:25 (WEA-2 E-138)				
	16:35	17:24	18:15	82 15:59 (WEA-1)	20:08	20:59	95 09:55 (WEA-2 E-138)	21:43	78 09:43 (WEA-2 E-138)				
4	08:40	08:09	07:14	14:37 (WEA-1)	07:03	06:00	09:02 (WEA-2 E-138)	05:18	08:25 (WEA-2 E-138)				
	16:36	17:25	18:17	82 15:59 (WEA-1)	20:10	21:01	96 09:56 (WEA-2 E-138)	21:44	77 09:42 (WEA-2 E-138)				
5	08:39	08:07	07:12	14:37 (WEA-1)	07:01	05:58	08:20 (WEA-2 E-138)	05:18	08:26 (WEA-2 E-138)				
	16:37	17:27	18:18	82 15:59 (WEA-1)	20:12	21:02	95 09:55 (WEA-2 E-138)	21:45	77 09:43 (WEA-2 E-138)				
6	08:39	08:06	07:10	14:37 (WEA-1)	06:59	05:56	08:19 (WEA-2 E-138)	05:17	08:26 (WEA-2 E-138)				
	16:38	17:29	18:20	83 16:00 (WEA-1)	20:13	21:04	96 09:55 (WEA-2 E-138)	21:46	76 09:41 (WEA-2 E-138)				
7	08:39	08:04	07:07	07:30 (WEA05)	06:57	05:55	08:20 (WEA-2 E-138)	05:16	08:26 (WEA-2 E-138)				
	16:39	17:31	18:22	85 15:59 (WEA-1)	20:15	21:06	95 09:55 (WEA-2 E-138)	21:47	76 09:42 (WEA-2 E-138)				
8	08:38	08:02	07:05	07:28 (WEA05)	06:54	05:53	08:19 (WEA-2 E-138)	05:16	08:26 (WEA-2 E-138)				
	16:41	17:33	18:24	88 15:59 (WEA-1)	20:17	21:07	95 09:54 (WEA-2 E-138)	21:48	75 09:41 (WEA-2 E-138)				
9	08:38	08:00	07:03	07:26 (WEA05)	06:52	05:51	07:17 (WEA03)	05:15	08:27 (WEA-2 E-138)				
	16:42	17:35	18:26	89 15:59 (WEA-1)	20:19	21:09	94 09:53 (WEA-2 E-138)	21:49	74 09:41 (WEA-2 E-138)				
10	08:37	07:59	07:01	15:04 (WEA-1)	06:50	05:49	07:17 (WEA03)	05:15	08:27 (WEA-2 E-138)				
	16:43	17:37	18:27	101 15:58 (WEA-1)	20:20	21:10	94 09:53 (WEA-2 E-138)	21:50	74 09:41 (WEA-2 E-138)				
11	08:37	07:57	06:58	07:23 (WEA05)	06:48	05:48	08:41 (WEA-2 E-138)	05:15	08:27 (WEA-2 E-138)				
	16:45	17:38	18:29	105 15:58 (WEA-1)	20:22	21:12	94 09:53 (WEA-2 E-138)	21:50	74 09:41 (WEA-2 E-138)				
12	08:36	07:55	06:56	14:59 (WEA-1)	06:45	05:46	08:39 (WEA-2 E-138)	05:14	08:28 (WEA-2 E-138)				
	16:46	17:40	18:31	100 15:58 (WEA-1)	20:24	21:14	94 09:53 (WEA-2 E-138)	21:51	73 09:41 (WEA-2 E-138)				
13	08:35	07:53	06:54	14:57 (WEA-1)	06:43	05:44	08:37 (WEA-2 E-138)	05:14	08:29 (WEA-2 E-138)				
	16:48	17:42	18:33	102 15:57 (WEA-1)	20:25	21:15	93 09:52 (WEA-2 E-138)	21:52	72 09:41 (WEA-2 E-138)				
14	08:35	07:51	06:52	14:55 (WEA-1)	06:41	05:43	08:36 (WEA-2 E-138)	05:14	08:29 (WEA-2 E-138)				
	16:49	17:44	18:34	104 15:56 (WEA-1)	20:27	21:17	93 09:52 (WEA-2 E-138)	21:52	72 09:41 (WEA-2 E-138)				
15	08:34	07:49	06:49	14:53 (WEA-1)	06:39	05:41	08:35 (WEA-2 E-138)	05:14	08:29 (WEA-2 E-138)				
	16:51	17:46	18:36	103 15:56 (WEA-1)	20:29	21:18	92 09:51 (WEA-2 E-138)	21:53	72 09:41 (WEA-2 E-138)				
16	08:33	07:47	06:47	08:12 (WEA02)	06:37	05:40	07:01 (WEA08)	05:13	08:30 (WEA-2 E-138)				
	16:52	17:48	18:38	103 15:55 (WEA-1)	20:30	21:20	92 09:51 (WEA-2 E-138)	21:54	71 09:41 (WEA-2 E-138)				
17	08:32	07:45	06:45	08:10 (WEA02)	06:34	05:38	06:58 (WEA08)	05:13	08:30 (WEA-2 E-138)				
	16:54	17:50	18:39	102 15:54 (WEA-1)	20:32	21:21	90 09:50 (WEA-2 E-138)	21:54	71 09:41 (WEA-2 E-138)				
18	08:31	07:43	06:42	07:23 (WEA01)	06:32	05:37	06:56 (WEA08)	05:13	08:30 (WEA-2 E-138)				
	16:56	17:51	18:41	100 15:53 (WEA-1)	20:34	21:23	90 09:49 (WEA-2 E-138)	21:54	70 09:40 (WEA-2 E-138)				
19	08:30	07:41	06:40	08:05 (WEA02)	06:30	05:35	06:55 (WEA08)	05:13	08:30 (WEA-2 E-138)				
	16:57	17:53	18:43	98 15:52 (WEA-1)	20:35	21:24	89 09:49 (WEA-2 E-138)	21:55	72 09:42 (WEA-2 E-138)				
20	08:29	07:39	06:38	08:03 (WEA02)	06:28	05:34	08:20 (WEA-2 E-138)	05:13	08:31 (WEA-2 E-138)				
	16:59	17:55	18:45	96 15:51 (WEA-1)	20:37	21:26	89 09:49 (WEA-2 E-138)	21:55	71 09:42 (WEA-2 E-138)				
21	08:28	07:37	06:35	08:03 (WEA02)	06:26	05:33	08:21 (WEA-2 E-138)	05:14	08:31 (WEA-2 E-138)				
	17:01	17:57	18:46	93 15:50 (WEA-1)	20:39	21:27	87 09:48 (WEA-2 E-138)	21:55	71 09:42 (WEA-2 E-138)				
22	08:27	07:35	06:33	08:04 (WEA02)	06:24	05:31	08:20 (WEA-2 E-138)	05:14	08:31 (WEA-2 E-138)				
	17:02	17:59	18:48	92 15:49 (WEA-1)	20:41	21:28	87 09:47 (WEA-2 E-138)	21:56	71 09:42 (WEA-2 E-138)				
23	08:26	07:33	06:31	08:05 (WEA02)	06:22	05:30	08:20 (WEA-2 E-138)	05:14	08:31 (WEA-2 E-138)				
	17:04	18:01	18:50	89 15:47 (WEA-1)	20:42	21:30	87 09:47 (WEA-2 E-138)	21:56	72 09:43 (WEA-2 E-138)				
24	08:25	07:31	06:29	08:06 (WEA02)	06:20	05:29	08:21 (WEA-2 E-138)	05:14	08:31 (WEA-2 E-138)				
	17:06	18:02	18:51	85 15:46 (WEA-1)	20:44	21:31	85 09:46 (WEA-2 E-138)	21:56	72 09:43 (WEA-2 E-138)				
25	08:23	07:29	06:26	08:08 (WEA02)	06:18	05:28	08:21 (WEA-2 E-138)	05:15	08:31 (WEA-2 E-138)				
	17:07	18:04	18:53	79 15:45 (WEA-1)	20:46	21:33	85 09:46 (WEA-2 E-138)	21:56	71 09:42 (WEA-2 E-138)				
26	08:22	07:27	06:24	08:09 (WEA02)	06:16	05:27	08:21 (WEA-2 E-138)	05:15	08:32 (WEA-2 E-138)				
	17:09	18:06	18:55	66 15:42 (WEA-1)	20:47	21:34	85 09:46 (WEA-2 E-138)	21:56	71 09:43 (WEA-2 E-138)				
27	08:21	07:25	06:22	08:13 (WEA09)	06:14	05:25	06:58 (WEA08)	05:15	08:32 (WEA-2 E-138)				
	17:11	18:08	18:57	46 15:40 (WEA-1)	20:49	21:35	83 09:45 (WEA-2 E-138)	21:56	71 09:43 (WEA-2 E-138)				
28	08:19	07:23	06:19	14:39 (WEA-1)	06:12	05:24	08:22 (WEA-2 E-138)	05:16	08:32 (WEA-2 E-138)				
	17:13	18:10	18:58	40 15:38 (WEA-1)	20:51	21:36	83 09:45 (WEA-2 E-138)	21:56	72 09:44 (WEA-2 E-138)				
29	08:18	07:17	06:10	16:01 (WEA-1)	06:10	05:23	08:22 (WEA-2 E-138)	05:17	08:32 (WEA-2 E-138)				
	17:15	18:10	18:58	34 16:35 (WEA-1)	20:52	21:38	82 09:44 (WEA-2 E-138)	21:56	72 09:44 (WEA-2 E-138)				
30	08:17	07:15	06:08	16:05 (WEA-1)	06:08	05:22	08:23 (WEA-2 E-138)	05:17	08:32 (WEA-2 E-138)				
	17:16	18:02	18:54	25 16:30 (WEA-1)	20:54	21:39	81 09:44 (WEA-2 E-138)	21:55	73 09:45 (WEA-2 E-138)				
31	08:15	07:12	06:05	16:12 (WEA-1)	06:05	05:22	08:24 (WEA-2 E-138)	05:17	08:33 (WEA-2 E-138)				
	17:18	18:03	18:54	12 16:24 (WEA-1)	20:55	21:40	80 09:44 (WEA-2 E-138)	21:55	73 09:45 (WEA-2 E-138)				
Sonnenscheinstunden	260	278	367	416	485	572	692	792	898	998	1100	1200	1300
astr.max.mögl.Beschattung	173	1377	2527	2245	2792	2992	3292	3592	3892	4192	4492	4792	5092
Red.Sonnenscheinwahrsch.	0,20	0,30	0,40	0,50	0,60	0,70	0,80	0,90	1,00	1,10	1,20	1,30	1,40
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,56	0,68	0,69	0,65	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64	0,64
Gesamte Reduktion	0,09	0,18	0,17	0,22	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25
Met.wahrsch.Beschattung	16	241	436	499	692	892	1092	1292	1492	1692	1892	2092	2292

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 36/5 - IP 36/5 Greven Esch 15c

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember			
1	05:18	08:32 (WEA-2 E-138)	05:54	08:30 (WEA-2 E-138)	06:43	08:40 (WEA-2 E-138)	07:32	08:07 (WEA-01)	07:26	14:34 (WEA-1)	08:16		
	21:55	09:45 (WEA-2 E-138)	21:23	10:03 (WEA-2 E-138)	20:22	09:47 (WEA-2 E-138)	19:13	16:36 (WEA-1)	17:07	30	15:04 (WEA-1)	16:27	
2	05:18	08:32 (WEA-2 E-138)	05:56	08:29 (WEA-2 E-138)	06:45	07:16 (WEA03)	07:34	08:03 (WEA05)	07:27		14:38 (WEA-1)	08:18	
	21:55	09:46 (WEA-2 E-138)	21:22	10:03 (WEA-2 E-138)	20:20	09:45 (WEA-2 E-138)	19:10	16:37 (WEA-1)	17:05	22	15:00 (WEA-1)	16:26	
3	05:19	08:32 (WEA-2 E-138)	05:57	08:30 (WEA-2 E-138)	06:47	07:15 (WEA03)	07:35	08:01 (WEA05)	07:29		14:45 (WEA-1)	08:19	
	21:54	09:47 (WEA-2 E-138)	21:20	10:04 (WEA-2 E-138)	20:17	09:43 (WEA-2 E-138)	19:08	16:37 (WEA-1)	17:03	8	14:53 (WEA-1)	16:25	
4	05:20	08:32 (WEA-2 E-138)	05:59	08:29 (WEA-2 E-138)	06:48	07:14 (WEA03)	07:37	08:02 (WEA05)	07:31			08:20	
	21:54	09:46 (WEA-2 E-138)	21:18	10:04 (WEA-2 E-138)	20:15	09:40 (WEA-2 E-138)	19:06	16:36 (WEA-1)	17:01			16:25	
5	05:21	08:32 (WEA-2 E-138)	06:00	08:29 (WEA-2 E-138)	06:50	07:16 (WEA03)	07:39	08:04 (WEA05)	07:33			08:22	
	21:54	09:47 (WEA-2 E-138)	21:17	10:04 (WEA-2 E-138)	20:13	09:38 (WEA-2 E-138)	19:03	16:36 (WEA-1)	17:00			16:24	
6	05:22	08:32 (WEA-2 E-138)	06:02	08:29 (WEA-2 E-138)	06:51	07:17 (WEA03)	07:40	08:06 (WEA05)	07:35			08:23	
	21:53	09:48 (WEA-2 E-138)	21:15	10:04 (WEA-2 E-138)	20:10	09:34 (WEA-2 E-138)	19:01	16:36 (WEA-1)	16:58			16:24	
7	05:22	08:32 (WEA-2 E-138)	06:03	08:29 (WEA-2 E-138)	06:53	07:19 (WEA03)	07:42	08:07 (WEA05)	07:36			08:24	
	21:52	09:49 (WEA-2 E-138)	21:13	10:04 (WEA-2 E-138)	20:08	09:31 (WEA-2 E-138)	18:59	16:35 (WEA-1)	16:56			16:23	
8	05:23	08:32 (WEA-2 E-138)	06:05	08:29 (WEA-2 E-138)	06:55	08:56 (WEA-2 E-138)	07:44	15:12 (WEA-1)	07:38			08:26	
	21:52	09:49 (WEA-2 E-138)	21:11	10:05 (WEA-2 E-138)	20:06	09:26 (WEA-2 E-138)	18:57	16:34 (WEA-1)	16:54			16:23	
9	05:24	08:32 (WEA-2 E-138)	06:06	08:29 (WEA-2 E-138)	06:56	09:02 (WEA-2 E-138)	07:45	15:12 (WEA-1)	07:40			08:27	
	21:51	09:50 (WEA-2 E-138)	21:09	10:04 (WEA-2 E-138)	20:04	09:19 (WEA-2 E-138)	18:54	16:34 (WEA-1)	16:53			16:23	
10	05:25	08:32 (WEA-2 E-138)	06:08	08:29 (WEA-2 E-138)	06:58		07:47	15:12 (WEA-1)	07:42			08:28	
	21:50	09:51 (WEA-2 E-138)	21:08	10:05 (WEA-2 E-138)	20:01		18:52	16:34 (WEA-1)	16:51			16:23	
11	05:26	08:32 (WEA-2 E-138)	06:10	08:29 (WEA-2 E-138)	07:00		07:49	15:11 (WEA-1)	07:43			08:29	
	21:50	09:51 (WEA-2 E-138)	21:06	10:04 (WEA-2 E-138)	19:59		18:50	16:33 (WEA-1)	16:50			16:22	
12	05:27	08:32 (WEA-2 E-138)	06:11	08:30 (WEA-2 E-138)	07:01		16:07 (WEA-1)	15:12 (WEA-1)	07:45			08:30	
	21:49	09:52 (WEA-2 E-138)	21:04	10:05 (WEA-2 E-138)	19:57	7	16:14 (WEA-1)	16:32 (WEA-1)	16:48			16:22	
13	05:28	08:32 (WEA-2 E-138)	06:13	08:29 (WEA-2 E-138)	07:03		15:57 (WEA-1)	15:12 (WEA-1)	07:47			08:31	
	21:48	09:53 (WEA-2 E-138)	21:02	10:04 (WEA-2 E-138)	19:54	24	16:21 (WEA-1)	16:32 (WEA-1)	16:47			16:22	
14	05:30	08:32 (WEA-2 E-138)	06:14	08:30 (WEA-2 E-138)	07:04		15:52 (WEA-1)	15:12 (WEA-1)	07:49		08:37 (WEA10)	08:32	
	21:47	09:53 (WEA-2 E-138)	21:00	10:04 (WEA-2 E-138)	19:52	33	16:25 (WEA-1)	16:31 (WEA-1)	16:45	7	08:44 (WEA10)	16:22	
15	05:31	08:32 (WEA-2 E-138)	06:16	08:29 (WEA-2 E-138)	07:06		15:48 (WEA-1)	15:12 (WEA-1)	07:50		08:36 (WEA10)	08:33	
	21:46	09:54 (WEA-2 E-138)	20:58	10:03 (WEA-2 E-138)	19:50	39	16:27 (WEA-1)	16:30 (WEA-1)	16:44	10	08:46 (WEA10)	16:22	
16	05:32	08:31 (WEA-2 E-138)	06:18	07:05 (WEA08)	07:08		15:44 (WEA-1)	15:12 (WEA-1)	07:52		08:35 (WEA10)	08:34	
	21:45	09:54 (WEA-2 E-138)	20:56	10:04 (WEA-2 E-138)	19:47	45	16:29 (WEA-1)	16:29 (WEA-1)	16:42	12	08:47 (WEA10)	16:23	
17	05:33	08:31 (WEA-2 E-138)	06:19	07:02 (WEA08)	07:09		07:39 (WEA04)	08:38 (WEA02)	07:54		08:35 (WEA10)	08:34	
	21:44	09:55 (WEA-2 E-138)	20:54	10:03 (WEA-2 E-138)	19:45	62	16:30 (WEA-1)	16:28 (WEA-1)	16:41	13	08:48 (WEA10)	16:23	
18	05:34	08:31 (WEA-2 E-138)	06:21	07:01 (WEA08)	07:11		07:37 (WEA04)	08:01	07:56		08:35 (WEA10)	08:35	
	21:43	09:55 (WEA-2 E-138)	20:52	10:03 (WEA-2 E-138)	19:43	77	16:32 (WEA-1)	16:28 (WEA-1)	16:40	14	08:49 (WEA10)	16:23	
19	05:36	08:30 (WEA-2 E-138)	06:22	07:00 (WEA08)	07:12		07:38 (WEA04)	08:03	07:57		08:35 (WEA10)	08:36	
	21:42	09:56 (WEA-2 E-138)	20:50	10:02 (WEA-2 E-138)	19:40	83	16:33 (WEA-1)	16:27 (WEA-1)	16:38	14	08:49 (WEA10)	16:23	
20	05:37	08:31 (WEA-2 E-138)	06:24	06:59 (WEA08)	07:14		07:39 (WEA04)	08:04	07:59		08:35 (WEA10)	08:37	
	21:41	09:57 (WEA-2 E-138)	20:48	10:02 (WEA-2 E-138)	19:38	89	16:33 (WEA-1)	16:26 (WEA-1)	16:37	15	08:50 (WEA10)	16:24	
21	05:38	08:31 (WEA-2 E-138)	06:26	06:58 (WEA08)	07:16		07:41 (WEA04)	08:06	08:34 (WEA02)	08:01	08:35 (WEA10)	08:37	
	21:39	09:57 (WEA-2 E-138)	20:46	10:00 (WEA-2 E-138)	19:36	92	16:35 (WEA-1)	16:28 (WEA-1)	16:36	14	08:49 (WEA10)	16:24	
22	05:40	08:30 (WEA-2 E-138)	06:27	06:59 (WEA08)	07:17		07:42 (WEA04)	08:08	08:34 (WEA02)	08:02	08:35 (WEA10)	08:38	
	21:38	09:58 (WEA-2 E-138)	20:44	10:00 (WEA-2 E-138)	19:33	94	16:35 (WEA-1)	16:26 (WEA-1)	16:35	15	08:50 (WEA10)	16:24	
23	05:41	08:30 (WEA-2 E-138)	06:29	06:59 (WEA08)	07:19		08:07 (WEA-01)	08:10	08:36 (WEA02)	08:04	08:36 (WEA10)	08:38	
	21:37	09:58 (WEA-2 E-138)	20:41	10:00 (WEA-2 E-138)	19:31	94	16:35 (WEA-1)	16:24 (WEA-1)	16:34	14	08:50 (WEA10)	16:25	
24	05:42	08:31 (WEA-2 E-138)	06:30	06:59 (WEA08)	07:21		08:07 (WEA-01)	08:11	08:38 (WEA02)	08:06	08:37 (WEA10)	08:39	
	21:35	09:59 (WEA-2 E-138)	20:39	09:58 (WEA-2 E-138)	19:29	97	16:36 (WEA-1)	16:22 (WEA-1)	16:33	13	08:50 (WEA10)	16:26	
25	05:44	08:30 (WEA-2 E-138)	06:32	07:00 (WEA08)	07:22		08:06 (WEA-01)	07:13	07:40 (WEA02)	08:07	08:38 (WEA10)	08:39	
	21:34	10:00 (WEA-2 E-138)	20:37	09:58 (WEA-2 E-138)	19:26	100	16:36 (WEA-1)	17:20	15:19 (WEA-1)	16:32	11	08:49 (WEA10)	16:26
26	05:45	08:30 (WEA-2 E-138)	06:34	07:01 (WEA08)	07:24		08:06 (WEA-01)	07:15	14:21 (WEA-1)	08:09	08:40 (WEA10)	08:39	
	21:33	10:00 (WEA-2 E-138)	20:35	09:56 (WEA-2 E-138)	19:24	101	16:36 (WEA-1)	17:18	15:18 (WEA-1)	16:31	9	08:49 (WEA10)	16:27
27	05:47	08:30 (WEA-2 E-138)	06:35	07:04 (WEA08)	07:26		08:06 (WEA-01)	07:17	14:23 (WEA-1)	08:10	08:42 (WEA10)	08:40	
	21:31	10:01 (WEA-2 E-138)	20:33	09:55 (WEA-2 E-138)	19:22	103	16:37 (WEA-1)	17:16	15:16 (WEA-1)	16:30	7	08:49 (WEA10)	16:28
28	05:48	08:30 (WEA-2 E-138)	06:37	08:36 (WEA-2 E-138)	07:27		08:05 (WEA-01)	07:18	14:25 (WEA-1)	08:12	08:44 (WEA10)	08:40	
	21:30	10:01 (WEA-2 E-138)	20:31	09:53 (WEA-2 E-138)	19:19	103	16:36 (WEA-1)	17:14	15:15 (WEA-1)	16:29	5	08:49 (WEA10)	16:28
29	05:50	08:29 (WEA-2 E-138)	06:39	08:37 (WEA-2 E-138)	07:29		08:06 (WEA-01)	07:20	14:27 (WEA-1)	08:13	08:45 (WEA10)	08:40	
	21:28	10:01 (WEA-2 E-138)	20:28	09:52 (WEA-2 E-138)	19:17	104	16:37 (WEA-1)	17:12	15:13 (WEA-1)	16:28	1	08:46 (WEA10)	16:29
30	05:51	08:30 (WEA-2 E-138)	06:40	08:37 (WEA-2 E-138)	07:30		08:06 (WEA-01)	07:22	14:28 (WEA-1)	08:15		08:40	
	21:27	10:02 (WEA-2 E-138)	20:26	09:50 (WEA-2 E-138)	19:15	102	16:36 (WEA-1)	17:10	15:10 (WEA-1)	16:27		16:30	
31	05:52	08:29 (WEA-2 E-138)	06:42	08:39 (WEA-2 E-138)	07:31			07:24	14:31 (WEA-1)			08:40	
	21:25	10:02 (WEA-2 E-138)	20:24	09:49 (WEA-2 E-138)	19:13			17:09	15:07 (WEA-1)			16:31	
Sonnenscheinstunden	501		453		381		332		267			244	
astr.max.mögl.Beschattung	2573		2922		1912		2449		234				
Red. Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32		0,23				
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84				
Reduktion Windrichtung	0,64		0,64		0,67		0,69		0,60				
Gesamte Reduktion	0,22		0,23		0,20		0,18		0,12				
Met. wahrsch. Beschattung	577		678		391		449		27				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 37 - IP 37 Marbecker Straße 11

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni						
1	08:40	08:14	09:12 (WEA-1)	07:21	09:06 (WEA-1)	07:10	06:06	07:20 (WEA-3 E-160)	05:21	07:17 (WEA-3 E-160)		
	16:32	17:20	09:23 (WEA-1)	18:11	09:27 (WEA-1)	20:05	20:56	08:26 (WEA-3 E-160)	21:41	08:26 (WEA-3 E-160)	69	08:26 (WEA-3 E-160)
2	08:40	08:12	09:09 (WEA-1)	07:18	09:10 (WEA-1)	07:08	06:04	07:19 (WEA-3 E-160)	05:20	07:17 (WEA-3 E-160)		
	16:34	17:22	09:27 (WEA-1)	18:13	09:23 (WEA-1)	20:07	20:57	08:26 (WEA-3 E-160)	21:42	08:26 (WEA-3 E-160)	69	08:26 (WEA-3 E-160)
3	08:40	08:10	09:06 (WEA-1)	07:16	09:02 (WEA-1)	07:06	06:02	07:18 (WEA-3 E-160)	05:19	07:18 (WEA-3 E-160)		
	16:35	17:24	09:29 (WEA-1)	18:15	09:10 (WEA-1)	20:08	20:59	08:26 (WEA-3 E-160)	21:43	08:26 (WEA-3 E-160)	68	08:26 (WEA-3 E-160)
4	08:40	08:09	09:05 (WEA-1)	07:14	09:00 (WEA-1)	07:03	06:00	07:18 (WEA-3 E-160)	05:18	07:18 (WEA-3 E-160)		
	16:36	17:26	09:31 (WEA-1)	18:17	09:04 (WEA-1)	20:10	21:01	08:27 (WEA-3 E-160)	21:44	08:26 (WEA-3 E-160)	68	08:26 (WEA-3 E-160)
5	08:40	08:07	09:04 (WEA-1)	07:12	09:00 (WEA-1)	07:01	05:58	07:18 (WEA-3 E-160)	05:18	07:19 (WEA-3 E-160)		
	16:37	17:27	09:33 (WEA-1)	18:19	09:02 (WEA-1)	20:12	21:02	08:27 (WEA-3 E-160)	21:45	08:26 (WEA-3 E-160)	67	08:26 (WEA-3 E-160)
6	08:39	08:06	09:02 (WEA-1)	07:10	09:00 (WEA-1)	06:59	05:56	07:17 (WEA-3 E-160)	05:17	07:19 (WEA-3 E-160)		
	16:38	17:29	09:34 (WEA-1)	18:20	09:01 (WEA-1)	20:14	21:04	08:27 (WEA-3 E-160)	21:46	08:26 (WEA-3 E-160)	67	08:26 (WEA-3 E-160)
7	08:39	08:04	09:01 (WEA-1)	07:07	09:00 (WEA-1)	06:57	05:55	07:17 (WEA-3 E-160)	05:16	07:20 (WEA-3 E-160)		
	16:39	17:31	09:35 (WEA-1)	18:22	09:00 (WEA-1)	20:15	21:06	08:28 (WEA-3 E-160)	21:47	08:26 (WEA-3 E-160)	66	08:26 (WEA-3 E-160)
8	08:38	08:02	09:00 (WEA-1)	07:05	07:41 (WEA-2 E-138)	06:54	05:53	07:16 (WEA-3 E-160)	05:16	07:19 (WEA-3 E-160)		
	16:41	17:33	09:36 (WEA-1)	18:24	07:44 (WEA-2 E-138)	20:17	21:07	08:28 (WEA-3 E-160)	21:48	08:25 (WEA-3 E-160)	66	08:25 (WEA-3 E-160)
9	08:38	08:00	08:59 (WEA-1)	07:03	07:36 (WEA-2 E-138)	06:52	05:51	07:15 (WEA-3 E-160)	05:15	07:20 (WEA-3 E-160)		
	16:42	17:35	09:37 (WEA-1)	18:26	07:49 (WEA-2 E-138)	20:19	21:09	08:28 (WEA-3 E-160)	21:49	08:26 (WEA-3 E-160)	66	08:26 (WEA-3 E-160)
10	08:37	07:59	09:00 (WEA-1)	07:01	07:34 (WEA-2 E-138)	06:50	05:49	07:16 (WEA-3 E-160)	05:15	07:21 (WEA-3 E-160)		
	16:43	17:37	09:38 (WEA-1)	18:27	07:52 (WEA-2 E-138)	20:20	21:10	08:29 (WEA-3 E-160)	21:50	08:26 (WEA-3 E-160)	65	08:26 (WEA-3 E-160)
11	08:37	07:57	08:59 (WEA-1)	06:58	07:31 (WEA-2 E-138)	06:48	05:48	07:15 (WEA-3 E-160)	05:15	07:20 (WEA-3 E-160)		
	16:45	17:38	09:39 (WEA-1)	18:29	07:52 (WEA-2 E-138)	20:22	21:12	08:28 (WEA-3 E-160)	21:51	08:25 (WEA-3 E-160)	65	08:25 (WEA-3 E-160)
12	08:36	07:55	08:59 (WEA-1)	06:56	07:30 (WEA-2 E-138)	06:45	05:46	07:15 (WEA-3 E-160)	05:14	07:21 (WEA-3 E-160)		
	16:46	17:40	09:39 (WEA-1)	18:31	07:53 (WEA-2 E-138)	20:24	21:14	08:29 (WEA-3 E-160)	21:51	08:26 (WEA-3 E-160)	65	08:26 (WEA-3 E-160)
13	08:36	07:53	08:58 (WEA-1)	06:54	07:29 (WEA-2 E-138)	06:43	05:44	07:15 (WEA-3 E-160)	05:14	07:21 (WEA-3 E-160)		
	16:48	17:42	09:40 (WEA-1)	18:33	07:54 (WEA-2 E-138)	20:25	21:15	08:28 (WEA-3 E-160)	21:52	08:26 (WEA-3 E-160)	65	08:26 (WEA-3 E-160)
14	08:35	07:51	08:58 (WEA-1)	06:52	07:28 (WEA-2 E-138)	06:41	05:43	07:15 (WEA-3 E-160)	05:14	07:22 (WEA-3 E-160)		
	16:49	17:44	09:40 (WEA-1)	18:34	07:54 (WEA-2 E-138)	20:27	21:17	08:29 (WEA-3 E-160)	21:53	08:26 (WEA-3 E-160)	64	08:26 (WEA-3 E-160)
15	08:34	07:49	08:58 (WEA-1)	06:49	07:27 (WEA-2 E-138)	06:39	05:41	07:14 (WEA-3 E-160)	05:14	07:22 (WEA-3 E-160)		
	16:51	17:46	09:40 (WEA-1)	18:36	07:54 (WEA-2 E-138)	20:29	21:18	08:28 (WEA-3 E-160)	21:53	08:26 (WEA-3 E-160)	64	08:26 (WEA-3 E-160)
16	08:33	07:47	08:57 (WEA-1)	06:47	07:27 (WEA-2 E-138)	06:37	05:40	07:15 (WEA-3 E-160)	05:13	07:23 (WEA-3 E-160)		
	16:52	17:48	09:40 (WEA-1)	18:38	07:55 (WEA-2 E-138)	20:30	21:20	08:28 (WEA-3 E-160)	21:54	08:26 (WEA-3 E-160)	63	08:26 (WEA-3 E-160)
17	08:32	07:45	08:57 (WEA-1)	06:45	07:26 (WEA-2 E-138)	06:34	05:38	07:15 (WEA-3 E-160)	05:13	07:23 (WEA-3 E-160)		
	16:54	17:50	09:40 (WEA-1)	18:39	07:54 (WEA-2 E-138)	20:32	21:21	08:29 (WEA-3 E-160)	21:54	08:26 (WEA-3 E-160)	63	08:26 (WEA-3 E-160)
18	08:31	07:43	08:58 (WEA-1)	06:42	07:26 (WEA-2 E-138)	06:32	05:37	07:14 (WEA-3 E-160)	05:13	07:23 (WEA-3 E-160)		
	16:56	17:51	09:40 (WEA-1)	18:41	07:53 (WEA-2 E-138)	20:34	21:23	08:28 (WEA-3 E-160)	21:54	08:26 (WEA-3 E-160)	63	08:26 (WEA-3 E-160)
19	08:30	07:41	08:57 (WEA-1)	06:40	07:27 (WEA-2 E-138)	06:30	05:35	07:14 (WEA-3 E-160)	05:13	07:23 (WEA-3 E-160)		
	16:57	17:53	09:39 (WEA-1)	18:43	07:53 (WEA-2 E-138)	20:36	21:24	08:28 (WEA-3 E-160)	21:55	08:27 (WEA-3 E-160)	64	08:27 (WEA-3 E-160)
20	08:29	07:39	08:57 (WEA-1)	06:38	07:26 (WEA-2 E-138)	06:28	05:34	07:15 (WEA-3 E-160)	05:14	07:23 (WEA-3 E-160)		
	16:59	17:55	09:38 (WEA-1)	18:45	07:52 (WEA-2 E-138)	20:37	21:26	08:28 (WEA-3 E-160)	21:55	08:26 (WEA-3 E-160)	64	08:26 (WEA-3 E-160)
21	08:28	07:37	08:57 (WEA-1)	06:36	07:27 (WEA-2 E-138)	06:26	05:33	07:15 (WEA-3 E-160)	05:14	07:23 (WEA-3 E-160)		
	17:01	17:57	09:38 (WEA-1)	18:46	07:51 (WEA-2 E-138)	20:39	21:27	08:28 (WEA-3 E-160)	21:55	08:26 (WEA-3 E-160)	64	08:26 (WEA-3 E-160)
22	08:27	07:35	08:58 (WEA-1)	06:33	07:28 (WEA-2 E-138)	06:24	05:31	07:14 (WEA-3 E-160)	05:14	07:23 (WEA-3 E-160)		
	17:02	17:59	09:37 (WEA-1)	18:48	07:50 (WEA-2 E-138)	20:41	21:29	08:27 (WEA-3 E-160)	21:56	08:26 (WEA-3 E-160)	64	08:26 (WEA-3 E-160)
23	08:26	07:33	07:57 (WEA02)	06:31	07:28 (WEA-2 E-138)	06:22	05:30	07:15 (WEA-3 E-160)	05:14	07:24 (WEA-3 E-160)		
	17:04	18:01	09:37 (WEA-1)	18:50	07:47 (WEA-2 E-138)	20:42	21:30	08:27 (WEA-3 E-160)	21:56	08:28 (WEA-3 E-160)	64	08:28 (WEA-3 E-160)
24	08:25	07:31	07:55 (WEA02)	06:29	07:30 (WEA-2 E-138)	06:20	05:29	07:15 (WEA-3 E-160)	05:14	07:24 (WEA-3 E-160)		
	17:06	18:02	09:36 (WEA-1)	18:51	07:45 (WEA-2 E-138)	20:44	21:31	08:27 (WEA-3 E-160)	21:56	08:27 (WEA-3 E-160)	63	08:27 (WEA-3 E-160)
25	08:23	07:29	07:53 (WEA02)	06:26	07:34 (WEA-2 E-138)	06:18	05:28	07:15 (WEA-3 E-160)	05:15	07:24 (WEA-3 E-160)		
	17:07	18:04	09:35 (WEA-1)	18:53	07:42 (WEA-2 E-138)	20:46	21:33	08:27 (WEA-3 E-160)	21:56	08:27 (WEA-3 E-160)	63	08:27 (WEA-3 E-160)
26	08:22	07:27	09:02 (WEA-1)	06:24	07:25 (WEA-2 E-138)	06:16	05:27	07:15 (WEA-3 E-160)	05:15	07:25 (WEA-3 E-160)		
	17:09	18:06	09:34 (WEA-1)	18:55	07:47 (WEA-2 E-138)	20:47	21:34	08:27 (WEA-3 E-160)	21:56	08:28 (WEA-3 E-160)	63	08:28 (WEA-3 E-160)
27	08:21	07:25	09:02 (WEA-1)	06:22	07:24 (WEA-2 E-138)	06:14	05:26	07:16 (WEA-3 E-160)	05:16	07:24 (WEA-3 E-160)		
	17:11	18:08	09:31 (WEA-1)	18:57	07:49 (WEA-2 E-138)	20:49	21:35	08:27 (WEA-3 E-160)	21:56	08:28 (WEA-3 E-160)	64	08:28 (WEA-3 E-160)
28	08:19	07:23	09:04 (WEA-1)	06:19	07:23 (WEA-2 E-138)	06:12	05:24	07:16 (WEA-3 E-160)	05:16	07:25 (WEA-3 E-160)		
	17:13	18:10	09:29 (WEA-1)	18:58	07:51 (WEA-2 E-138)	20:51	21:36	08:26 (WEA-3 E-160)	21:56	08:29 (WEA-3 E-160)	64	08:29 (WEA-3 E-160)
29	08:18			07:17	07:20 (WEA-2 E-138)	06:10	05:23	07:17 (WEA-3 E-160)	05:17	07:25 (WEA-3 E-160)		
	17:15			20:00	07:25 (WEA-2 E-138)	20:52	21:38	08:27 (WEA-3 E-160)	21:56	08:29 (WEA-3 E-160)	64	08:29 (WEA-3 E-160)
30	08:17			07:15	07:18 (WEA-2 E-138)	06:08	05:22	07:17 (WEA-3 E-160)	05:17	07:25 (WEA-3 E-160)		
	17:16			20:02	07:21 (WEA-2 E-138)	20:54	21:39	08:26 (WEA-3 E-160)	21:55	08:30 (WEA-3 E-160)	65	08:30 (WEA-3 E-160)
31	08:15			07:12			05:22	07:17 (WEA-3 E-160)				
	17:18			20:03			21:40	08:26 (WEA-3 E-160)			69	08:26 (WEA-3 E-160)
Sonnenscheinstunden	259	278	367	413	416	642	485	2218	498	1949		
astr.max.mögl.Beschattung		986		413		642		2218		1949		
Red.Sonnenscheinwahrsch.		0,30		0,30		0,41		0,46		0,36		
Reduktion Betriebsdauer		0,84		0,84		0,84		0,84		0,84		
Reduktion Windrichtung		0,57		0,62		0,69		0,69		0,69		
Gesamte Reduktion		0,15		0,15		0,24		0,26		0,21		
Met.wahrsch.Beschattung		1										

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 37 - IP 37 Marbecker Straße 111

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember				
1	05:18	07:25 (WEA-3 E-160)	05:54	07:26 (WEA-3 E-160)	06:43	07:32	08:09 (WEA-2 E-138)	07:26	08:28 (WEA-1)	08:16
	21:55	64 08:29 (WEA-3 E-160)	21:24	73 08:39 (WEA-3 E-160)	20:22	19:13	24 08:33 (WEA-2 E-138)	17:07	39 09:07 (WEA-1)	16:27
2	05:18	07:25 (WEA-3 E-160)	05:56	07:25 (WEA-3 E-160)	06:45	07:34	08:10 (WEA-2 E-138)	07:27	08:29 (WEA-1)	08:18
	21:55	65 08:30 (WEA-3 E-160)	21:22	74 08:39 (WEA-3 E-160)	20:20	19:10	22 08:32 (WEA-2 E-138)	17:05	37 09:06 (WEA-1)	16:26
3	05:19	07:25 (WEA-3 E-160)	05:57	07:26 (WEA-3 E-160)	06:47	07:35	08:11 (WEA-2 E-138)	07:29	08:30 (WEA-1)	08:19
	21:54	66 08:31 (WEA-3 E-160)	21:20	73 08:39 (WEA-3 E-160)	20:17	19:08	19 08:30 (WEA-2 E-138)	17:03	35 09:05 (WEA-1)	16:25
4	05:20	07:25 (WEA-3 E-160)	05:59	07:26 (WEA-3 E-160)	06:48	07:37	08:12 (WEA-2 E-138)	07:31	08:31 (WEA-1)	08:21
	21:54	65 08:30 (WEA-3 E-160)	21:18	72 08:38 (WEA-3 E-160)	20:15	19:06	15 08:27 (WEA-2 E-138)	17:01	34 09:05 (WEA-1)	16:25
5	05:21	07:25 (WEA-3 E-160)	06:00	07:26 (WEA-3 E-160)	06:50	07:39	08:15 (WEA-2 E-138)	07:33	08:32 (WEA-1)	08:22
	21:54	66 08:31 (WEA-3 E-160)	21:17	71 08:37 (WEA-3 E-160)	20:13	19:03	9 08:24 (WEA-2 E-138)	17:00	32 09:04 (WEA-1)	16:24
6	05:22	07:25 (WEA-3 E-160)	06:02	07:27 (WEA-3 E-160)	06:52	07:40		07:35	08:34 (WEA-1)	08:23
	21:53	67 08:32 (WEA-3 E-160)	21:15	71 08:38 (WEA-3 E-160)	20:10	19:01		16:58	28 09:02 (WEA-1)	16:24
7	05:22	07:25 (WEA-3 E-160)	06:03	07:26 (WEA-3 E-160)	06:53	07:42		07:36	08:35 (WEA-1)	08:24
	21:52	67 08:32 (WEA-3 E-160)	21:13	71 08:37 (WEA-3 E-160)	20:08	18:59		16:56	26 09:01 (WEA-1)	16:24
8	05:23	07:25 (WEA-3 E-160)	06:05	07:27 (WEA-3 E-160)	06:55	07:44		07:38	08:37 (WEA-1)	08:26
	21:52	68 08:33 (WEA-3 E-160)	21:11	70 08:37 (WEA-3 E-160)	20:06	18:57		16:55	22 08:59 (WEA-1)	16:23
9	05:24	07:26 (WEA-3 E-160)	06:06	07:27 (WEA-3 E-160)	06:56	07:46		07:40	08:40 (WEA-1)	08:27
	21:51	67 08:33 (WEA-3 E-160)	21:10	69 08:36 (WEA-3 E-160)	20:04	18:54		16:53	17 08:57 (WEA-1)	16:23
10	05:25	07:26 (WEA-3 E-160)	06:08	07:28 (WEA-3 E-160)	06:58	07:47		07:42	08:44 (WEA-1)	08:28
	21:50	68 08:34 (WEA-3 E-160)	21:08	68 08:36 (WEA-3 E-160)	20:01	18:52		16:51	10 08:54 (WEA-1)	16:23
11	05:26	07:26 (WEA-3 E-160)	06:10	07:28 (WEA-3 E-160)	07:00	07:49		07:43		08:29
	21:50	68 08:34 (WEA-3 E-160)	21:06	67 08:35 (WEA-3 E-160)	19:59	18:50	5	09:47 (WEA-1)	07:43	16:23
12	05:27	07:26 (WEA-3 E-160)	06:11	07:29 (WEA-3 E-160)	07:01	07:51		09:41 (WEA-1)	07:45	08:30
	21:49	69 08:35 (WEA-3 E-160)	21:04	65 08:34 (WEA-3 E-160)	19:57	18:48	17	09:58 (WEA-1)	16:48	16:22
13	05:28	07:25 (WEA-3 E-160)	06:13	07:29 (WEA-3 E-160)	07:03	07:52		09:38 (WEA-1)	07:47	08:31
	21:48	70 08:35 (WEA-3 E-160)	21:02	64 08:33 (WEA-3 E-160)	19:54	18:46	23	10:01 (WEA-1)	16:47	16:22
14	05:30	07:25 (WEA-3 E-160)	06:14	07:30 (WEA-3 E-160)	07:04	07:54		09:36 (WEA-1)	07:49	08:32
	21:47	70 08:35 (WEA-3 E-160)	21:00	62 08:32 (WEA-3 E-160)	19:52	18:43	27	10:03 (WEA-1)	16:45	16:22
15	05:31	07:25 (WEA-3 E-160)	06:16	07:31 (WEA-3 E-160)	07:06	07:56		09:34 (WEA-1)	07:50	08:33
	21:46	71 08:36 (WEA-3 E-160)	20:58	60 08:31 (WEA-3 E-160)	19:50	18:41	30	10:04 (WEA-1)	16:44	16:22
16	05:32	07:25 (WEA-3 E-160)	06:18	07:32 (WEA-3 E-160)	07:08	07:57		08:25 (WEA02)	07:52	08:34
	21:45	71 08:36 (WEA-3 E-160)	20:56	58 08:30 (WEA-3 E-160)	19:47	18:39	34	10:05 (WEA-1)	16:42	16:23
17	05:33	07:25 (WEA-3 E-160)	06:19	07:32 (WEA-3 E-160)	07:09	07:59		08:25 (WEA02)	07:54	08:35
	21:44	71 08:36 (WEA-3 E-160)	20:54	56 08:28 (WEA-3 E-160)	19:45	18:37	39	10:06 (WEA-1)	16:41	16:23
18	05:34	07:25 (WEA-3 E-160)	06:21	07:34 (WEA-3 E-160)	07:11	08:01		08:27 (WEA02)	07:56	08:35
	21:43	71 08:36 (WEA-3 E-160)	20:52	53 08:27 (WEA-3 E-160)	19:43	18:35	40	10:07 (WEA-1)	16:40	16:23
19	05:36	07:25 (WEA-3 E-160)	06:22	07:34 (WEA-3 E-160)	07:13	08:03		08:29 (WEA02)	07:57	08:36
	21:42	72 08:37 (WEA-3 E-160)	20:50	51 08:25 (WEA-3 E-160)	19:40	18:33	39	10:08 (WEA-1)	16:38	16:23
20	05:37	07:25 (WEA-3 E-160)	06:24	07:36 (WEA-3 E-160)	07:14	08:04		09:29 (WEA-1)	07:59	08:37
	21:41	73 08:38 (WEA-3 E-160)	20:48	48 08:24 (WEA-3 E-160)	19:38	18:31	40	10:09 (WEA-1)	16:37	16:24
21	05:38	07:25 (WEA-3 E-160)	06:26	07:38 (WEA-3 E-160)	07:16	08:06		09:28 (WEA-1)	08:01	08:37
	21:39	73 08:38 (WEA-3 E-160)	20:46	44 08:22 (WEA-3 E-160)	19:36	18:28	41	10:09 (WEA-1)	16:36	16:24
22	05:40	07:25 (WEA-3 E-160)	06:27	07:39 (WEA-3 E-160)	07:17	08:08		09:27 (WEA-1)	08:02	08:38
	21:38	73 08:38 (WEA-3 E-160)	20:44	41 08:20 (WEA-3 E-160)	19:33	18:26	42	10:09 (WEA-1)	16:35	16:25
23	05:41	07:24 (WEA-3 E-160)	06:29	07:42 (WEA-3 E-160)	07:19	08:10		09:27 (WEA-1)	08:04	08:38
	21:37	74 08:38 (WEA-3 E-160)	20:41	35 08:17 (WEA-3 E-160)	19:31	18:24	42	10:09 (WEA-1)	16:34	16:25
24	05:42	07:25 (WEA-3 E-160)	06:31	07:44 (WEA-3 E-160)	07:21	08:11		09:27 (WEA-1)	08:06	08:39
	21:36	74 08:39 (WEA-3 E-160)	20:39	30 08:14 (WEA-3 E-160)	19:29	18:22	43	10:10 (WEA-1)	16:33	16:26
25	05:44	07:25 (WEA-3 E-160)	06:32	07:48 (WEA-3 E-160)	07:22	08:13		08:27 (WEA-1)	08:07	08:39
	21:34	73 08:38 (WEA-3 E-160)	20:37	22 08:10 (WEA-3 E-160)	19:26	18:19	43	09:10 (WEA-1)	16:32	16:26
26	05:45	07:25 (WEA-3 E-160)	06:34	07:55 (WEA-3 E-160)	07:24	08:15		08:27 (WEA-1)	08:09	08:39
	21:33	73 08:38 (WEA-3 E-160)	20:35	7 08:02 (WEA-3 E-160)	19:24	18:17	43	09:10 (WEA-1)	16:31	16:27
27	05:47	07:25 (WEA-3 E-160)	06:35	07:26	07:26	08:09 (WEA-2 E-138)	07:17	08:27 (WEA-1)	08:10	08:40
	21:31	74 08:39 (WEA-3 E-160)	20:33		19:22	27 08:36 (WEA-2 E-138)	17:16	09:10 (WEA-1)	16:30	16:28
28	05:48	07:25 (WEA-3 E-160)	06:37		07:27	08:08 (WEA-2 E-138)	07:18	08:27 (WEA-1)	08:12	08:40
	21:30	74 08:39 (WEA-3 E-160)	20:31		19:20	27 08:35 (WEA-2 E-138)	17:14	09:09 (WEA-1)	16:29	16:28
29	05:50	07:25 (WEA-3 E-160)	06:39		07:29	08:08 (WEA-2 E-138)	07:20	08:28 (WEA-1)	08:13	08:40
	21:28	73 08:38 (WEA-3 E-160)	20:28		19:17	27 08:35 (WEA-2 E-138)	17:12	09:09 (WEA-1)	16:28	16:29
30	05:51	07:25 (WEA-3 E-160)	06:40		07:31	08:09 (WEA-2 E-138)	07:22	08:27 (WEA-1)	08:15	08:40
	21:27	74 08:39 (WEA-3 E-160)	20:26		19:15	25 08:34 (WEA-2 E-138)	17:11	09:08 (WEA-1)	16:27	16:30
31	05:53	07:25 (WEA-3 E-160)	06:42				07:24	08:28 (WEA-1)		08:40
	21:25	74 08:39 (WEA-3 E-160)	20:24				17:09	09:07 (WEA-1)		16:31
Sonnenscheinstunden	501		453		381		332		267	244
astr.max.mögl.Beschattung	2178		1475		295		843		280	
Red.Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32		0,23	
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84	
Reduktion Windrichtung	0,69		0,69		0,62		0,58		0,57	
Gesamte Reduktion	0,24		0,25		0,19		0,15		0,11	
Met.wahrsch.Beschattung	521		363		55		129		31	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 37/2 - IP 37/2 Marbecker Straße 104

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1	08:40	08:14	09:20 (WEA-1) 07:21	08:06 (WEA-2 E-138) 07:10	06:06	05:21		06:40 (WEA-4 E-160)
	16:32	17:20	09:47 (WEA-1) 18:11	08:32 (WEA-3 E-160) 20:05	20:56	21:41	64	07:44 (WEA-4 E-160)
2	08:40	08:12	09:21 (WEA-1) 07:18	08:06 (WEA-3 E-160) 07:08	06:04	05:20		06:40 (WEA-4 E-160)
	16:33	17:22	09:46 (WEA-1) 18:13	08:34 (WEA-3 E-160) 20:07	20:57	21:42	64	07:44 (WEA-4 E-160)
3	08:40	08:11	09:21 (WEA-1) 07:16	08:03 (WEA-3 E-160) 07:06	06:02	05:19		06:40 (WEA-4 E-160)
	16:35	17:24	09:45 (WEA-1) 18:15	08:35 (WEA-3 E-160) 20:08	20:59	21:43	65	07:45 (WEA-4 E-160)
4	08:40	08:09	09:23 (WEA-1) 07:14	08:02 (WEA-3 E-160) 07:03	06:00	05:18		06:40 (WEA-4 E-160)
	16:36	17:26	09:45 (WEA-1) 18:17	08:37 (WEA-3 E-160) 20:10	21:01	21:44	64	07:44 (WEA-4 E-160)
5	08:40	08:07	09:25 (WEA-1) 07:12	08:00 (WEA-3 E-160) 07:01	05:58	07:04 (WEA-4 E-160) 05:18		06:41 (WEA-4 E-160)
	16:37	17:27	09:43 (WEA-1) 18:19	08:38 (WEA-3 E-160) 20:12	21:02	07:19 (WEA-4 E-160) 21:45	64	07:45 (WEA-4 E-160)
6	08:39	08:06	09:26 (WEA-1) 07:10	07:59 (WEA-3 E-160) 06:59	05:56	07:00 (WEA-4 E-160) 05:17		06:40 (WEA-4 E-160)
	16:38	17:29	09:41 (WEA-1) 18:20	08:40 (WEA-3 E-160) 20:14	21:04	07:22 (WEA-4 E-160) 21:46	65	07:45 (WEA-4 E-160)
7	08:39	08:04	09:29 (WEA-1) 07:07	07:57 (WEA-3 E-160) 06:57	05:55	06:58 (WEA-4 E-160) 05:16		06:41 (WEA-4 E-160)
	16:39	17:31	09:38 (WEA-1) 18:22	08:40 (WEA-3 E-160) 20:15	21:06	07:26 (WEA-4 E-160) 21:47	65	07:46 (WEA-4 E-160)
8	08:38	08:02	07:05	07:57 (WEA-3 E-160) 06:54	05:53	06:55 (WEA-4 E-160) 05:16		06:40 (WEA-4 E-160)
	16:41	17:33	18:24	08:41 (WEA-3 E-160) 20:17	21:07	07:28 (WEA-4 E-160) 21:48	65	07:45 (WEA-4 E-160)
9	08:38	08:00	07:03	07:56 (WEA-3 E-160) 06:52	05:51	06:53 (WEA-4 E-160) 05:15		06:41 (WEA-4 E-160)
	16:42	17:35	18:26	08:41 (WEA-3 E-160) 20:19	21:09	07:29 (WEA-4 E-160) 21:49	65	07:46 (WEA-4 E-160)
10	08:37	07:59	07:01	07:55 (WEA-3 E-160) 06:50	05:49	06:52 (WEA-4 E-160) 05:15		06:41 (WEA-4 E-160)
	16:43	17:37	18:27	08:42 (WEA-3 E-160) 20:20	21:10	07:31 (WEA-4 E-160) 21:50	65	07:46 (WEA-4 E-160)
11	08:37	07:57	06:58	07:54 (WEA-3 E-160) 06:48	05:48	06:50 (WEA-4 E-160) 05:15		06:41 (WEA-4 E-160)
	16:45	17:38	18:29	08:41 (WEA-3 E-160) 20:22	21:12	07:32 (WEA-4 E-160) 21:51	65	07:46 (WEA-4 E-160)
12	08:36	07:55	06:56	07:54 (WEA-3 E-160) 06:45	05:46	06:49 (WEA-4 E-160) 05:14		06:41 (WEA-4 E-160)
	16:46	17:40	18:31	08:42 (WEA-3 E-160) 20:24	21:14	07:34 (WEA-4 E-160) 21:51	65	07:46 (WEA-4 E-160)
13	08:36	07:53	06:54	07:54 (WEA-3 E-160) 06:43	05:44	06:47 (WEA-4 E-160) 05:14		06:42 (WEA-4 E-160)
	16:48	17:42	18:33	08:42 (WEA-3 E-160) 20:25	21:15	07:34 (WEA-4 E-160) 21:52	65	07:47 (WEA-4 E-160)
14	08:35	07:51	06:52	07:52 (WEA-3 E-160) 06:41	05:43	06:47 (WEA-4 E-160) 05:14		06:42 (WEA-4 E-160)
	16:49	17:44	18:34	08:41 (WEA-3 E-160) 20:27	21:17	07:36 (WEA-4 E-160) 21:53	65	07:47 (WEA-4 E-160)
15	08:34	07:49	06:49	07:52 (WEA-3 E-160) 06:39	05:41	06:45 (WEA-4 E-160) 05:14		06:42 (WEA-4 E-160)
	16:51	17:46	18:36	08:41 (WEA-3 E-160) 20:29	21:18	07:36 (WEA-4 E-160) 21:53	65	07:47 (WEA-4 E-160)
16	08:33	07:47	06:47	07:53 (WEA-3 E-160) 06:37	05:40	06:45 (WEA-4 E-160) 05:13		06:43 (WEA-4 E-160)
	16:52	17:48	18:38	08:41 (WEA-3 E-160) 20:30	21:20	07:37 (WEA-4 E-160) 21:54	65	07:48 (WEA-4 E-160)
17	08:32	07:45	06:45	07:52 (WEA-3 E-160) 06:34	05:38	06:45 (WEA-4 E-160) 05:13		06:43 (WEA-4 E-160)
	16:54	17:50	18:39	08:40 (WEA-3 E-160) 20:32	21:21	07:38 (WEA-4 E-160) 21:54	65	07:48 (WEA-4 E-160)
18	08:31	07:43	06:42	07:52 (WEA-3 E-160) 06:32	05:37	06:43 (WEA-4 E-160) 05:13		06:43 (WEA-4 E-160)
	16:56	17:51	18:41	08:39 (WEA-3 E-160) 20:34	21:23	07:38 (WEA-4 E-160) 21:54	65	07:48 (WEA-4 E-160)
19	08:30	07:41	06:40	07:52 (WEA-3 E-160) 06:30	05:35	06:43 (WEA-4 E-160) 05:13		06:43 (WEA-4 E-160)
	16:57	17:53	18:43	08:39 (WEA-3 E-160) 20:36	21:24	07:39 (WEA-4 E-160) 21:55	65	07:48 (WEA-4 E-160)
20	08:29	07:39	06:38	07:52 (WEA-3 E-160) 06:28	05:34	06:43 (WEA-4 E-160) 05:14		06:43 (WEA-4 E-160)
	16:59	17:55	18:45	08:37 (WEA-3 E-160) 20:37	21:26	07:40 (WEA-4 E-160) 21:55	65	07:48 (WEA-4 E-160)
21	08:28	07:37	06:36	07:53 (WEA-3 E-160) 06:26	05:33	06:42 (WEA-4 E-160) 05:14		06:43 (WEA-4 E-160)
	17:01	17:57	18:46	08:36 (WEA-3 E-160) 20:39	21:27	07:41 (WEA-4 E-160) 21:55	65	07:48 (WEA-4 E-160)
22	08:27	07:35	06:33	07:53 (WEA-3 E-160) 06:24	05:31	06:41 (WEA-4 E-160) 05:14		06:43 (WEA-4 E-160)
	17:02	17:59	18:48	08:35 (WEA-3 E-160) 20:41	21:29	07:40 (WEA-4 E-160) 21:56	65	07:48 (WEA-4 E-160)
23	08:26	07:33	06:31	07:53 (WEA-3 E-160) 06:22	05:30	06:41 (WEA-4 E-160) 05:14		06:44 (WEA-4 E-160)
	17:04	18:01	18:50	08:33 (WEA-3 E-160) 20:42	21:30	07:41 (WEA-4 E-160) 21:56	65	07:49 (WEA-4 E-160)
24	08:25	07:31	06:29	07:54 (WEA-3 E-160) 06:20	05:29	06:41 (WEA-4 E-160) 05:14		06:44 (WEA-4 E-160)
	17:06	18:02	18:51	08:32 (WEA-3 E-160) 20:44	21:31	07:41 (WEA-4 E-160) 21:56	65	07:49 (WEA-4 E-160)
25	08:23	07:29	06:26	07:56 (WEA-3 E-160) 06:18	05:28	06:41 (WEA-4 E-160) 05:15		06:44 (WEA-4 E-160)
	17:07	18:04	18:53	08:31 (WEA-3 E-160) 20:46	21:33	07:42 (WEA-4 E-160) 21:56	65	07:49 (WEA-4 E-160)
26	08:22	07:27	06:24	07:57 (WEA-3 E-160) 06:16	05:27	06:40 (WEA-4 E-160) 05:15		06:45 (WEA-4 E-160)
	17:09	18:06	18:55	08:29 (WEA-3 E-160) 20:47	21:34	07:42 (WEA-4 E-160) 21:56	65	07:50 (WEA-4 E-160)
27	08:21	07:25	06:22	07:58 (WEA-3 E-160) 06:14	05:26	06:40 (WEA-4 E-160) 05:16		06:44 (WEA-4 E-160)
	17:11	18:08	18:57	08:26 (WEA-3 E-160) 20:49	21:35	07:42 (WEA-4 E-160) 21:56	66	07:50 (WEA-4 E-160)
28	08:19	07:23	06:19	08:01 (WEA-3 E-160) 06:12	05:24	06:40 (WEA-4 E-160) 05:16		06:45 (WEA-4 E-160)
	17:13	18:10	18:58	08:23 (WEA-3 E-160) 20:51	21:36	07:42 (WEA-4 E-160) 21:56	65	07:50 (WEA-4 E-160)
29	08:18	07:17	06:17	09:04 (WEA-3 E-160) 06:10	05:23	06:41 (WEA-4 E-160) 05:17		06:45 (WEA-4 E-160)
	17:15	18:10	20:00	09:19 (WEA-3 E-160) 20:52	21:38	07:44 (WEA-4 E-160) 21:56	65	07:50 (WEA-4 E-160)
30	08:17	07:15	06:15	06:08	05:22	06:40 (WEA-4 E-160) 05:17		06:45 (WEA-4 E-160)
	17:16	20:02	20:02	20:54	21:39	07:44 (WEA-4 E-160) 21:55	66	07:51 (WEA-4 E-160)
31	08:15	07:12	06:12	05:22	05:22	06:40 (WEA-4 E-160) 05:17		06:45 (WEA-4 E-160)
	17:18	20:03	20:03	21:40	21:40	07:44 (WEA-4 E-160) 05:17	66	07:51 (WEA-4 E-160)
Sonnenscheinstunden	259	278	367	416	485	498		1948
astr.max.mögl.Beschattung	552	354	1150		1356			0,36
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30		0,46			0,84
Reduktion Betriebsdauer	0,84	0,84	0,84		0,84			0,70
Reduktion Windrichtung	0,55	0,59	0,62		0,70			0,21
Gesamte Reduktion	0,09	0,15	0,15		0,27			0,21
Met.wahrsch.Beschattung	49	52	175		360			409

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 37/2 - IP 37/2 Marbecker Straße 104

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember			
1	05:18				07:00 (WEA-4 E-160)	06:43						08:16	09:02 (WEA-1)	
	21:55	65	07:50 (WEA-4 E-160)	21:24	44	07:44 (WEA-4 E-160)	20:22					16:27	14	09:16 (WEA-1)
2	05:18		06:46 (WEA-4 E-160)	05:56		07:01 (WEA-4 E-160)	06:45					08:18		09:04 (WEA-1)
	21:55	65	07:51 (WEA-4 E-160)	21:22	41	07:42 (WEA-4 E-160)	20:20					16:26	11	09:15 (WEA-1)
3	05:19		06:46 (WEA-4 E-160)	05:57		07:03 (WEA-4 E-160)	06:47					08:19		09:06 (WEA-1)
	21:54	65	07:51 (WEA-4 E-160)	21:20	38	07:41 (WEA-4 E-160)	20:17					16:25	7	09:13 (WEA-1)
4	05:20		06:46 (WEA-4 E-160)	05:59		07:04 (WEA-4 E-160)	06:48					08:21		
	21:54	65	07:51 (WEA-4 E-160)	21:19	35	07:39 (WEA-4 E-160)	20:15					08:58 (WEA-1)		
5	05:21		06:46 (WEA-4 E-160)	06:00		07:05 (WEA-4 E-160)	06:50					08:56 (WEA-1)		
	21:54	65	07:51 (WEA-4 E-160)	21:17	31	07:36 (WEA-4 E-160)	20:13					09:11 (WEA-1)		
6	05:22		06:47 (WEA-4 E-160)	06:02		07:08 (WEA-4 E-160)	06:52					08:54 (WEA-1)		
	21:53	64	07:51 (WEA-4 E-160)	21:15	26	07:34 (WEA-4 E-160)	20:11					09:14 (WEA-1)		
7	05:22		06:47 (WEA-4 E-160)	06:03		07:11 (WEA-4 E-160)	06:53					08:53 (WEA-1)		
	21:52	65	07:52 (WEA-4 E-160)	21:13	20	07:31 (WEA-4 E-160)	20:08					09:15 (WEA-1)		
8	05:23		06:47 (WEA-4 E-160)	06:05		07:16 (WEA-4 E-160)	06:55					08:52 (WEA-1)		
	21:52	65	07:52 (WEA-4 E-160)	21:11	10	07:26 (WEA-4 E-160)	20:06					09:16 (WEA-1)		
9	05:24		06:48 (WEA-4 E-160)	06:06			06:56					08:51 (WEA-1)		
	21:51	64	07:52 (WEA-4 E-160)	21:10			20:04					09:17 (WEA-1)		
10	05:25		06:48 (WEA-4 E-160)	06:08			06:58					08:51 (WEA-1)		
	21:50	64	07:52 (WEA-4 E-160)	21:08			20:01					09:18 (WEA-1)		
11	05:26		06:48 (WEA-4 E-160)	06:10			07:00					08:51 (WEA-1)		
	21:50	64	07:52 (WEA-4 E-160)	21:06			19:59					09:18 (WEA-1)		
12	05:27		06:49 (WEA-4 E-160)	06:11			07:01					08:50 (WEA-1)		
	21:49	63	07:52 (WEA-4 E-160)	21:04			19:57					09:19 (WEA-1)		
13	05:28		06:49 (WEA-4 E-160)	06:13			07:03					08:50 (WEA-1)		
	21:48	63	07:52 (WEA-4 E-160)	21:02			19:54					09:20 (WEA-1)		
14	05:30		06:49 (WEA-4 E-160)	06:14			07:04					08:49 (WEA-1)		
	21:47	63	07:52 (WEA-4 E-160)	21:00			19:52	14	09:09 (WEA-3 E-160)	07:54		09:19 (WEA-1)		
15	05:31		06:49 (WEA-4 E-160)	06:16			07:06					08:50 (WEA-1)		
	21:46	63	07:52 (WEA-4 E-160)	20:58			19:50	22	09:10 (WEA-3 E-160)	07:56		09:20 (WEA-1)		
16	05:32		06:50 (WEA-4 E-160)	06:18			07:08					08:50 (WEA-1)		
	21:45	62	07:52 (WEA-4 E-160)	20:56			19:47	27	09:15 (WEA-3 E-160)	07:57		09:20 (WEA-1)		
17	05:33		06:50 (WEA-4 E-160)	06:19			07:09					08:50 (WEA-1)		
	21:44	62	07:52 (WEA-4 E-160)	20:54			19:45	31	09:16 (WEA-3 E-160)	07:59		09:20 (WEA-1)		
18	05:34		06:50 (WEA-4 E-160)	06:21			07:11					08:51 (WEA-1)		
	21:43	61	07:51 (WEA-4 E-160)	20:52			19:43	35	09:18 (WEA-3 E-160)	08:01		09:20 (WEA-1)		
19	05:36		06:50 (WEA-4 E-160)	06:22			07:13					08:51 (WEA-1)		
	21:42	61	07:51 (WEA-4 E-160)	20:50			19:40	37	09:19 (WEA-3 E-160)	08:03		09:21 (WEA-1)		
20	05:37		06:51 (WEA-4 E-160)	06:24			07:14					08:52 (WEA-1)		
	21:41	60	07:51 (WEA-4 E-160)	20:48			19:38	40	09:20 (WEA-3 E-160)	08:04		09:21 (WEA-1)		
21	05:38		06:52 (WEA-4 E-160)	06:26			07:16					08:53 (WEA-1)		
	21:39	59	07:51 (WEA-4 E-160)	20:46			19:36	42	09:21 (WEA-3 E-160)	08:06		09:21 (WEA-1)		
22	05:40		06:52 (WEA-4 E-160)	06:27			07:17					08:53 (WEA-1)		
	21:38	58	07:50 (WEA-4 E-160)	20:44			19:33	44	09:21 (WEA-3 E-160)	08:08		09:20 (WEA-1)		
23	05:41		06:52 (WEA-4 E-160)	06:29			07:19					08:54 (WEA-1)		
	21:37	58	07:50 (WEA-4 E-160)	20:42			19:31	44	09:21 (WEA-3 E-160)	08:10		09:20 (WEA-1)		
24	05:42		06:53 (WEA-4 E-160)	06:31			07:21					08:55 (WEA-1)		
	21:36	57	07:50 (WEA-4 E-160)	20:39			19:29	46	09:22 (WEA-3 E-160)	08:11		09:20 (WEA-1)		
25	05:44		06:54 (WEA-4 E-160)	06:32			07:22					08:56 (WEA-1)		
	21:34	55	07:49 (WEA-4 E-160)	20:37			19:26	47	09:22 (WEA-3 E-160)	08:12		09:20 (WEA-1)		
26	05:45		06:54 (WEA-4 E-160)	06:34			07:24					08:56 (WEA-1)		
	21:33	54	07:48 (WEA-4 E-160)	20:35			19:24	47	09:22 (WEA-3 E-160)	08:13		09:19 (WEA-1)		
27	05:47		06:55 (WEA-4 E-160)	06:35			07:26					08:57 (WEA-1)		
	21:31	53	07:48 (WEA-4 E-160)	20:33			19:22	48	09:22 (WEA-3 E-160)	08:14		09:19 (WEA-1)		
28	05:48		06:56 (WEA-4 E-160)	06:37			07:27					08:59 (WEA-1)		
	21:30	51	07:47 (WEA-4 E-160)	20:31			19:20	49	09:22 (WEA-3 E-160)	08:15		09:19 (WEA-1)		
29	05:50		06:56 (WEA-4 E-160)	06:39			07:29					08:59 (WEA-1)		
	21:28	50	07:46 (WEA-4 E-160)	20:28			19:17	49	09:22 (WEA-3 E-160)	08:16		09:18 (WEA-1)		
30	05:51		06:58 (WEA-4 E-160)	06:40			07:31					09:01 (WEA-1)		
	21:27	48	07:46 (WEA-4 E-160)	20:26			19:15	49	09:22 (WEA-3 E-160)	08:17		09:17 (WEA-1)		
31	05:53		06:58 (WEA-4 E-160)	06:42								08:40		
	21:25	46	07:44 (WEA-4 E-160)	20:24								16:31		
Sonnenscheinstunden	501			453			381					267		244
astr.max.mögl.Beschattung	1858			245			671					667		32
Red.Sonnenscheinwahrsch.	0,41			0,43			0,36					0,23		0,15
Reduktion Betriebsdauer	0,84			0,84			0,84					0,84		0,84
Reduktion Windrichtung	0,70			0,70			0,62					0,55		0,55
Gesamte Reduktion	0,24			0,25			0,18					0,10		0,07
Met.wahrsch.Beschattung	446			61			124					70		2

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 37/3 - IP 37/3 Marbecker Straße 102

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni						
1 08:40		08:14	09:17 (WEA-1) 07:21	08:05 (WEA-3 E-160) 07:10	06:06	07:02 (WEA-4 E-160) 05:21				06:58 (WEA-4 E-160)		
1 16:32		17:20	09:41 (WEA-1) 18:11	08:36 (WEA-3 E-160) 20:05	20:56	07:48 (WEA-4 E-160) 21:41	53			07:51 (WEA-4 E-160)		
2 08:40		08:12	09:17 (WEA-1) 07:18	08:03 (WEA-3 E-160) 07:08	06:04	07:01 (WEA-4 E-160) 05:20				06:58 (WEA-4 E-160)		
1 16:34		17:22	09:40 (WEA-1) 18:13	08:38 (WEA-3 E-160) 20:07	20:57	07:49 (WEA-4 E-160) 21:42	52			07:50 (WEA-4 E-160)		
3 08:40		08:51	09:18 (WEA-1) 07:46	08:01 (WEA-3 E-160) 07:06	06:02	07:00 (WEA-4 E-160) 05:19				06:59 (WEA-4 E-160)		
1 16:35		17:24	09:39 (WEA-1) 18:15	07:38 (WEA-3 E-160) 20:08	20:59	07:49 (WEA-4 E-160) 21:43	52			07:51 (WEA-4 E-160)		
4 08:40		08:09	09:20 (WEA-1) 07:14	08:00 (WEA-3 E-160) 07:03	06:00	07:00 (WEA-4 E-160) 05:18				06:59 (WEA-4 E-160)		
1 16:36		17:26	09:39 (WEA-1) 18:17	08:39 (WEA-3 E-160) 20:10	21:01	07:50 (WEA-4 E-160) 21:44	51			07:50 (WEA-4 E-160)		
5 08:40		08:07	09:21 (WEA-1) 07:12	07:59 (WEA-3 E-160) 07:01	05:58	06:58 (WEA-4 E-160) 05:18				07:00 (WEA-4 E-160)		
1 16:37		17:27	09:37 (WEA-1) 18:19	08:40 (WEA-3 E-160) 20:12	21:02	07:51 (WEA-4 E-160) 21:45	51			07:51 (WEA-4 E-160)		
6 08:39		08:06	09:24 (WEA-1) 07:10	07:59 (WEA-3 E-160) 06:59	05:56	06:57 (WEA-4 E-160) 05:17				07:01 (WEA-4 E-160)		
1 16:38		17:29	09:35 (WEA-1) 18:20	08:40 (WEA-3 E-160) 20:14	21:04	07:51 (WEA-4 E-160) 21:46	50			07:50 (WEA-4 E-160)		
7 08:39		08:04	09:27 (WEA-1) 07:07	07:57 (WEA-3 E-160) 06:57	05:55	06:58 (WEA-4 E-160) 05:16				07:01 (WEA-4 E-160)		
1 16:39		17:31	09:42 (WEA-1) 18:22	08:40 (WEA-3 E-160) 20:15	21:06	07:52 (WEA-4 E-160) 21:47	50			07:51 (WEA-4 E-160)		
8 08:38		08:02	09:28 (WEA-1) 07:05	07:57 (WEA-3 E-160) 06:54	05:53	06:57 (WEA-4 E-160) 05:16				07:00 (WEA-4 E-160)		
1 16:41		17:33	09:43 (WEA-1) 18:24	08:40 (WEA-3 E-160) 20:17	21:07	07:52 (WEA-4 E-160) 21:48	50			07:50 (WEA-4 E-160)		
9 08:38		08:00	09:29 (WEA-1) 07:03	07:56 (WEA-3 E-160) 06:55	05:46	06:56 (WEA-4 E-160) 05:15				07:02 (WEA-4 E-160)		
1 16:42		17:35	09:44 (WEA-1) 18:26	08:41 (WEA-3 E-160) 20:19	21:09	07:52 (WEA-4 E-160) 21:49	49			07:50 (WEA-4 E-160)		
10 08:37		07:59	09:30 (WEA-1) 07:01	07:57 (WEA-3 E-160) 06:50	05:49	06:56 (WEA-4 E-160) 05:15				07:02 (WEA-4 E-160)		
1 16:43		17:37	09:45 (WEA-1) 18:27	08:41 (WEA-3 E-160) 20:20	21:10	07:53 (WEA-4 E-160) 21:50	49			07:51 (WEA-4 E-160)		
11 08:37		07:57	09:31 (WEA-1) 06:58	07:56 (WEA-3 E-160) 06:48	05:48	06:55 (WEA-4 E-160) 05:15				07:02 (WEA-4 E-160)		
1 16:45	8	09:26 (WEA-1) 17:38	08:29 (WEA-2 E-138) 18:29	08:40 (WEA-3 E-160) 20:22	21:12	07:52 (WEA-4 E-160) 21:51	48			07:50 (WEA-4 E-160)		
12 08:36		07:55	09:17 (WEA-1) 06:56	07:56 (WEA-3 E-160) 06:45	05:46	06:55 (WEA-4 E-160) 05:14				07:02 (WEA-4 E-160)		
1 16:46	12	09:29 (WEA-1) 17:40	08:31 (WEA-2 E-138) 18:31	08:40 (WEA-3 E-160) 20:24	21:14	07:53 (WEA-4 E-160) 21:51	48			07:50 (WEA-4 E-160)		
13 08:36		07:53	09:16 (WEA-1) 06:54	07:56 (WEA-3 E-160) 06:43	05:44	06:55 (WEA-4 E-160) 05:14				07:03 (WEA-4 E-160)		
1 16:48	15	09:31 (WEA-1) 17:42	08:34 (WEA-2 E-138) 18:33	08:40 (WEA-3 E-160) 20:25	21:15	07:53 (WEA-4 E-160) 21:52	47			07:50 (WEA-4 E-160)		
14 08:35		07:51	09:16 (WEA-1) 06:52	07:55 (WEA-3 E-160) 06:41	05:43	06:55 (WEA-4 E-160) 05:14				07:03 (WEA-4 E-160)		
1 16:49	16	09:32 (WEA-1) 17:44	08:34 (WEA-2 E-138) 18:34	08:38 (WEA-3 E-160) 20:27	21:17	07:53 (WEA-4 E-160) 21:53	47			07:50 (WEA-4 E-160)		
15 08:34		07:49	09:15 (WEA-1) 06:49	07:56 (WEA-3 E-160) 06:39	05:41	06:54 (WEA-4 E-160) 05:14				07:04 (WEA-4 E-160)		
1 16:51	19	09:34 (WEA-1) 17:46	08:36 (WEA-2 E-138) 18:36	08:38 (WEA-3 E-160) 20:29	21:18	07:52 (WEA-4 E-160) 21:53	47			07:51 (WEA-4 E-160)		
16 08:33		07:47	09:15 (WEA-1) 06:47	07:56 (WEA-3 E-160) 06:37	05:40	06:55 (WEA-4 E-160) 05:13				07:04 (WEA-4 E-160)		
1 16:52	20	09:35 (WEA-1) 17:48	08:38 (WEA-2 E-138) 18:38	08:37 (WEA-3 E-160) 20:30	21:20	07:53 (WEA-4 E-160) 21:54	47			07:51 (WEA-4 E-160)		
17 08:32		07:45	09:14 (WEA-1) 06:45	07:56 (WEA-3 E-160) 06:34	05:38	06:55 (WEA-4 E-160) 05:13				07:04 (WEA-4 E-160)		
1 16:54	22	09:36 (WEA-1) 17:50	08:21 (WEA-2 E-138) 18:39	08:35 (WEA-3 E-160) 20:32	21:21	07:53 (WEA-4 E-160) 21:54	47			07:51 (WEA-4 E-160)		
18 08:31		07:43	09:14 (WEA-1) 06:42	07:57 (WEA-3 E-160) 06:32	05:37	06:54 (WEA-4 E-160) 05:13				07:05 (WEA-4 E-160)		
1 16:56	23	09:37 (WEA-1) 17:51	08:24 (WEA-2 E-138) 18:41	08:34 (WEA-3 E-160) 20:34	21:23	07:52 (WEA-4 E-160) 21:54	46			07:51 (WEA-4 E-160)		
19 08:30		07:41	09:13 (WEA-1) 06:40	07:58 (WEA-3 E-160) 06:30	05:35	06:55 (WEA-4 E-160) 05:13				07:05 (WEA-4 E-160)		
1 16:57	24	09:37 (WEA-1) 17:53	08:25 (WEA-2 E-138) 18:43	08:33 (WEA-3 E-160) 20:36	21:24	07:53 (WEA-4 E-160) 21:55	46			07:51 (WEA-4 E-160)		
20 08:29		07:39	09:07 (WEA-1) 06:38	07:58 (WEA-3 E-160) 06:28	05:34	06:55 (WEA-4 E-160) 05:14				07:05 (WEA-4 E-160)		
1 16:59	25	09:38 (WEA-1) 17:55	08:25 (WEA-2 E-138) 18:45	08:31 (WEA-3 E-160) 20:37	21:26	07:53 (WEA-4 E-160) 21:55	46			07:51 (WEA-4 E-160)		
21 08:28		07:37	09:13 (WEA-1) 06:36	07:59 (WEA-3 E-160) 06:26	05:33	06:55 (WEA-4 E-160) 05:14				07:05 (WEA-4 E-160)		
1 17:01	26	09:39 (WEA-1) 17:57	08:26 (WEA-2 E-138) 18:46	08:29 (WEA-3 E-160) 20:39	21:27	07:53 (WEA-4 E-160) 21:55	46			07:51 (WEA-4 E-160)		
22 08:27		07:35	09:13 (WEA-1) 06:33	08:06 (WEA-2 E-138) 06:24	05:31	06:54 (WEA-4 E-160) 05:14				07:05 (WEA-4 E-160)		
1 17:02	27	09:40 (WEA-1) 17:59	08:27 (WEA-2 E-138) 18:48	08:27 (WEA-3 E-160) 20:41	21:29	07:52 (WEA-4 E-160) 21:56	46			07:51 (WEA-4 E-160)		
23 08:26		07:33	09:13 (WEA-1) 06:31	08:03 (WEA-2 E-138) 06:22	05:30	06:55 (WEA-4 E-160) 05:14				07:06 (WEA-4 E-160)		
1 17:04	27	09:40 (WEA-1) 18:01	08:27 (WEA-2 E-138) 18:50	08:24 (WEA-3 E-160) 20:42	21:30	07:52 (WEA-4 E-160) 21:56	46			07:52 (WEA-4 E-160)		
24 08:25		07:31	09:14 (WEA-1) 06:29	08:06 (WEA-2 E-138) 06:20	05:29	06:55 (WEA-4 E-160) 05:14				07:06 (WEA-4 E-160)		
1 17:06	28	09:41 (WEA-1) 18:02	08:27 (WEA-2 E-138) 18:51	08:20 (WEA-3 E-160) 20:44	21:31	07:52 (WEA-4 E-160) 21:56	46			07:52 (WEA-4 E-160)		
25 08:23		07:29	09:14 (WEA-1) 06:26	08:06 (WEA-2 E-138) 06:26	05:28	06:55 (WEA-4 E-160) 05:15				07:05 (WEA-4 E-160)		
1 17:07	28	09:42 (WEA-1) 18:04	08:27 (WEA-2 E-138) 18:53	08:20 (WEA-3 E-160) 20:46	21:33	07:52 (WEA-4 E-160) 21:56	47			07:52 (WEA-4 E-160)		
26 08:22		07:27	09:13 (WEA-1) 06:24	08:06 (WEA-2 E-138) 06:24	05:27	06:56 (WEA-4 E-160) 05:15				07:06 (WEA-4 E-160)		
1 17:09	28	09:41 (WEA-1) 18:06	08:30 (WEA-2 E-138) 18:55	08:20 (WEA-3 E-160) 20:47	21:34	07:52 (WEA-4 E-160) 21:56	47			07:53 (WEA-4 E-160)		
27 08:21		07:25	09:14 (WEA-1) 06:22	08:06 (WEA-2 E-138) 06:22	05:26	06:56 (WEA-4 E-160) 05:16				07:06 (WEA-4 E-160)		
1 17:11	28	09:42 (WEA-1) 18:08	08:32 (WEA-2 E-138) 18:57	08:20 (WEA-3 E-160) 20:49	21:35	07:52 (WEA-4 E-160) 21:56	47			07:53 (WEA-4 E-160)		
28 08:19		07:23	09:14 (WEA-1) 06:19	08:06 (WEA-2 E-138) 06:19	05:24	06:56 (WEA-4 E-160) 05:16				07:06 (WEA-4 E-160)		
1 17:13	28	09:42 (WEA-1) 18:10	08:34 (WEA-2 E-138) 18:58	08:21 (WEA-3 E-160) 20:51	21:36	07:51 (WEA-4 E-160) 21:56	47			07:53 (WEA-4 E-160)		
29 08:18		07:17	09:15 (WEA-1) 06:10	08:05 (WEA-2 E-138) 06:10	05:23	06:57 (WEA-4 E-160) 05:17				07:06 (WEA-4 E-160)		
1 17:15	27	09:42 (WEA-1) 18:00	08:30 (WEA-2 E-138) 18:50	08:20 (WEA-3 E-160) 20:52	21:38	07:52 (WEA-4 E-160) 21:56	47			07:53 (WEA-4 E-160)		
30 08:17		07:15	09:15 (WEA-1) 06:08	08:03 (WEA-2 E-138) 06:08	05:22	06:57 (WEA-4 E-160) 05:17				07:06 (WEA-4 E-160)		
1 17:16	27	09:42 (WEA-1) 18:02	08:30 (WEA-2 E-138) 18:50	08:20 (WEA-3 E-160) 20:54	21:39	07:52 (WEA-4 E-160) 21:55	48			07:54 (WEA-4 E-160)		
31 08:15		07:12	09:15 (WEA-1) 06:03	08:04 (WEA-2 E-138) 06:03	05:20	06:58 (WEA-4 E-160) 05:17				07:06 (WEA-4 E-160)		
1 17:18	26	09:41 (WEA-1) 18:03	08:31 (WEA-2 E-138) 18:51	08:21 (WEA-3 E-160) 20:53	21:40	07:51 (WEA-4 E-160) 21:54	48			07:54 (WEA-4 E-160)		
Sonnenscheinstunden	259	278	367	416	485	498						
astr.max.mögl.Beschattung	484	351	891	246	1718	1443						
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	0,36						
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84						
Reduktion Windrichtung	0,55	0,59	0,62	0,70	0,70	0,70						
Gesamte Reduktion	0,09	0,15	0,15	0,24	0,26	0,21						
Met.wahrsch.Beschattung	43	52	136	58	454	301						

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:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 37/3 - IP 37/3 Marbecker Straße 102

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	07:06 (WEA-4 E-160)	05:54	07:06 (WEA-4 E-160)	06:43	07:32	08:35 (WEA-3 E-160)	07:26		08:16	09:00 (WEA-1)
	21:55	48 07:54 (WEA-4 E-160)	21:24	57 08:03 (WEA-4 E-160)	20:22	19:13	43 09:18 (WEA-3 E-160)	17:07		16:27	9 09:09 (WEA-1)
2	05:18	07:06 (WEA-4 E-160)	05:56	07:06 (WEA-4 E-160)	06:45	07:34	08:35 (WEA-3 E-160)	07:27		08:18	09:04 (WEA-1)
	21:55	49 07:55 (WEA-4 E-160)	21:22	57 08:03 (WEA-4 E-160)	20:20	19:10	44 09:19 (WEA-3 E-160)	17:05		16:26	2 09:06 (WEA-1)
3	05:19	07:06 (WEA-4 E-160)	05:57	07:07 (WEA-4 E-160)	06:47	07:35	08:35 (WEA-3 E-160)	07:29		08:19	
	21:54	49 07:55 (WEA-4 E-160)	21:20	56 08:03 (WEA-4 E-160)	20:17	19:08	44 09:19 (WEA-3 E-160)	17:03		16:25	
4	05:20	07:06 (WEA-4 E-160)	05:59	07:06 (WEA-4 E-160)	06:48	07:37	08:34 (WEA-3 E-160)	07:31		08:21	
	21:54	49 07:55 (WEA-4 E-160)	21:19	56 08:02 (WEA-4 E-160)	20:15	19:06	44 09:18 (WEA-3 E-160)	17:01	1	08:58 (WEA-1)	16:25
5	05:21	07:06 (WEA-4 E-160)	06:00	07:06 (WEA-4 E-160)	06:50	07:39	08:34 (WEA-3 E-160)	07:33		08:53 (WEA-1)	08:22
	21:54	50 07:56 (WEA-4 E-160)	21:17	55 08:01 (WEA-4 E-160)	20:13	19:03	43 09:17 (WEA-3 E-160)	17:00	12	09:05 (WEA-1)	16:24
6	05:22	07:06 (WEA-4 E-160)	06:02	07:07 (WEA-4 E-160)	06:52	07:41	08:34 (WEA-3 E-160)	07:35		08:51 (WEA-1)	08:23
	21:53	50 07:56 (WEA-4 E-160)	21:15	54 08:01 (WEA-4 E-160)	20:11	19:01	43 09:17 (WEA-3 E-160)	16:58	16	09:07 (WEA-1)	16:24
7	05:22	07:06 (WEA-4 E-160)	06:03	07:07 (WEA-4 E-160)	06:53	07:42	08:34 (WEA-3 E-160)	07:36		08:50 (WEA-1)	08:24
	21:53	51 07:57 (WEA-4 E-160)	21:13	53 08:00 (WEA-4 E-160)	20:08	18:59	42 09:16 (WEA-3 E-160)	16:56	19	09:09 (WEA-1)	16:24
8	05:23	07:06 (WEA-4 E-160)	06:05	07:08 (WEA-4 E-160)	06:55	07:44	08:34 (WEA-3 E-160)	07:38		08:49 (WEA-1)	08:26
	21:52	52 07:58 (WEA-4 E-160)	21:14	52 08:00 (WEA-4 E-160)	20:06	18:57	41 09:15 (WEA-3 E-160)	16:55	21	09:10 (WEA-1)	16:23
9	05:24	07:06 (WEA-4 E-160)	06:06	07:08 (WEA-4 E-160)	06:56	07:46	08:35 (WEA-3 E-160)	07:40		08:48 (WEA-1)	08:27
	21:51	52 07:58 (WEA-4 E-160)	21:10	51 07:59 (WEA-4 E-160)	20:04	18:54	39 09:14 (WEA-3 E-160)	16:53	23	09:11 (WEA-1)	16:23
10	05:25	07:06 (WEA-4 E-160)	06:08	07:09 (WEA-4 E-160)	06:58	07:47	08:36 (WEA-3 E-160)	07:42		08:47 (WEA-1)	08:28
	21:50	53 07:59 (WEA-4 E-160)	21:08	49 07:58 (WEA-4 E-160)	20:01	18:52	37 09:13 (WEA-3 E-160)	16:51	25	09:12 (WEA-1)	16:23
11	05:26	07:06 (WEA-4 E-160)	06:10	07:10 (WEA-4 E-160)	07:00	07:49	08:36 (WEA-3 E-160)	07:43		08:47 (WEA-1)	08:29
	21:50	53 07:59 (WEA-4 E-160)	21:06	47 07:57 (WEA-4 E-160)	19:59	18:50	35 09:11 (WEA-3 E-160)	16:50	26	09:13 (WEA-1)	16:23
12	05:27	07:06 (WEA-4 E-160)	06:11	07:11 (WEA-4 E-160)	07:01	07:51	08:37 (WEA-3 E-160)	07:45		08:47 (WEA-1)	08:30
	21:49	54 08:00 (WEA-4 E-160)	21:04	45 07:56 (WEA-4 E-160)	19:57	18:48	33 09:10 (WEA-3 E-160)	16:48	27	09:13 (WEA-1)	16:22
13	05:28	07:06 (WEA-4 E-160)	06:13	07:11 (WEA-4 E-160)	07:03	07:52	08:38 (WEA-3 E-160)	07:47		08:47 (WEA-1)	08:31
	21:48	54 08:00 (WEA-4 E-160)	21:02	44 07:55 (WEA-4 E-160)	19:54	18:46	31 09:09 (WEA-3 E-160)	16:47	26	09:14 (WEA-1)	16:22
14	05:30	07:06 (WEA-4 E-160)	06:14	07:13 (WEA-4 E-160)	07:04	07:54	08:40 (WEA-2 E-138)	07:49		08:46 (WEA-1)	08:32
	21:47	54 08:00 (WEA-4 E-160)	21:00	41 07:54 (WEA-4 E-160)	19:52	18:43	27 09:07 (WEA-3 E-160)	16:45	28	09:14 (WEA-1)	16:22
15	05:31	07:06 (WEA-4 E-160)	06:16	07:14 (WEA-4 E-160)	07:06	07:56	08:39 (WEA-2 E-138)	07:51		08:46 (WEA-1)	08:33
	21:46	55 08:01 (WEA-4 E-160)	20:58	37 07:51 (WEA-4 E-160)	19:50	18:41	26 09:05 (WEA-3 E-160)	16:44	28	09:14 (WEA-1)	16:22
16	05:32	07:05 (WEA-4 E-160)	06:18	07:16 (WEA-4 E-160)	07:08	07:57	08:38 (WEA-2 E-138)	07:52		08:46 (WEA-1)	08:34
	21:45	56 08:01 (WEA-4 E-160)	20:56	34 07:50 (WEA-4 E-160)	19:47	18:39	22 09:00 (WEA-3 E-160)	16:42	28	09:14 (WEA-1)	16:23
17	05:33	07:05 (WEA-4 E-160)	06:19	07:17 (WEA-4 E-160)	07:09	07:59	08:37 (WEA-2 E-138)	07:54		08:47 (WEA-1)	08:35
	21:44	56 08:01 (WEA-4 E-160)	20:54	30 07:47 (WEA-4 E-160)	19:45	18:37	21 08:58 (WEA-2 E-138)	16:41	28	09:15 (WEA-1)	16:23
18	05:34	07:05 (WEA-4 E-160)	06:21	07:20 (WEA-4 E-160)	07:11	08:01	08:37 (WEA-2 E-138)	07:56		08:47 (WEA-1)	08:35
	21:43	56 08:01 (WEA-4 E-160)	20:52	25 07:45 (WEA-4 E-160)	19:43	18:35	21 08:58 (WEA-2 E-138)	16:40	28	09:15 (WEA-1)	16:23
19	05:36	07:05 (WEA-4 E-160)	06:22	07:22 (WEA-4 E-160)	07:13	08:03	08:37 (WEA-2 E-138)	07:57		08:48 (WEA-1)	08:36
	21:42	56 08:01 (WEA-4 E-160)	20:50	19 07:41 (WEA-4 E-160)	19:40	18:33	21 08:58 (WEA-2 E-138)	16:38	27	09:15 (WEA-1)	16:23
20	05:37	07:05 (WEA-4 E-160)	06:24	07:29 (WEA-4 E-160)	07:14	08:04	08:37 (WEA-2 E-138)	07:59		08:48 (WEA-1)	08:37
	21:41	58 08:03 (WEA-4 E-160)	20:48	6 07:35 (WEA-4 E-160)	19:38	18:21	21 08:58 (WEA-2 E-138)	16:37	27	09:15 (WEA-1)	16:24
21	05:38	07:05 (WEA-4 E-160)	06:26	07:16	07:16	08:06	08:37 (WEA-2 E-138)	08:01		08:49 (WEA-1)	08:37
	21:39	58 08:03 (WEA-4 E-160)	20:46	19:36	25 09:12 (WEA-3 E-160)	18:28	19 08:56 (WEA-2 E-138)	16:36	26	09:15 (WEA-1)	16:24
22	05:40	07:05 (WEA-4 E-160)	06:27	07:17	07:17	08:08	08:38 (WEA-2 E-138)	08:02		08:49 (WEA-1)	08:38
	21:38	58 08:03 (WEA-4 E-160)	20:44	19:33	29 09:13 (WEA-3 E-160)	18:26	17 08:55 (WEA-2 E-138)	16:35	25	09:14 (WEA-1)	16:25
23	05:41	07:05 (WEA-4 E-160)	06:29	07:19	07:19	08:10	08:39 (WEA-2 E-138)	08:04		08:50 (WEA-1)	08:38
	21:37	57 08:02 (WEA-4 E-160)	20:42	19:31	32 09:15 (WEA-3 E-160)	18:24	15 08:54 (WEA-2 E-138)	16:34	24	09:14 (WEA-1)	16:25
24	05:42	07:05 (WEA-4 E-160)	06:31	07:21	07:21	08:11	08:41 (WEA-2 E-138)	08:06		08:51 (WEA-1)	08:39
	21:36	58 08:03 (WEA-4 E-160)	20:39	19:29	35 09:17 (WEA-3 E-160)	18:22	12 08:53 (WEA-2 E-138)	16:33	23	09:14 (WEA-1)	16:26
25	05:44	07:05 (WEA-4 E-160)	06:32	07:22	07:22	08:13	08:40 (WEA-3 E-160)	07:13		08:52 (WEA-1)	08:39
	21:34	58 08:03 (WEA-4 E-160)	20:37	19:27	37 09:17 (WEA-3 E-160)	17:20	6 07:50 (WEA-2 E-138)	16:32	22	09:14 (WEA-1)	16:26
26	05:45	07:05 (WEA-4 E-160)	06:34	07:24	07:24	08:15	08:39 (WEA-3 E-160)	07:15		08:53 (WEA-1)	08:39
	21:33	58 08:03 (WEA-4 E-160)	20:35	19:24	39 09:18 (WEA-3 E-160)	17:18		16:31	20	09:13 (WEA-1)	16:27
27	05:47	07:05 (WEA-4 E-160)	06:35	07:26	07:26	08:17	08:38 (WEA-3 E-160)	07:17		08:54 (WEA-1)	08:40
	21:31	59 08:04 (WEA-4 E-160)	20:33	19:22	41 09:19 (WEA-3 E-160)	17:16		16:30	19	09:13 (WEA-1)	16:28
28	05:48	07:05 (WEA-4 E-160)	06:37	07:27	07:27	08:19	08:37 (WEA-3 E-160)	07:19		08:56 (WEA-1)	08:40
	21:30	58 08:03 (WEA-4 E-160)	20:31	19:20	41 09:18 (WEA-3 E-160)	17:14		16:29	17	09:13 (WEA-1)	16:28
29	05:50	07:05 (WEA-4 E-160)	06:39	07:29	07:29	08:20	08:36 (WEA-3 E-160)	07:20		08:56 (WEA-1)	08:40
	21:28	58 08:03 (WEA-4 E-160)	20:28	19:17	43 09:19 (WEA-3 E-160)	17:12		16:28	15	09:11 (WEA-1)	16:29
30	05:51	07:05 (WEA-4 E-160)	06:40	07:31	07:31	08:22	08:36 (WEA-3 E-160)	07:22		08:58 (WEA-1)	08:40
	21:27	58 08:03 (WEA-4 E-160)	20:26	19:15	43 09:19 (WEA-3 E-160)	17:11		16:27	13	09:11 (WEA-1)	16:30
31	05:53	07:05 (WEA-4 E-160)	06:42			07:24				08:40	
	21:25	58 08:03 (WEA-4 E-160)	20:24			17:09				16:31	
Sonnenscheinstunden	501		453		381		332		267		244
astr.max.mögl.Beschattung	1693		868		397		747		594		11
Red.Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32		0,23		0,15
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84		0,84
Reduktion Windrichtung	0,70		0,70		0,62		0,62		0,55		0,55
Gesamte Reduktion	0,24		0,25		0,18		0,16		0,10		0,07
Met.wahrsch.Beschattung	404		214		73		120		62		1

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 38/1 - IP 38/1 Marbecker Straße 103

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1 08:40	09:43 (WEA-1) 08:14		07:21	08:48 (WEA-3 E-160) 07:10	06:06	07:35 (WEA-4 E-160) 05:21	06:18 (WEA-5 E-160)	
16:32	30 10:13 (WEA-1) 17:20		18:11	45 09:33 (WEA-3 E-160) 20:05	20:56	77 08:52 (WEA-4 E-160) 21:41	70 07:39 (WEA-4 E-160)	
2 08:40	09:44 (WEA-1) 08:12		07:18	43 08:49 (WEA-3 E-160) 07:08	06:04	77 07:34 (WEA-4 E-160) 05:20	63 08:42 (WEA-4 E-160)	
16:33	29 10:13 (WEA-1) 17:22		18:13	41 08:49 (WEA-3 E-160) 07:06	06:02	77 08:51 (WEA-4 E-160) 21:42	63 08:42 (WEA-4 E-160)	
3 08:40	09:45 (WEA-1) 08:11		07:16	41 09:30 (WEA-3 E-160) 20:08	20:59	78 08:51 (WEA-4 E-160) 21:43	63 08:43 (WEA-4 E-160)	
16:35	29 10:14 (WEA-1) 17:24		18:15	39 08:50 (WEA-3 E-160) 07:03	06:00	78 08:52 (WEA-4 E-160) 21:44	62 08:42 (WEA-4 E-160)	
4 08:40	09:46 (WEA-1) 08:09	13 09:06 (WEA-3 E-160) 07:14	18:17	39 09:29 (WEA-3 E-160) 20:10	21:01	78 08:52 (WEA-4 E-160) 21:44	62 08:42 (WEA-4 E-160)	
16:36	29 10:15 (WEA-1) 17:26		18:17	35 08:52 (WEA-3 E-160) 07:01	05:58	78 07:33 (WEA-4 E-160) 05:18	61 08:42 (WEA-4 E-160)	
5 08:40	09:46 (WEA-1) 08:07	30 09:22 (WEA-3 E-160) 07:19	18:19	35 09:27 (WEA-3 E-160) 20:12	21:02	79 08:52 (WEA-4 E-160) 21:45	61 08:42 (WEA-4 E-160)	
16:37	29 10:15 (WEA-1) 17:27		18:19	35 08:52 (WEA-3 E-160) 07:01	05:58	79 07:33 (WEA-4 E-160) 05:17	61 08:42 (WEA-4 E-160)	
6 08:39	09:46 (WEA-1) 08:06	30 08:36 (WEA-2 E-138) 07:10	18:10	33 09:26 (WEA-3 E-160) 20:14	21:04	78 08:51 (WEA-4 E-160) 21:46	60 08:41 (WEA-4 E-160)	
16:38	29 10:15 (WEA-1) 17:29	39 09:25 (WEA-3 E-160) 07:07	18:20	33 09:26 (WEA-3 E-160) 20:14	21:04	78 08:51 (WEA-4 E-160) 21:46	60 08:41 (WEA-4 E-160)	
7 08:39	09:47 (WEA-1) 08:04	47 09:27 (WEA-3 E-160) 07:07	18:22	27 08:55 (WEA-3 E-160) 06:57	21:06	79 08:52 (WEA-4 E-160) 21:47	60 08:41 (WEA-4 E-160)	
16:39	28 10:15 (WEA-1) 17:31	47 09:27 (WEA-3 E-160) 07:05	18:22	27 08:55 (WEA-3 E-160) 06:57	21:06	79 08:52 (WEA-4 E-160) 21:47	60 08:41 (WEA-4 E-160)	
8 08:38	09:48 (WEA-1) 08:02	51 09:28 (WEA-3 E-160) 07:05	18:24	23 09:20 (WEA-3 E-160) 20:17	21:07	82 08:51 (WEA-4 E-160) 21:48	59 08:41 (WEA-4 E-160)	
16:41	28 10:16 (WEA-1) 17:33	51 09:28 (WEA-3 E-160) 07:05	18:24	23 09:20 (WEA-3 E-160) 20:17	21:07	82 08:51 (WEA-4 E-160) 21:48	59 08:41 (WEA-4 E-160)	
9 08:38	09:48 (WEA-1) 08:00	57 09:30 (WEA-3 E-160) 07:03	18:26	15 09:16 (WEA-3 E-160) 20:19	21:09	87 08:50 (WEA-4 E-160) 21:49	58 08:41 (WEA-4 E-160)	
16:42	28 10:16 (WEA-1) 17:35	57 09:30 (WEA-3 E-160) 07:03	18:26	15 09:16 (WEA-3 E-160) 20:19	21:09	87 08:50 (WEA-4 E-160) 21:49	58 08:41 (WEA-4 E-160)	
10 08:37	09:48 (WEA-1) 07:59	59 08:32 (WEA-2 E-138) 07:01	18:27		06:50	90 08:51 (WEA-4 E-160) 21:50	58 08:41 (WEA-4 E-160)	
16:43	28 10:16 (WEA-1) 17:37	59 09:32 (WEA-3 E-160) 06:58	18:27		06:50	90 08:51 (WEA-4 E-160) 21:50	58 08:41 (WEA-4 E-160)	
11 08:37	09:49 (WEA-1) 07:57	61 09:33 (WEA-3 E-160) 06:58	18:29		06:48	90 08:51 (WEA-4 E-160) 21:50	58 08:41 (WEA-4 E-160)	
16:45	27 10:16 (WEA-1) 17:38	61 09:33 (WEA-3 E-160) 06:58	18:29		06:48	90 08:51 (WEA-4 E-160) 21:50	58 08:41 (WEA-4 E-160)	
12 08:36	09:50 (WEA-1) 07:55	62 08:32 (WEA-2 E-138) 06:56	18:31		06:45	93 08:50 (WEA-4 E-160) 21:51	57 08:41 (WEA-4 E-160)	
16:46	27 10:17 (WEA-1) 17:40	62 09:34 (WEA-3 E-160) 06:54	18:31		06:45	93 08:50 (WEA-4 E-160) 21:51	57 08:41 (WEA-4 E-160)	
13 08:36	09:51 (WEA-1) 07:53	64 09:36 (WEA-3 E-160) 06:54	18:34		06:43	94 08:50 (WEA-4 E-160) 21:51	57 08:41 (WEA-4 E-160)	
16:48	26 10:17 (WEA-1) 17:42	64 09:36 (WEA-3 E-160) 06:54	18:34		06:43	94 08:50 (WEA-4 E-160) 21:51	57 08:41 (WEA-4 E-160)	
14 08:35	09:51 (WEA-1) 07:51	64 09:36 (WEA-3 E-160) 06:52	18:34		06:41	97 08:50 (WEA-4 E-160) 21:52	57 08:41 (WEA-4 E-160)	
16:49	25 10:16 (WEA-1) 17:44	64 09:36 (WEA-3 E-160) 06:52	18:34		06:41	97 08:50 (WEA-4 E-160) 21:52	57 08:41 (WEA-4 E-160)	
15 08:34	09:52 (WEA-1) 07:49	64 09:36 (WEA-3 E-160) 06:49	18:36		06:39	98 08:49 (WEA-4 E-160) 21:53	56 08:41 (WEA-4 E-160)	
16:51	24 10:16 (WEA-1) 17:46	64 09:36 (WEA-3 E-160) 06:47	18:38		06:37	98 08:49 (WEA-4 E-160) 21:53	56 08:41 (WEA-4 E-160)	
16 08:33	09:53 (WEA-1) 07:47	64 09:37 (WEA-3 E-160) 06:45	18:38		06:37	98 08:49 (WEA-4 E-160) 21:53	56 08:41 (WEA-4 E-160)	
16:52	23 10:16 (WEA-1) 17:48	64 09:37 (WEA-3 E-160) 06:45	18:38		06:37	98 08:49 (WEA-4 E-160) 21:53	56 08:41 (WEA-4 E-160)	
17 08:32	09:54 (WEA-1) 07:45	63 08:34 (WEA-2 E-138) 06:45	18:39		06:34	97 08:49 (WEA-4 E-160) 21:54	55 08:41 (WEA-4 E-160)	
16:54	22 10:16 (WEA-1) 17:50	63 08:34 (WEA-2 E-138) 06:45	18:39		06:34	97 08:49 (WEA-4 E-160) 21:54	55 08:41 (WEA-4 E-160)	
18 08:31	09:56 (WEA-1) 07:43	62 08:35 (WEA-2 E-138) 06:42	18:41		06:32	97 08:49 (WEA-4 E-160) 21:54	55 08:41 (WEA-4 E-160)	
16:56	19 10:15 (WEA-1) 17:51	62 08:35 (WEA-2 E-138) 06:42	18:41		06:32	97 08:49 (WEA-4 E-160) 21:54	55 08:41 (WEA-4 E-160)	
19 08:30	09:56 (WEA-1) 07:41	62 08:36 (WEA-2 E-138) 06:40	18:43		06:30	97 08:49 (WEA-4 E-160) 21:54	55 08:41 (WEA-4 E-160)	
16:57	18 10:14 (WEA-1) 17:53	62 08:36 (WEA-2 E-138) 06:40	18:43		06:30	97 08:49 (WEA-4 E-160) 21:54	55 08:41 (WEA-4 E-160)	
20 08:29	09:58 (WEA-1) 07:39	60 09:37 (WEA-3 E-160) 06:38	18:45		06:28	95 08:48 (WEA-4 E-160) 21:55	54 08:41 (WEA-4 E-160)	
16:59	15 10:13 (WEA-1) 17:55	60 09:37 (WEA-3 E-160) 06:38	18:45		06:28	95 08:48 (WEA-4 E-160) 21:55	54 08:41 (WEA-4 E-160)	
21 08:28	10:01 (WEA-1) 07:37	50 08:47 (WEA-3 E-160) 06:36	18:46		06:26	93 08:47 (WEA-4 E-160) 21:55	54 08:41 (WEA-4 E-160)	
17:01	10 10:11 (WEA-1) 17:57	50 08:47 (WEA-3 E-160) 06:36	18:46		06:26	93 08:47 (WEA-4 E-160) 21:55	54 08:41 (WEA-4 E-160)	
22 08:27	07:35	50 08:47 (WEA-3 E-160) 06:33	18:48		06:24	93 08:47 (WEA-4 E-160) 21:55	54 08:41 (WEA-4 E-160)	
17:02	17:59	50 08:47 (WEA-3 E-160) 06:33	18:48		06:24	93 08:47 (WEA-4 E-160) 21:55	54 08:41 (WEA-4 E-160)	
23 08:26	07:33	50 08:47 (WEA-3 E-160) 06:31	18:50		06:22	92 08:46 (WEA-4 E-160) 21:56	54 08:41 (WEA-4 E-160)	
17:04	18:01	50 08:47 (WEA-3 E-160) 06:31	18:50		06:22	92 08:46 (WEA-4 E-160) 21:56	54 08:41 (WEA-4 E-160)	
24 08:25	07:31	50 08:47 (WEA-3 E-160) 06:29	18:51		06:20	92 08:46 (WEA-4 E-160) 21:56	54 08:41 (WEA-4 E-160)	
17:06	18:02	50 08:47 (WEA-3 E-160) 06:29	18:51		06:20	92 08:46 (WEA-4 E-160) 21:56	54 08:41 (WEA-4 E-160)	
25 08:23	07:29	49 09:37 (WEA-3 E-160) 06:26	18:51		06:18	92 08:46 (WEA-4 E-160) 21:56	54 08:41 (WEA-4 E-160)	
17:07	18:04	49 09:37 (WEA-3 E-160) 06:26	18:51		06:18	92 08:46 (WEA-4 E-160) 21:56	54 08:41 (WEA-4 E-160)	
26 08:22	07:27	48 09:36 (WEA-3 E-160) 06:24	18:55		06:16	88 08:45 (WEA-4 E-160) 21:56	55 08:42 (WEA-4 E-160)	
17:09	18:06	48 09:36 (WEA-3 E-160) 06:24	18:55		06:16	88 08:45 (WEA-4 E-160) 21:56	55 08:42 (WEA-4 E-160)	
27 08:21	07:25	48 08:47 (WEA-3 E-160) 06:22	18:58		06:14	87 08:45 (WEA-4 E-160) 21:56	55 08:42 (WEA-4 E-160)	
17:11	18:08	48 08:47 (WEA-3 E-160) 06:22	18:58		06:14	87 08:45 (WEA-4 E-160) 21:56	55 08:42 (WEA-4 E-160)	
28 08:19	07:23	46 09:35 (WEA-3 E-160) 06:19	18:58		06:12	84 08:44 (WEA-4 E-160) 21:56	56 08:43 (WEA-4 E-160)	
17:13	18:10	46 09:35 (WEA-3 E-160) 06:19	18:58		06:12	84 08:44 (WEA-4 E-160) 21:56	56 08:43 (WEA-4 E-160)	
29 08:18			17:17		06:10	82 08:44 (WEA-4 E-160) 21:56	56 08:44 (WEA-4 E-160)	
17:15			20:00		06:08	80 08:44 (WEA-4 E-160) 21:56	57 08:44 (WEA-4 E-160)	
30 08:17			17:15		06:08	80 08:44 (WEA-4 E-160) 21:56	57 08:44 (WEA-4 E-160)	
17:16			20:02		06:06	78 08:44 (WEA-4 E-160) 21:55	57 08:44 (WEA-4 E-160)	
31 08:15			17:12		06:04	78 08:44 (WEA-4 E-160) 21:55	57 08:44 (WEA-4 E-160)	
17:18			20:03		06:02	74 08:43 (WEA-4 E-160) 21:55	57 08:44 (WEA-4 E-160)	
Sonnenscheinstunden	259	278	367	416	485	74	498	1725
astr.max.mögl.Beschattung	523	1312	301	1244	2706			0,36
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46			0,84
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84			0,68
Reduktion Windrichtung	0,57	0,59	0,58	0,63	0,69			0,26
Gesamte Reduktion	0,09	0,15	0,14	0,26	0,26			0,20
Met.wahrsch.Beschattung	48	193	43	286	705			353

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 38/1 - IP 38/1 Marbecker Straße 103

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18	07:47 (WEA-4 E-160)	05:54	06:23 (WEA-5 E-160)	06:43	08:02 (WEA-4 E-160)	07:32	07:26	08:01 (WEA-2 E-138)	08:16	09:31 (WEA-1)	
2	05:18	07:48 (WEA-4 E-160)	05:56	06:24 (WEA-5 E-160)	06:45	08:06 (WEA-4 E-160)	07:34	07:27	09:00 (WEA-3 E-160)	08:18	09:38 (WEA-1)	27
3	05:19	07:48 (WEA-4 E-160)	05:57	06:25 (WEA-5 E-160)	06:47	08:07 (WEA-4 E-160)	07:35	07:29	08:59 (WEA-3 E-160)	08:23	09:39 (WEA-1)	28
4	05:20	07:47 (WEA-4 E-160)	05:59	06:27 (WEA-5 E-160)	06:48	08:09 (WEA-4 E-160)	07:36	07:30	08:03 (WEA-2 E-138)	08:19	09:31 (WEA-1)	29
5	05:21	07:47 (WEA-4 E-160)	06:00	06:28 (WEA-5 E-160)	06:50	08:11 (WEA-4 E-160)	07:37	07:31	08:06 (WEA-2 E-138)	08:22	09:32 (WEA-1)	30
6	05:22	07:47 (WEA-4 E-160)	06:02	06:29 (WEA-5 E-160)	06:52	08:12 (WEA-4 E-160)	07:38	07:32	08:07 (WEA-2 E-138)	08:23	09:33 (WEA-1)	31
7	05:23	07:47 (WEA-4 E-160)	06:03	06:30 (WEA-5 E-160)	06:53	08:13 (WEA-4 E-160)	07:39	07:33	08:08 (WEA-2 E-138)	08:24	09:34 (WEA-1)	1
8	05:23	07:47 (WEA-4 E-160)	06:05	06:31 (WEA-5 E-160)	06:55	08:14 (WEA-4 E-160)	07:40	07:34	08:09 (WEA-2 E-138)	08:25	09:35 (WEA-1)	2
9	05:24	07:47 (WEA-4 E-160)	06:06	06:32 (WEA-5 E-160)	06:56	08:15 (WEA-4 E-160)	07:41	07:35	08:10 (WEA-2 E-138)	08:26	09:36 (WEA-1)	3
10	05:25	07:47 (WEA-4 E-160)	06:08	06:33 (WEA-5 E-160)	06:58	08:16 (WEA-4 E-160)	07:42	07:36	08:11 (WEA-2 E-138)	08:27	09:37 (WEA-1)	4
11	05:26	07:47 (WEA-4 E-160)	06:10	06:34 (WEA-5 E-160)	07:00	08:17 (WEA-4 E-160)	07:43	07:37	08:12 (WEA-2 E-138)	08:28	09:38 (WEA-1)	5
12	05:27	07:47 (WEA-4 E-160)	06:11	06:35 (WEA-5 E-160)	07:01	08:18 (WEA-4 E-160)	07:44	07:38	08:13 (WEA-2 E-138)	08:29	09:39 (WEA-1)	6
13	05:28	07:47 (WEA-4 E-160)	06:13	06:36 (WEA-5 E-160)	07:03	08:19 (WEA-4 E-160)	07:45	07:39	08:14 (WEA-2 E-138)	08:30	09:40 (WEA-1)	7
14	05:30	07:47 (WEA-4 E-160)	06:14	06:37 (WEA-5 E-160)	07:04	08:20 (WEA-4 E-160)	07:46	07:40	08:15 (WEA-2 E-138)	08:31	09:41 (WEA-1)	8
15	05:31	07:47 (WEA-4 E-160)	06:16	06:38 (WEA-5 E-160)	07:06	08:21 (WEA-4 E-160)	07:47	07:41	08:16 (WEA-2 E-138)	08:32	09:42 (WEA-1)	9
16	05:32	07:47 (WEA-4 E-160)	06:18	06:39 (WEA-5 E-160)	07:08	08:22 (WEA-4 E-160)	07:48	07:42	08:17 (WEA-2 E-138)	08:33	09:43 (WEA-1)	10
17	05:33	07:47 (WEA-4 E-160)	06:19	06:40 (WEA-5 E-160)	07:09	08:23 (WEA-4 E-160)	07:49	07:43	08:18 (WEA-2 E-138)	08:34	09:44 (WEA-1)	11
18	05:34	07:47 (WEA-4 E-160)	06:21	06:41 (WEA-5 E-160)	07:11	08:24 (WEA-4 E-160)	07:50	07:44	08:19 (WEA-2 E-138)	08:35	09:45 (WEA-1)	12
19	05:36	07:47 (WEA-4 E-160)	06:22	06:42 (WEA-5 E-160)	07:13	08:25 (WEA-4 E-160)	07:51	07:45	08:20 (WEA-2 E-138)	08:36	09:46 (WEA-1)	13
20	05:37	07:47 (WEA-4 E-160)	06:24	06:43 (WEA-5 E-160)	07:14	08:26 (WEA-4 E-160)	07:52	07:46	08:21 (WEA-2 E-138)	08:37	09:47 (WEA-1)	14
21	05:38	07:47 (WEA-4 E-160)	06:26	06:44 (WEA-5 E-160)	07:16	08:27 (WEA-4 E-160)	07:53	07:47	08:22 (WEA-2 E-138)	08:38	09:48 (WEA-1)	15
22	05:40	07:47 (WEA-4 E-160)	06:27	06:45 (WEA-5 E-160)	07:17	08:28 (WEA-4 E-160)	07:54	07:48	08:23 (WEA-2 E-138)	08:39	09:49 (WEA-1)	16
23	05:41	07:47 (WEA-4 E-160)	06:29	06:46 (WEA-5 E-160)	07:19	08:29 (WEA-4 E-160)	07:55	07:49	08:24 (WEA-2 E-138)	08:40	09:50 (WEA-1)	17
24	05:42	07:47 (WEA-4 E-160)	06:31	06:47 (WEA-5 E-160)	07:21	08:30 (WEA-4 E-160)	07:56	07:50	08:25 (WEA-2 E-138)	08:41	09:51 (WEA-1)	18
25	05:44	07:47 (WEA-4 E-160)	06:32	06:48 (WEA-5 E-160)	07:22	08:31 (WEA-4 E-160)	07:57	07:51	08:26 (WEA-2 E-138)	08:42	09:52 (WEA-1)	19
26	05:45	07:47 (WEA-4 E-160)	06:34	06:49 (WEA-5 E-160)	07:24	08:32 (WEA-4 E-160)	07:58	07:52	08:27 (WEA-2 E-138)	08:43	09:53 (WEA-1)	20
27	05:47	07:47 (WEA-4 E-160)	06:35	06:50 (WEA-5 E-160)	07:26	08:33 (WEA-4 E-160)	07:59	07:53	08:28 (WEA-2 E-138)	08:44	09:54 (WEA-1)	21
28	05:48	07:47 (WEA-4 E-160)	06:37	06:51 (WEA-5 E-160)	07:27	08:34 (WEA-4 E-160)	08:00	07:54	08:29 (WEA-2 E-138)	08:45	09:55 (WEA-1)	22
29	05:50	07:47 (WEA-4 E-160)	06:39	06:52 (WEA-5 E-160)	07:29	08:35 (WEA-4 E-160)	08:01	07:55	08:30 (WEA-2 E-138)	08:46	09:56 (WEA-1)	23
30	05:51	07:47 (WEA-4 E-160)	06:40	06:53 (WEA-5 E-160)	07:31	08:36 (WEA-4 E-160)	08:02	07:56	08:31 (WEA-2 E-138)	08:47	09:57 (WEA-1)	24
31	05:53	07:47 (WEA-4 E-160)	06:42	06:54 (WEA-5 E-160)	07:33	08:37 (WEA-4 E-160)	08:03	07:57	08:32 (WEA-2 E-138)	08:48	09:58 (WEA-1)	25
	21:25	09:00 (WEA-4 E-160)	20:24	08:36 (WEA-4 E-160)	19:15	17:09	15:02	13:45	12:28	11:11	10:00	9:00
Sonnenscheinstunden	501		453	381	51	332	267	498	244	897	0,15	0,15
astr.max.mögl.Beschattung	2463		2172		1345		998	648	408	2463	0,84	0,84
Red.Sonnenscheinwahrsch.	0,41		0,43		0,32		0,23	0,15	0,11	0,07	0,07	0,07
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,69		0,68		0,58		0,58	0,58	0,58	0,57	0,57	0,57
Gesamte Reduktion	0,24		0,24		0,15		0,11	0,07	0,07	0,07	0,07	0,07
Met.wahrsch.Beschattung	580		524		205		145	95	62	580	0,15	0,15

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 38/2 - IP 38/2 Marbecker Straße 105

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni						
1 08:40	09:52 (WEA-1) 08:14	09:14 (WEA-3 E-160) 07:21	08:59 (WEA-3 E-160) 07:10	06:06	07:39 (WEA-4 E-160) 05:21	06:12 (WEA-5 E-160)						
2 16:32	30 10:22 (WEA-1) 17:20	18 09:32 (WEA-3 E-160) 18:11	45 09:44 (WEA-3 E-160) 20:05	20:56	83 09:02 (WEA-4 E-160) 21:41	95 06:12 (WEA-5 E-160)						
3 08:40	16:33	29 09:53 (WEA-1) 08:12	23 09:11 (WEA-3 E-160) 07:18	42 09:00 (WEA-3 E-160) 07:08	20:57	84 09:38 (WEA-4 E-160) 21:42	94 06:12 (WEA-5 E-160)					
4 08:40	16:36	29 09:54 (WEA-1) 08:11	23 08:42 (WEA-3 E-160) 07:16	42 09:01 (WEA-3 E-160) 07:06	20:57	84 09:37 (WEA-4 E-160) 21:42	94 06:14 (WEA-5 E-160)					
5 08:40	16:36	29 09:55 (WEA-1) 08:09	23 08:40 (WEA-3 E-160) 07:14	42 09:02 (WEA-3 E-160) 07:03	20:59	85 09:02 (WEA-4 E-160) 21:43	92 06:15 (WEA-5 E-160)					
6 08:39	16:37	28 09:56 (WEA-1) 08:06	23 08:31 (WEA-3 E-160) 07:10	42 09:04 (WEA-3 E-160) 07:01	21:00	85 09:03 (WEA-4 E-160) 21:44	89 06:17 (WEA-5 E-160)					
7 08:39	16:38	28 09:56 (WEA-1) 08:04	23 08:37 (WEA-3 E-160) 07:07	42 09:06 (WEA-3 E-160) 06:57	21:01	85 09:03 (WEA-4 E-160) 21:44	89 06:18 (WEA-5 E-160)					
8 08:38	16:39	28 09:57 (WEA-1) 08:02	23 08:36 (WEA-3 E-160) 07:05	42 09:08 (WEA-3 E-160) 06:55	21:02	85 09:02 (WEA-4 E-160) 21:44	89 06:19 (WEA-5 E-160)					
9 08:38	16:41	27 09:58 (WEA-1) 08:00	23 08:35 (WEA-3 E-160) 07:03	42 09:10 (WEA-3 E-160) 06:53	21:03	85 09:01 (WEA-4 E-160) 21:44	89 06:20 (WEA-5 E-160)					
10 08:37	16:42	26 09:58 (WEA-1) 07:59	23 08:34 (WEA-3 E-160) 07:01	42 09:12 (WEA-3 E-160) 06:51	21:04	85 09:00 (WEA-4 E-160) 21:44	89 06:21 (WEA-5 E-160)					
11 08:37	16:43	26 09:59 (WEA-1) 07:57	23 08:33 (WEA-3 E-160) 06:58	42 09:14 (WEA-3 E-160) 06:49	21:05	85 08:59 (WEA-4 E-160) 21:44	89 06:22 (WEA-5 E-160)					
12 08:36	16:45	25 10:00 (WEA-1) 07:55	23 08:32 (WEA-3 E-160) 06:56	42 09:16 (WEA-3 E-160) 06:47	21:06	85 08:58 (WEA-4 E-160) 21:44	89 06:23 (WEA-5 E-160)					
13 08:36	16:46	24 10:01 (WEA-1) 07:53	23 08:31 (WEA-3 E-160) 06:54	42 09:18 (WEA-3 E-160) 06:45	21:07	85 08:57 (WEA-4 E-160) 21:44	89 06:24 (WEA-5 E-160)					
14 08:35	16:48	23 10:02 (WEA-1) 07:51	23 08:30 (WEA-3 E-160) 06:52	42 09:20 (WEA-3 E-160) 06:43	21:08	85 08:56 (WEA-4 E-160) 21:44	89 06:25 (WEA-5 E-160)					
15 08:34	16:49	22 10:03 (WEA-1) 07:49	23 08:29 (WEA-3 E-160) 06:50	42 09:22 (WEA-3 E-160) 06:41	21:09	85 08:55 (WEA-4 E-160) 21:44	89 06:26 (WEA-5 E-160)					
16 08:33	16:51	21 10:04 (WEA-1) 07:47	23 08:28 (WEA-3 E-160) 06:48	42 09:24 (WEA-3 E-160) 06:39	21:10	85 08:54 (WEA-4 E-160) 21:44	89 06:27 (WEA-5 E-160)					
17 08:32	16:52	20 10:05 (WEA-1) 07:45	23 08:27 (WEA-3 E-160) 06:46	42 09:26 (WEA-3 E-160) 06:37	21:11	85 08:53 (WEA-4 E-160) 21:44	89 06:28 (WEA-5 E-160)					
18 08:31	16:54	19 10:06 (WEA-1) 07:43	23 08:26 (WEA-3 E-160) 06:44	42 09:28 (WEA-3 E-160) 06:35	21:12	85 08:52 (WEA-4 E-160) 21:44	89 06:29 (WEA-5 E-160)					
19 08:30	16:55	18 10:07 (WEA-1) 07:41	23 08:25 (WEA-3 E-160) 06:42	42 09:30 (WEA-3 E-160) 06:33	21:13	85 08:51 (WEA-4 E-160) 21:44	89 06:30 (WEA-5 E-160)					
20 08:29	16:57	17 10:08 (WEA-1) 07:39	23 08:24 (WEA-3 E-160) 06:40	42 09:32 (WEA-3 E-160) 06:31	21:14	85 08:50 (WEA-4 E-160) 21:44	89 06:31 (WEA-5 E-160)					
21 08:28	16:58	22 10:09 (WEA-1) 07:37	23 08:23 (WEA-3 E-160) 06:38	42 09:34 (WEA-3 E-160) 06:29	21:15	85 08:49 (WEA-4 E-160) 21:44	89 06:32 (WEA-5 E-160)					
22 08:27	17:01	21 10:10 (WEA-1) 07:35	23 08:22 (WEA-3 E-160) 06:36	42 09:36 (WEA-3 E-160) 06:27	21:16	85 08:48 (WEA-4 E-160) 21:44	89 06:33 (WEA-5 E-160)					
23 08:26	17:04	20 10:11 (WEA-1) 07:33	23 08:21 (WEA-3 E-160) 06:34	42 09:38 (WEA-3 E-160) 06:25	21:17	85 08:47 (WEA-4 E-160) 21:44	89 06:34 (WEA-5 E-160)					
24 08:25	17:06	19 10:12 (WEA-1) 07:31	23 08:20 (WEA-3 E-160) 06:32	42 09:40 (WEA-3 E-160) 06:23	21:18	85 08:46 (WEA-4 E-160) 21:44	89 06:35 (WEA-5 E-160)					
25 08:23	17:07	18 10:13 (WEA-1) 07:29	23 08:19 (WEA-3 E-160) 06:30	42 09:42 (WEA-3 E-160) 06:21	21:19	85 08:45 (WEA-4 E-160) 21:44	89 06:36 (WEA-5 E-160)					
26 08:22	17:09	17 10:14 (WEA-1) 07:27	23 08:18 (WEA-3 E-160) 06:28	42 09:44 (WEA-3 E-160) 06:19	21:20	85 08:44 (WEA-4 E-160) 21:44	89 06:37 (WEA-5 E-160)					
27 08:21	17:11	16 10:15 (WEA-1) 07:25	23 08:17 (WEA-3 E-160) 06:26	42 09:46 (WEA-3 E-160) 06:17	21:21	85 08:43 (WEA-4 E-160) 21:44	89 06:38 (WEA-5 E-160)					
28 08:19	17:13	15 10:16 (WEA-1) 07:23	23 08:16 (WEA-3 E-160) 06:24	42 09:48 (WEA-3 E-160) 06:15	21:22	85 08:42 (WEA-4 E-160) 21:44	89 06:39 (WEA-5 E-160)					
29 08:18	17:15	14 10:17 (WEA-1) 07:21	23 08:15 (WEA-3 E-160) 06:22	42 09:50 (WEA-3 E-160) 06:13	21:23	85 08:41 (WEA-4 E-160) 21:44	89 06:40 (WEA-5 E-160)					
30 08:17	17:16	13 10:18 (WEA-1) 07:19	23 08:14 (WEA-3 E-160) 06:20	42 09:52 (WEA-3 E-160) 06:11	21:24	85 08:40 (WEA-4 E-160) 21:44	89 06:41 (WEA-5 E-160)					
31 08:15	17:18	12 10:19 (WEA-1) 07:17	23 08:13 (WEA-3 E-160) 06:18	42 09:54 (WEA-3 E-160) 06:09	21:25	85 08:39 (WEA-4 E-160) 21:44	89 06:42 (WEA-5 E-160)					
Sonnenscheinstunden 259							278	367	416	485	498	2373
astr.max.mögl.Beschattung 452							1589	259	1191	3061	498	2373
Red.Sonnenscheinwahrsch. 0,20							0,30	0,30	0,41	0,46	0,46	0,36
Reduktion Betriebsdauer 0,04							0,04	0,04	0,04	0,04	0,04	0,04
Reduktion Windrichtung 0,57							0,58	0,57	0,68	0,69	0,68	0,68
Gesamte Reduktion 0,09							0,14	0,14	0,23	0,26	0,26	0,20
Met.wahrsch.Beschattung 42							230	36	274	797	498	496

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

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



Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 38/2 - IP 38/2 Marbecker Straße 105

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18	07:45 (WEA-4 E-160)	05:54	06:23 (WEA-5 E-160)	06:43	08:20 (WEA-4 E-160)	07:32	07:26	08:05 (WEA-2 E-138)	08:16	09:41 (WEA-1)	
2	05:18	07:45 (WEA-4 E-160)	05:56	06:24 (WEA-5 E-160)	06:45	08:28 (WEA-4 E-160)	07:34	07:27	09:15 (WEA-3 E-160)	16:27	25 10:06 (WEA-1)	
3	05:19	07:45 (WEA-4 E-160)	05:57	06:25 (WEA-5 E-160)	06:47		07:35	19:10	17:05	67 09:15 (WEA-3 E-160)	16:26	
4	05:20	07:45 (WEA-4 E-160)	05:59	06:26 (WEA-5 E-160)	06:48		07:36	19:08	17:03	64 09:14 (WEA-3 E-160)	16:25	
5	05:21	07:45 (WEA-4 E-160)	06:00	06:27 (WEA-5 E-160)	06:50		07:37	19:06	17:01	60 08:07 (WEA-2 E-138)	16:25	
6	05:22	07:45 (WEA-4 E-160)	06:02	06:28 (WEA-5 E-160)	06:52		07:38	19:05	17:01	60 09:13 (WEA-3 E-160)	16:25	
7	05:22	07:45 (WEA-4 E-160)	06:03	06:29 (WEA-5 E-160)	06:53		07:39	19:04	17:01	60 08:01 (WEA20)	16:22	
8	05:23	07:45 (WEA-4 E-160)	06:05	06:30 (WEA-5 E-160)	06:55		07:40	19:03	17:00	57 09:11 (WEA-3 E-160)	16:24	
9	05:24	07:45 (WEA-4 E-160)	06:06	06:31 (WEA-5 E-160)	06:56		07:41	19:02	17:00	57 08:09 (WEA-2 E-138)	16:24	
10	05:25	07:45 (WEA-4 E-160)	06:08	06:32 (WEA-5 E-160)	06:58		07:42	19:01	17:00	57 09:10 (WEA-3 E-160)	16:24	
11	05:26	07:45 (WEA-4 E-160)	06:10	06:33 (WEA-5 E-160)	07:00		07:43	19:00	17:00	57 08:10 (WEA-3 E-160)	16:24	
12	05:27	07:45 (WEA-4 E-160)	06:11	06:34 (WEA-5 E-160)	07:01		07:44	18:59	17:00	57 09:07 (WEA-3 E-160)	16:23	
13	05:28	07:45 (WEA-4 E-160)	06:13	06:35 (WEA-5 E-160)	07:03		07:45	18:58	17:00	57 08:42 (WEA-3 E-160)	16:23	
14	05:30	07:45 (WEA-4 E-160)	06:14	06:36 (WEA-5 E-160)	07:04		07:46	18:57	17:00	57 09:05 (WEA-3 E-160)	16:23	
15	05:31	07:45 (WEA-4 E-160)	06:16	06:37 (WEA-5 E-160)	07:06		07:47	18:56	17:00	57 09:07 (WEA-3 E-160)	16:23	
16	05:32	07:45 (WEA-4 E-160)	06:18	06:38 (WEA-5 E-160)	07:08		07:48	18:55	17:00	57 09:05 (WEA-3 E-160)	16:23	
17	05:33	07:45 (WEA-4 E-160)	06:19	06:39 (WEA-5 E-160)	07:09		07:49	18:54	17:00	57 08:45 (WEA-3 E-160)	16:23	
18	05:34	07:45 (WEA-4 E-160)	06:21	06:40 (WEA-5 E-160)	07:11		07:50	18:53	17:00	57 09:02 (WEA-3 E-160)	16:23	
19	05:36	07:45 (WEA-4 E-160)	06:22	06:41 (WEA-5 E-160)	07:13		07:51	18:52	17:00	57 09:02 (WEA-3 E-160)	16:23	
20	05:37	07:45 (WEA-4 E-160)	06:24	06:42 (WEA-5 E-160)	07:14		07:52	18:51	17:00	57 08:50 (WEA-3 E-160)	16:23	
21	05:38	07:45 (WEA-4 E-160)	06:26	06:43 (WEA-5 E-160)	07:16		07:53	18:50	17:00	57 09:02 (WEA-3 E-160)	16:23	
22	05:40	07:45 (WEA-4 E-160)	06:27	06:44 (WEA-5 E-160)	07:17		07:54	18:49	17:00	57 09:02 (WEA-3 E-160)	16:23	
23	05:41	07:45 (WEA-4 E-160)	06:29	06:45 (WEA-5 E-160)	07:19		07:55	18:48	17:00	57 09:02 (WEA-3 E-160)	16:23	
24	05:42	07:45 (WEA-4 E-160)	06:31	06:46 (WEA-5 E-160)	07:21		07:56	18:47	17:00	57 09:02 (WEA-3 E-160)	16:23	
25	05:44	07:45 (WEA-4 E-160)	06:32	06:47 (WEA-5 E-160)	07:22		07:57	18:46	17:00	57 09:02 (WEA-3 E-160)	16:23	
26	05:45	07:45 (WEA-4 E-160)	06:34	06:48 (WEA-5 E-160)	07:24		07:58	18:45	17:00	57 09:02 (WEA-3 E-160)	16:23	
27	05:47	07:45 (WEA-4 E-160)	06:35	06:49 (WEA-5 E-160)	07:26		07:59	18:44	17:00	57 09:02 (WEA-3 E-160)	16:23	
28	05:48	07:45 (WEA-4 E-160)	06:37	06:50 (WEA-5 E-160)	07:27		08:00	18:43	17:00	57 09:02 (WEA-3 E-160)	16:23	
29	05:50	07:45 (WEA-4 E-160)	06:39	06:51 (WEA-5 E-160)	07:29		08:01	18:42	17:00	57 09:02 (WEA-3 E-160)	16:23	
30	05:51	07:45 (WEA-4 E-160)	06:40	06:52 (WEA-5 E-160)	07:31		08:02	18:41	17:00	57 09:02 (WEA-3 E-160)	16:23	
31	05:53	07:45 (WEA-4 E-160)	06:42	06:53 (WEA-5 E-160)	07:33		08:03	18:40	17:00	57 09:02 (WEA-3 E-160)	16:23	
	21:25	09:12 (WEA-4 E-160)	20:24	08:37 (WEA-4 E-160)			17:09	70 09:16 (WEA-3 E-160)		267	244	
Sonnenscheinstunden	501		453		381		332		633		905	
astr.max.mögl.Beschattung	3017		2230		8		1373		633		905	
Red.Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32		0,23		0,15	
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84		0,84	
Reduktion Windrichtung	0,69		0,68		0,68		0,57		0,58		0,57	
Gesamte Reduktion	0,24		0,24		0,20		0,15		0,11		0,07	
Met.wahrsch.Beschattung	711		538		2		206		69		63	

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

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



Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 38/3 - IP 38/3 Marbecker Straße 105a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1 08:40	09:55 (WEA-1) 08:14	08:47 (WEA-2 E-138) 07:21	09:06 (WEA-3 E-160) 07:10	06:06	07:45 (WEA-4 E-160) 05:21	06:15 (WEA-5 E-160)	
2 16:32	10:23 (WEA-1) 17:20	09:41 (WEA-3 E-160) 18:11	09:45 (WEA-3 E-160) 20:05	20:56	09:11 (WEA-4 E-160) 21:41	06:10 (WEA-4 E-160)	
3 16:33	09:56 (WEA-1) 08:12	08:43 (WEA-2 E-138) 07:18	09:07 (WEA-3 E-160) 07:08	06:04	07:44 (WEA-4 E-160) 05:20	06:15 (WEA-5 E-160)	
4 16:35	10:24 (WEA-1) 17:22	09:43 (WEA-3 E-160) 18:13	09:43 (WEA-3 E-160) 20:07	20:57	09:10 (WEA-4 E-160) 21:42	06:10 (WEA-4 E-160)	
5 16:36	09:57 (WEA-1) 08:11	08:41 (WEA-2 E-138) 07:16	09:08 (WEA-3 E-160) 07:06	06:02	07:44 (WEA-4 E-160) 05:19	06:18 (WEA-5 E-160)	
6 16:38	10:25 (WEA-1) 17:24	09:44 (WEA-3 E-160) 18:15	09:40 (WEA-3 E-160) 20:08	20:59	09:10 (WEA-4 E-160) 21:43	06:10 (WEA-4 E-160)	
7 16:39	09:58 (WEA-1) 08:09	08:41 (WEA-2 E-138) 07:14	09:10 (WEA-3 E-160) 07:03	06:00	07:44 (WEA-4 E-160) 05:18	06:20 (WEA-5 E-160)	
8 16:36	10:25 (WEA-1) 17:26	09:46 (WEA-3 E-160) 18:17	09:38 (WEA-3 E-160) 20:10	21:01	09:11 (WEA-4 E-160) 21:44	06:20 (WEA-5 E-160)	
9 16:41	09:58 (WEA-1) 08:07	08:33 (WEA02) 07:12	09:13 (WEA-3 E-160) 07:01	05:58	07:43 (WEA-4 E-160) 05:18	07:49 (WEA-4 E-160)	
10 16:37	10:25 (WEA-1) 17:27	09:47 (WEA-3 E-160) 18:19	09:35 (WEA-3 E-160) 20:12	21:02	09:10 (WEA-4 E-160) 21:45	06:20 (WEA-5 E-160)	
11 16:38	09:59 (WEA-1) 08:06	08:39 (WEA-2 E-138) 07:10	09:17 (WEA-3 E-160) 06:59	05:56	07:43 (WEA-4 E-160) 05:17	07:49 (WEA-4 E-160)	
12 16:38	10:26 (WEA-1) 17:29	09:48 (WEA-3 E-160) 18:20	09:30 (WEA-3 E-160) 20:14	21:04	09:10 (WEA-4 E-160) 21:46	06:20 (WEA-5 E-160)	
13 16:39	09:59 (WEA-1) 08:04	08:38 (WEA-2 E-138) 07:07	06:57	05:55	07:43 (WEA-4 E-160) 05:16	07:50 (WEA-4 E-160)	
14 16:39	10:25 (WEA-1) 17:31	09:49 (WEA-3 E-160) 18:22	20:15	21:06	09:11 (WEA-4 E-160) 21:47	06:20 (WEA-5 E-160)	
15 16:38	10:00 (WEA-1) 08:02	08:38 (WEA-2 E-138) 07:05	06:54	05:53	07:43 (WEA-4 E-160) 05:16	07:49 (WEA-4 E-160)	
16 16:41	10:26 (WEA-1) 17:33	09:50 (WEA-3 E-160) 18:24	20:17	22	08:45 (WEA-4 E-160) 21:07	07:49 (WEA-4 E-160)	
17 16:42	10:01 (WEA-1) 08:00	08:38 (WEA-2 E-138) 07:03	06:52	05:51	08:18 (WEA-4 E-160) 21:07	07:50 (WEA-4 E-160)	
18 16:42	10:25 (WEA-1) 17:35	09:50 (WEA-3 E-160) 18:26	20:19	31	08:49 (WEA-4 E-160) 21:09	09:01 (WEA-4 E-160)	
19 16:42	10:01 (WEA-1) 07:59	08:38 (WEA-2 E-138) 07:01	06:50	08:14 (WEA-4 E-160) 20:49	06:15 (WEA-5 E-160) 05:15	07:51 (WEA-4 E-160)	
20 16:43	10:25 (WEA-1) 17:37	09:52 (WEA-3 E-160) 18:27	20:20	39	08:53 (WEA-4 E-160) 21:10	09:01 (WEA-4 E-160)	
21 16:43	10:02 (WEA-1) 07:57	08:38 (WEA-2 E-138) 06:58	06:48	08:10 (WEA-4 E-160) 20:48	06:13 (WEA-5 E-160) 05:15	07:51 (WEA-4 E-160)	
22 16:45	10:25 (WEA-1) 17:38	09:52 (WEA-3 E-160) 18:29	20:22	45	08:55 (WEA-4 E-160) 21:12	09:01 (WEA-4 E-160)	
23 16:46	10:04 (WEA-1) 07:55	08:39 (WEA-2 E-138) 06:56	06:45	08:07 (WEA-4 E-160) 20:46	06:12 (WEA-5 E-160) 05:14	07:51 (WEA-4 E-160)	
24 16:46	10:25 (WEA-1) 17:40	09:53 (WEA-3 E-160) 18:31	20:24	50	08:57 (WEA-4 E-160) 21:14	09:02 (WEA-4 E-160)	
25 16:48	10:05 (WEA-1) 07:53	08:39 (WEA-2 E-138) 06:54	06:43	08:05 (WEA-4 E-160) 20:44	06:08 (WEA-5 E-160) 05:14	07:52 (WEA-4 E-160)	
26 16:48	10:25 (WEA-1) 17:42	09:53 (WEA-3 E-160) 18:33	20:25	54	08:59 (WEA-4 E-160) 21:15	09:08 (WEA-4 E-160)	
27 16:49	10:06 (WEA-1) 07:51	08:40 (WEA-2 E-138) 06:52	06:41	08:03 (WEA-4 E-160) 20:43	06:10 (WEA-5 E-160) 05:14	07:52 (WEA-4 E-160)	
28 16:49	10:24 (WEA-1) 17:44	09:54 (WEA-3 E-160) 18:34	20:27	58	09:01 (WEA-4 E-160) 21:17	09:09 (WEA-4 E-160)	
29 16:49	10:07 (WEA-1) 07:49	08:40 (WEA-2 E-138) 06:49	06:39	08:01 (WEA-4 E-160) 20:41	06:09 (WEA-5 E-160) 05:14	07:53 (WEA-4 E-160)	
30 16:51	10:23 (WEA-1) 17:46	09:54 (WEA-3 E-160) 18:36	20:29	61	09:02 (WEA-4 E-160) 21:18	09:08 (WEA-4 E-160)	
31 16:51	10:09 (WEA-1) 07:47	08:42 (WEA-2 E-138) 06:47	06:37	08:00 (WEA-4 E-160) 20:40	06:09 (WEA-5 E-160) 05:13	07:53 (WEA-4 E-160)	
1 16:52	10:22 (WEA-1) 17:48	09:54 (WEA-3 E-160) 18:38	20:30	64	09:04 (WEA-4 E-160) 21:20	09:08 (WEA-4 E-160)	
2 16:54	10:12 (WEA-1) 07:45	08:43 (WEA-2 E-138) 06:45	06:34	07:57 (WEA-4 E-160) 20:38	06:09 (WEA-5 E-160) 05:13	07:53 (WEA-4 E-160)	
3 16:54	10:20 (WEA-1) 17:50	09:54 (WEA-3 E-160) 18:39	20:32	67	09:04 (WEA-4 E-160) 21:21	09:08 (WEA-4 E-160)	
4 16:54	10:07 (WEA-1) 07:43	08:46 (WEA-2 E-138) 06:42	06:32	07:56 (WEA-4 E-160) 20:37	06:09 (WEA-5 E-160) 05:13	07:53 (WEA-4 E-160)	
5 16:56	17:51	09:54 (WEA-3 E-160) 18:41	20:34	69	09:05 (WEA-4 E-160) 21:23	09:07 (WEA-4 E-160)	
6 16:57	07:41	09:01 (WEA-3 E-160) 06:40	06:30	75	07:55 (WEA-4 E-160) 20:35	06:08 (WEA-5 E-160) 05:13	07:54 (WEA-4 E-160)
7 16:57	17:53	09:54 (WEA-3 E-160) 18:43	20:36	71	09:06 (WEA-4 E-160) 21:24	09:07 (WEA-4 E-160)	
8 16:57	07:39	09:01 (WEA-3 E-160) 06:38	06:28	77	07:53 (WEA-4 E-160) 20:34	06:09 (WEA-5 E-160) 05:13	07:54 (WEA-4 E-160)
9 16:58	17:55	09:53 (WEA-3 E-160) 18:45	20:37	74	09:07 (WEA-4 E-160) 21:26	09:07 (WEA-4 E-160)	
10 16:58	07:37	09:01 (WEA-3 E-160) 06:36	06:26	75	07:52 (WEA-4 E-160) 20:33	06:09 (WEA-5 E-160) 05:14	07:54 (WEA-4 E-160)
11 17:01	17:57	09:52 (WEA-3 E-160) 18:46	20:39	79	09:07 (WEA-4 E-160) 21:27	09:06 (WEA-4 E-160)	
12 17:02	07:35	09:01 (WEA-3 E-160) 06:33	06:24	87	07:51 (WEA-4 E-160) 20:31	06:08 (WEA-5 E-160) 05:14	07:54 (WEA-4 E-160)
13 17:02	17:59	09:52 (WEA-3 E-160) 18:48	20:41	77	09:08 (WEA-4 E-160) 21:29	09:04 (WEA-4 E-160)	
14 17:02	07:33	09:02 (WEA-3 E-160) 06:31	06:22	77	07:50 (WEA-4 E-160) 20:30	06:09 (WEA-5 E-160) 05:14	07:55 (WEA-4 E-160)
15 17:04	18:01	09:51 (WEA-3 E-160) 18:50	20:42	79	09:09 (WEA-4 E-160) 21:30	09:05 (WEA-4 E-160)	
16 17:04	07:31	09:02 (WEA-3 E-160) 06:29	06:20	80	07:49 (WEA-4 E-160) 20:29	06:09 (WEA-5 E-160) 05:14	07:55 (WEA-4 E-160)
17 17:06	18:02	09:51 (WEA-3 E-160) 18:51	20:44	80	09:09 (WEA-4 E-160) 21:31	09:05 (WEA-4 E-160)	
18 17:06	07:29	09:03 (WEA-3 E-160) 06:26	06:18	87	07:48 (WEA-4 E-160) 20:28	06:10 (WEA-5 E-160) 05:15	07:54 (WEA-4 E-160)
19 17:07	18:04	09:50 (WEA-3 E-160) 18:53	20:46	81	09:09 (WEA-4 E-160) 21:33	09:05 (WEA-4 E-160)	
20 17:07	07:27	09:04 (WEA-3 E-160) 06:24	06:16	87	07:47 (WEA-4 E-160) 20:27	06:09 (WEA-5 E-160) 05:15	07:55 (WEA-4 E-160)
21 17:09	18:06	09:49 (WEA-3 E-160) 18:55	20:47	82	09:09 (WEA-4 E-160) 21:34	09:04 (WEA-4 E-160)	
22 17:09	07:25	09:03 (WEA-3 E-160) 06:22	06:14	87	07:47 (WEA-4 E-160) 20:26	06:11 (WEA-5 E-160) 05:16	07:55 (WEA-4 E-160)
23 17:11	18:08	09:47 (WEA-3 E-160) 18:57	20:49	83	09:10 (WEA-4 E-160) 21:35	09:04 (WEA-4 E-160)	
24 17:11	07:23	09:04 (WEA-3 E-160) 06:19	06:12	87	07:47 (WEA-4 E-160) 20:24	06:11 (WEA-5 E-160) 05:16	07:55 (WEA-4 E-160)
25 17:13	18:10	09:46 (WEA-3 E-160) 18:58	20:51	84	09:11 (WEA-4 E-160) 21:36	09:03 (WEA-4 E-160)	
26 17:13	07:17	06:19	06:10	87	07:46 (WEA-4 E-160) 20:23	06:13 (WEA-5 E-160) 05:17	07:55 (WEA-4 E-160)
27 17:15	13	09:33 (WEA-3 E-160) 17:15	20:52	85	09:11 (WEA-4 E-160) 21:38	09:04 (WEA-4 E-160)	
28 17:15	09:16 (WEA-3 E-160) 17:16	07:15	06:08	87	07:45 (WEA-4 E-160) 20:22	06:13 (WEA-5 E-160) 05:17	07:55 (WEA-4 E-160)
29 17:16	20	09:36 (WEA-3 E-160) 17:16	20:54	86	09:11 (WEA-4 E-160) 21:39	09:04 (WEA-4 E-160)	
30 17:18	25	09:38 (WEA-3 E-160) 17:18	20:53	90	09:03 (WEA-4 E-160) 21:40	09:03 (WEA-4 E-160)	
31 17:18	25	09:38 (WEA-3 E-160) 17:18	20:53	90	09:03 (WEA-4 E-160) 21:40	09:03 (WEA-4 E-160)	
Sonnenscheinstunden	259	278	367	416	485	498	2132
astr.max.mögl.Beschattung	442	1628	170	1517	3025	2132	1628
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	0,36	0,36
Reduktion Betriebsdauer	0,04	0,04	0,04	0,04	0,04	0,04	0,04
Reduktion Windrichtung	0,57	0,57	0,57	0,68	0,68	0,68	0,68
Gesamte Reduktion	0,09	0,14	0,14	0,23	0,26	0,20	0,20
Met.wahrsch.Beschattung	41	234	24	346	782	432	432

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

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



Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: IP 38/3 - IP 38/3 Marbecker Straße 105a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1 05:18	07:55 (WEA-4 E-160) 05:54	06:23 (WEA-5 E-160) 06:43	08:09 (WEA-4 E-160) 07:32	07:26	08:07 (WEA-2 E-138) 08:16	09:44 (WEA-1)	
2 05:18	70 09:05 (WEA-4 E-160) 21:24	103 09:20 (WEA-4 E-160) 20:22	45 08:54 (WEA-4 E-160) 19:13	07:27	73 09:21 (WEA-3 E-160) 16:27	23 10:07 (WEA-1)	
3 05:19	07:55 (WEA-4 E-160) 05:57	06:24 (WEA-5 E-160) 06:45	08:12 (WEA-4 E-160) 07:34	07:27	08:07 (WEA-2 E-138) 08:18	09:44 (WEA-1)	
4 05:20	71 09:06 (WEA-4 E-160) 21:22	100 09:20 (WEA-4 E-160) 20:20	39 08:51 (WEA-4 E-160) 19:10	07:25	71 09:20 (WEA-3 E-160) 16:26	24 10:08 (WEA-1)	
5 05:21	07:55 (WEA-4 E-160) 05:59	06:25 (WEA-5 E-160) 06:47	08:16 (WEA-4 E-160) 07:35	07:29	08:08 (WEA-2 E-138) 08:19	09:44 (WEA-1)	
6 05:22	71 09:06 (WEA-4 E-160) 21:20	97 09:20 (WEA-4 E-160) 20:17	31 08:47 (WEA-4 E-160) 19:08	07:23	67 09:19 (WEA-3 E-160) 16:25	25 10:09 (WEA-1)	
7 05:22	73 09:08 (WEA-4 E-160) 21:15	87 09:20 (WEA-4 E-160) 20:11	23 08:19 (WEA-4 E-160) 07:37	07:31	08:08 (WEA-2 E-138) 08:21	09:44 (WEA-1)	
8 05:23	73 09:08 (WEA-4 E-160) 21:13	87 09:20 (WEA-4 E-160) 20:15	23 08:42 (WEA-4 E-160) 19:06	07:31	66 09:19 (WEA-3 E-160) 16:25	26 10:10 (WEA-1)	
9 05:24	06:25 (WEA-5 E-160) 06:06	07:52 (WEA-4 E-160) 06:50	07:53 (WEA-4 E-160) 07:06	07:33	08:01 (WEA20) 08:22	09:44 (WEA-1)	
10 05:25	74 09:09 (WEA-4 E-160) 21:11	87 09:20 (WEA-4 E-160) 20:06	07:52 (WEA-4 E-160) 06:53	07:30	64 09:18 (WEA-3 E-160) 16:24	26 10:10 (WEA-1)	
11 05:26	80 09:10 (WEA-4 E-160) 21:08	87 09:20 (WEA-4 E-160) 20:01	07:53 (WEA-4 E-160) 07:06	07:40	08:03 (WEA20) 08:23	09:45 (WEA-1)	
12 05:27	88 09:11 (WEA-4 E-160) 21:06	86 09:19 (WEA-4 E-160) 19:59	07:53 (WEA-4 E-160) 07:01	07:46	60 09:17 (WEA-3 E-160) 16:24	27 10:12 (WEA-1)	
13 05:28	89 09:11 (WEA-4 E-160) 21:04	86 09:19 (WEA-4 E-160) 19:57	07:54 (WEA-4 E-160) 07:04	07:44	08:11 (WEA-2 E-138) 08:24	09:45 (WEA-1)	
14 05:30	91 09:12 (WEA-4 E-160) 21:02	85 09:18 (WEA-4 E-160) 19:54	07:54 (WEA-4 E-160) 07:04	07:49	09:16 (WEA-3 E-160) 16:24	27 10:12 (WEA-1)	
15 05:31	93 09:12 (WEA-4 E-160) 21:00	84 09:18 (WEA-4 E-160) 19:52	07:54 (WEA-4 E-160) 07:06	07:49	09:50 (WEA-3 E-160) 07:38	27 10:12 (WEA-1)	
16 05:32	95 09:13 (WEA-4 E-160) 20:58	83 09:17 (WEA-4 E-160) 19:50	07:54 (WEA-4 E-160) 07:08	07:46	55 09:16 (WEA-3 E-160) 16:24	27 10:12 (WEA-1)	
17 05:33	97 09:13 (WEA-4 E-160) 20:56	83 09:17 (WEA-4 E-160) 19:47	07:54 (WEA-4 E-160) 07:09	07:57	09:50 (WEA-3 E-160) 07:36	27 10:12 (WEA-1)	
18 05:34	99 09:14 (WEA-4 E-160) 20:54	82 09:16 (WEA-4 E-160) 19:45	07:54 (WEA-4 E-160) 07:09	07:59	50 09:15 (WEA-3 E-160) 16:23	27 10:12 (WEA-1)	
19 05:36	100 09:14 (WEA-4 E-160) 20:52	81 09:16 (WEA-4 E-160) 19:43	07:55 (WEA-4 E-160) 07:11	07:51	08:48 (WEA-3 E-160) 08:30	09:46 (WEA-1)	
20 05:37	101 09:14 (WEA-4 E-160) 20:50	79 09:14 (WEA-4 E-160) 19:40	07:55 (WEA-4 E-160) 07:13	07:51	09:36 (WEA-3 E-160) 16:25	27 10:12 (WEA-1)	
21 05:38	103 09:15 (WEA-4 E-160) 20:48	78 09:14 (WEA-4 E-160) 19:38	07:56 (WEA-4 E-160) 07:14	07:54	08:18 (WEA-2 E-138) 08:28	09:46 (WEA-1)	
22 05:40	104 09:15 (WEA-4 E-160) 20:46	77 09:14 (WEA-4 E-160) 19:36	07:56 (WEA-4 E-160) 07:16	07:54	09:41 (WEA-3 E-160) 16:25	27 10:12 (WEA-1)	
23 05:41	106 09:16 (WEA-4 E-160) 20:41	73 09:11 (WEA-4 E-160) 19:31	07:57 (WEA-4 E-160) 07:17	07:57	09:36 (WEA-3 E-160) 16:25	27 10:12 (WEA-1)	
24 05:42	105 09:16 (WEA-4 E-160) 20:39	72 09:10 (WEA-4 E-160) 19:29	07:57 (WEA-4 E-160) 07:17	07:57	47 10:21 (WEA-3 E-160) 16:42	27 10:12 (WEA-1)	
25 05:44	106 09:17 (WEA-4 E-160) 20:37	69 09:09 (WEA-4 E-160) 19:26	07:58 (WEA-4 E-160) 07:19	07:59	09:34 (WEA-3 E-160) 16:42	27 10:12 (WEA-1)	
26 05:45	106 09:17 (WEA-4 E-160) 20:36	69 09:09 (WEA-4 E-160) 19:26	07:58 (WEA-4 E-160) 07:19	07:59	47 10:21 (WEA-3 E-160) 16:42	27 10:12 (WEA-1)	
27 05:47	107 09:18 (WEA-4 E-160) 20:33	63 09:05 (WEA-4 E-160) 19:22	07:58 (WEA-4 E-160) 07:21	07:59	09:34 (WEA-3 E-160) 16:42	27 10:12 (WEA-1)	
28 05:48	107 09:18 (WEA-4 E-160) 20:31	61 09:03 (WEA-4 E-160) 19:20	07:58 (WEA-4 E-160) 07:21	07:59	48 10:22 (WEA-3 E-160) 16:41	27 10:12 (WEA-1)	
29 05:50	107 09:18 (WEA-4 E-160) 20:28	58 09:02 (WEA-4 E-160) 19:17	07:59 (WEA-4 E-160) 07:22	07:59	09:36 (WEA-3 E-160) 16:41	27 10:12 (WEA-1)	
30 05:51	106 06:20 (WEA-5 E-160) 06:40	54 08:05 (WEA-4 E-160) 07:31	07:59 (WEA-4 E-160) 07:22	07:59	25 09:10 (WEA-3 E-160) 16:23	29 10:15 (WEA-1)	
31 05:53	105 09:19 (WEA-4 E-160) 20:26	50 08:57 (WEA-4 E-160) 07:24	07:59 (WEA-4 E-160) 07:24	07:59	08:48 (WEA-3 E-160) 08:30	09:46 (WEA-1)	
Sonnenscheinstunden	501	453	381	332	267	244	876
astr.max.mögl.Beschattung	2859	2461	138	1241	734	876	0,15
Red.Sonnenscheinwahrsch.	0,41	0,43	0,36	0,32	0,23	0,15	0,15
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,68	0,68	0,68	0,57	0,57	0,57	0,57
Gesamte Reduktion	0,23	0,24	0,20	0,15	0,11	0,07	0,07
Met.wahrsch.Beschattung	669	588	28	185	79	61	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 39 - IP 39 Bannhorst 17

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1 08:40		09:11 (WEA02) 08:14	08:50 (WEA-01) 07:20	15:33 (WEA-3 E-160) 07:10	06:06	19:29 (WEA-4 E-160) 05:21	19:04 (WEA-4 E-160)
1 16:32	89	14:21 (WEA-1) 17:20	11:32 (WEA-2 E-138) 18:11	16:42 (WEA-3 E-160) 20:05	20:56	19:44 (WEA-4 E-160) 21:41	67 20:11 (WEA-4 E-160)
2 08:40		09:11 (WEA02) 08:12	08:49 (WEA-01) 07:18	15:33 (WEA-3 E-160) 07:08	06:04	19:25 (WEA-4 E-160) 05:20	19:03 (WEA-4 E-160)
1 16:33	90	14:21 (WEA-1) 17:22	11:30 (WEA-2 E-138) 18:13	16:42 (WEA-3 E-160) 20:07	20:57	19:48 (WEA-4 E-160) 21:42	68 20:11 (WEA-4 E-160)
3 08:40		09:11 (WEA02) 08:10	08:49 (WEA-01) 07:16	15:32 (WEA-3 E-160) 07:06	06:02	19:21 (WEA-4 E-160) 05:19	19:04 (WEA-4 E-160)
1 16:35	91	14:22 (WEA-1) 17:24	11:26 (WEA-2 E-138) 18:15	16:42 (WEA-3 E-160) 20:08	20:59	19:51 (WEA-4 E-160) 21:43	68 20:12 (WEA-4 E-160)
4 08:40		09:10 (WEA02) 08:09	08:49 (WEA-01) 07:14	15:32 (WEA-3 E-160) 07:03	06:00	19:20 (WEA-4 E-160) 05:18	19:04 (WEA-4 E-160)
1 16:36	90	14:21 (WEA-1) 17:25	09:14 (WEA-01) 18:17	16:42 (WEA-3 E-160) 20:10	21:01	19:54 (WEA-4 E-160) 21:44	68 20:12 (WEA-4 E-160)
5 08:39		09:10 (WEA02) 08:07	08:49 (WEA-01) 07:12	15:32 (WEA-3 E-160) 07:01	05:58	19:17 (WEA-4 E-160) 05:18	19:05 (WEA-4 E-160)
1 16:37	89	14:22 (WEA-1) 17:27	09:14 (WEA-01) 18:18	16:42 (WEA-3 E-160) 20:12	21:02	19:55 (WEA-4 E-160) 21:45	67 20:12 (WEA-4 E-160)
6 08:39		09:10 (WEA02) 08:06	08:31 (WEA05) 07:10	15:33 (WEA03) 06:59	05:56	19:15 (WEA-4 E-160) 05:17	19:05 (WEA-4 E-160)
1 16:38	90	14:22 (WEA-1) 17:29	09:14 (WEA-01) 18:20	16:42 (WEA-3 E-160) 20:13	21:04	19:56 (WEA-4 E-160) 21:46	67 20:12 (WEA-4 E-160)
7 08:39		09:09 (WEA02) 08:04	08:29 (WEA05) 07:07	15:32 (WEA-3 E-160) 06:56	05:55	19:14 (WEA-4 E-160) 05:16	19:05 (WEA-4 E-160)
1 16:39	92	14:22 (WEA-1) 17:31	09:14 (WEA-01) 18:22	16:41 (WEA-3 E-160) 20:15	21:06	19:58 (WEA-4 E-160) 21:47	68 20:13 (WEA-4 E-160)
8 08:38		09:08 (WEA02) 08:02	08:27 (WEA05) 07:05	15:32 (WEA03) 06:54	05:53	19:13 (WEA-4 E-160) 05:16	19:05 (WEA-4 E-160)
1 16:41	91	14:21 (WEA-1) 17:33	09:13 (WEA-01) 18:24	16:41 (WEA-3 E-160) 20:17	21:07	19:59 (WEA-4 E-160) 21:48	67 20:12 (WEA-4 E-160)
9 08:38		09:08 (WEA02) 08:00	08:25 (WEA05) 07:03	15:32 (WEA03) 06:52	05:51	19:11 (WEA-4 E-160) 05:15	19:05 (WEA-4 E-160)
1 16:42	89	14:21 (WEA-1) 17:35	09:13 (WEA-01) 18:26	16:41 (WEA-3 E-160) 20:19	21:09	20:00 (WEA-4 E-160) 21:49	68 20:13 (WEA-4 E-160)
10 08:37		09:07 (WEA02) 07:59	08:24 (WEA05) 07:01	15:32 (WEA03) 06:50	05:49	19:10 (WEA-4 E-160) 05:15	19:05 (WEA-4 E-160)
1 16:43	90	14:21 (WEA-1) 17:37	09:12 (WEA-01) 18:27	16:40 (WEA-3 E-160) 20:20	21:10	20:02 (WEA-4 E-160) 21:50	67 20:12 (WEA-4 E-160)
11 08:37		09:08 (WEA02) 07:57	08:27 (WEA05) 06:58	15:31 (WEA-3 E-160) 06:48	05:48	19:09 (WEA-4 E-160) 05:15	19:06 (WEA-4 E-160)
1 16:45	87	14:20 (WEA-1) 17:38	16:11 (WEA-3 E-160) 18:29	16:40 (WEA-3 E-160) 20:22	21:12	20:02 (WEA-4 E-160) 21:51	67 20:13 (WEA-4 E-160)
12 08:36		09:09 (WEA02) 07:55	08:53 (WEA-01) 06:56	15:32 (WEA-3 E-160) 06:45	05:46	19:09 (WEA-4 E-160) 05:14	19:06 (WEA-4 E-160)
1 16:46	85	14:20 (WEA-1) 17:40	16:19 (WEA-3 E-160) 18:31	16:40 (WEA-3 E-160) 20:24	21:14	20:03 (WEA-4 E-160) 21:51	67 20:13 (WEA-4 E-160)
13 08:35		09:05 (WEA02) 07:53	08:55 (WEA-01) 06:54	15:33 (WEA-3 E-160) 06:43	05:44	19:07 (WEA-4 E-160) 05:14	19:06 (WEA-4 E-160)
1 16:48	83	14:19 (WEA-1) 17:42	16:23 (WEA-3 E-160) 18:32	16:40 (WEA-3 E-160) 20:25	21:15	20:04 (WEA-4 E-160) 21:52	68 20:14 (WEA-4 E-160)
14 08:35		09:04 (WEA02) 07:51	08:58 (WEA-01) 06:52	15:32 (WEA-3 E-160) 06:41	05:43	19:07 (WEA-4 E-160) 05:14	19:07 (WEA-4 E-160)
1 16:49	81	14:18 (WEA-1) 17:44	16:26 (WEA-3 E-160) 18:34	16:38 (WEA-3 E-160) 20:27	21:17	20:05 (WEA-4 E-160) 21:52	67 20:14 (WEA-4 E-160)
15 08:34		09:03 (WEA02) 07:49	15:50 (WEA-3 E-160) 06:49	15:33 (WEA-3 E-160) 06:39	05:41	19:06 (WEA-4 E-160) 05:14	19:07 (WEA-4 E-160)
1 16:51	78	14:16 (WEA-1) 17:46	16:28 (WEA-3 E-160) 18:36	16:38 (WEA-3 E-160) 20:29	21:18	20:05 (WEA-4 E-160) 21:53	67 20:14 (WEA-4 E-160)
16 08:33		09:02 (WEA02) 07:47	15:48 (WEA-3 E-160) 06:47	15:32 (WEA03) 06:37	05:40	19:06 (WEA-4 E-160) 05:13	19:06 (WEA-4 E-160)
1 16:52	67	11:41 (WEA-2 E-138) 17:48	16:30 (WEA-3 E-160) 18:38	16:37 (WEA-3 E-160) 20:30	21:20	20:06 (WEA-4 E-160) 21:54	68 20:14 (WEA-4 E-160)
17 08:32		09:01 (WEA02) 07:45	15:46 (WEA-3 E-160) 06:45	15:32 (WEA03) 06:34	05:38	19:06 (WEA-4 E-160) 05:13	19:07 (WEA-4 E-160)
1 16:54	63	11:41 (WEA-2 E-138) 17:50	16:32 (WEA-3 E-160) 18:39	16:35 (WEA-3 E-160) 20:32	21:21	20:07 (WEA-4 E-160) 21:54	67 20:14 (WEA-4 E-160)
18 08:31		09:00 (WEA02) 07:43	15:44 (WEA-3 E-160) 06:42	15:32 (WEA03) 06:32	05:37	19:05 (WEA-4 E-160) 05:13	19:08 (WEA-4 E-160)
1 16:56	64	11:41 (WEA-2 E-138) 17:51	16:34 (WEA-3 E-160) 18:41	16:35 (WEA-3 E-160) 20:34	21:23	20:06 (WEA-4 E-160) 21:54	67 20:15 (WEA-4 E-160)
19 08:30		09:00 (WEA02) 07:41	15:42 (WEA-3 E-160) 06:40	15:32 (WEA03) 06:30	05:35	19:05 (WEA-4 E-160) 05:13	19:08 (WEA-4 E-160)
1 16:57	63	11:40 (WEA-2 E-138) 17:53	16:34 (WEA-3 E-160) 18:43	16:34 (WEA-3 E-160) 20:35	21:24	20:07 (WEA-4 E-160) 21:55	67 20:15 (WEA-4 E-160)
20 08:29		09:00 (WEA02) 07:39	15:48 (WEA04) 06:38	15:32 (WEA08) 06:28	05:34	19:04 (WEA-4 E-160) 05:13	19:08 (WEA-4 E-160)
1 16:59	64	11:40 (WEA-2 E-138) 17:55	16:35 (WEA-3 E-160) 18:45	16:32 (WEA-3 E-160) 20:37	21:26	20:08 (WEA-4 E-160) 21:55	67 20:15 (WEA-4 E-160)
21 08:28		09:00 (WEA02) 07:37	15:48 (WEA04) 06:35	15:32 (WEA08) 06:26	05:33	19:04 (WEA-4 E-160) 05:14	19:08 (WEA-4 E-160)
1 17:01	63	11:40 (WEA-2 E-138) 17:57	16:37 (WEA-3 E-160) 18:46	16:30 (WEA-3 E-160) 20:39	21:27	20:08 (WEA-4 E-160) 21:55	67 20:15 (WEA-4 E-160)
22 08:27		09:01 (WEA02) 07:35	15:48 (WEA04) 06:33	15:32 (WEA08) 06:24	05:31	19:03 (WEA-4 E-160) 05:14	19:08 (WEA-4 E-160)
1 17:02	63	11:41 (WEA-2 E-138) 17:59	16:38 (WEA-3 E-160) 18:48	16:29 (WEA-3 E-160) 20:41	21:28	20:08 (WEA-4 E-160) 21:56	67 20:15 (WEA-4 E-160)
23 08:26		09:01 (WEA02) 07:33	15:48 (WEA04) 06:31	15:32 (WEA08) 06:22	05:30	19:03 (WEA-4 E-160) 05:14	19:08 (WEA-4 E-160)
1 17:04	61	11:40 (WEA-2 E-138) 18:00	16:39 (WEA-3 E-160) 18:50	16:27 (WEA-3 E-160) 20:42	21:30	20:08 (WEA-4 E-160) 21:56	67 20:15 (WEA-4 E-160)
24 08:25		09:02 (WEA02) 07:31	15:42 (WEA04) 06:29	15:32 (WEA08) 06:20	05:29	19:03 (WEA-4 E-160) 05:14	19:09 (WEA-4 E-160)
1 17:06	59	11:40 (WEA-2 E-138) 18:02	16:40 (WEA-3 E-160) 18:51	16:25 (WEA-3 E-160) 20:44	21:31	20:09 (WEA-4 E-160) 21:56	67 20:16 (WEA-4 E-160)
25 08:23		09:03 (WEA02) 07:29	15:48 (WEA04) 06:26	15:32 (WEA08) 06:18	05:28	19:03 (WEA-4 E-160) 05:15	19:09 (WEA-4 E-160)
1 17:07	57	11:40 (WEA-2 E-138) 18:04	16:40 (WEA-3 E-160) 18:53	16:23 (WEA-3 E-160) 20:46	21:33	20:09 (WEA-4 E-160) 21:56	67 20:16 (WEA-4 E-160)
26 08:22		08:58 (WEA-01) 07:27	15:35 (WEA-3 E-160) 06:24	15:32 (WEA08) 06:15	05:27	19:03 (WEA-4 E-160) 05:15	19:09 (WEA-4 E-160)
1 17:09	58	11:39 (WEA-2 E-138) 18:06	16:40 (WEA-3 E-160) 18:55	16:19 (WEA-3 E-160) 20:47	21:34	20:09 (WEA-4 E-160) 21:56	68 20:17 (WEA-4 E-160)
27 08:21		08:55 (WEA-01) 07:25	15:34 (WEA-3 E-160) 06:22	15:54 (WEA-3 E-160) 06:13	05:25	19:03 (WEA-4 E-160) 05:15	19:09 (WEA-4 E-160)
1 17:11	59	11:38 (WEA-2 E-138) 18:08	16:41 (WEA-3 E-160) 18:57	16:15 (WEA-3 E-160) 20:49	21:35	20:10 (WEA-4 E-160) 21:56	68 20:17 (WEA-4 E-160)
28 08:19		08:53 (WEA-01) 07:23	15:34 (WEA-3 E-160) 06:19	16:02 (WEA-3 E-160) 20:51	21:36	20:10 (WEA-4 E-160) 21:56	67 20:17 (WEA-4 E-160)
1 17:13	58	11:37 (WEA-2 E-138) 18:10	16:41 (WEA-3 E-160) 18:58	16:08 (WEA-3 E-160) 20:51	21:36	20:10 (WEA-4 E-160) 21:56	67 20:17 (WEA-4 E-160)
29 08:18		08:52 (WEA-01) 07:21	15:48 (WEA04) 06:17	15:32 (WEA08) 06:10	05:23	19:03 (WEA-4 E-160) 05:16	19:10 (WEA-4 E-160)
1 17:15	54	11:37 (WEA-2 E-138) 18:11	16:40 (WEA-3 E-160) 18:59	16:08 (WEA-3 E-160) 20:52	21:38	20:10 (WEA-4 E-160) 21:56	67 20:17 (WEA-4 E-160)
30 08:17		08:51 (WEA-01) 07:19	15:48 (WEA04) 06:15	15:32 (WEA08) 06:08	05:22	19:04 (WEA-4 E-160) 05:17	19:10 (WEA-4 E-160)
1 17:16	53	11:35 (WEA-2 E-138) 18:12	16:40 (WEA-3 E-160) 18:59	16:08 (WEA-3 E-160) 20:54	21:39	20:11 (WEA-4 E-160) 21:55	68 20:18 (WEA-4 E-160)
31 08:15		08:50 (WEA-01) 07:17	15:48 (WEA04) 06:12	15:32 (WEA08) 06:07	05:22	19:04 (WEA-4 E-160) 05:17	19:10 (WEA-4 E-160)
1 17:18	51	11:33 (WEA-2 E-138) 18:13	16:40 (WEA-3 E-160) 18:59	16:08 (WEA-3 E-160) 20:54	21:40	20:11 (WEA-4 E-160) 21:55	68 20:18 (WEA-4 E-160)
Sonnenscheinstunden	259	278	367	416	485	498	2020
astr.max.mögl.Beschattung	2272	1298	1783	1688	1688	2020	
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,46	0,46	0,36	
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	
Reduktion Windrichtung	0,58	0,67	0,71	0,62	0,62	0,62	
Gesamte Reduktion	0,09	0,17	0,18	0,24	0,24	0,19	
Met.wahrsch.Beschattung	213	221	315	399	399	378	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 39 - IP 39 Bannhorst 17

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18	19:10 (WEA-4 E-160) 05:54	19:19 (WEA-4 E-160) 06:43	07:32	16:11 (WEA-3 E-160) 07:26	07:54 (WEA05) 08:16	08:50 (WEA02)					
2	05:18	20:17 (WEA-4 E-160) 21:23	20:13 (WEA-4 E-160) 20:22	19:13	17:19 (WEA-3 E-160) 17:07	08:42 (WEA-01) 16:27	14:02 (WEA-1)					
3	05:19	19:11 (WEA-4 E-160) 05:57	19:21 (WEA-4 E-160) 06:47	07:35	16:11 (WEA-3 E-160) 07:27	07:55 (WEA05) 08:18	08:51 (WEA-1)					
4	05:20	20:18 (WEA-4 E-160) 21:20	20:12 (WEA-4 E-160) 20:17	19:10	17:19 (WEA-3 E-160) 17:05	08:42 (WEA-01) 16:26	14:04 (WEA-1)					
5	05:21	19:10 (WEA-4 E-160) 06:00	19:22 (WEA-4 E-160) 06:48	07:37	16:11 (WEA-3 E-160) 07:29	07:57 (WEA05) 08:19	08:51 (WEA02)					
6	05:21	20:18 (WEA-4 E-160) 21:17	20:08 (WEA-4 E-160) 20:13	19:07	17:18 (WEA-3 E-160) 17:03	08:43 (WEA-01) 16:25	14:04 (WEA-1)					
7	05:22	19:11 (WEA-4 E-160) 06:02	19:24 (WEA-4 E-160) 06:51	07:40	16:06 (WEA-3 E-160) 07:45	08:23 (WEA-01) 08:23	08:50 (WEA02)					
8	05:23	20:19 (WEA-4 E-160) 21:13	20:05 (WEA-4 E-160) 20:08	18:59	17:17 (WEA-3 E-160) 16:56	08:44 (WEA-01) 16:23	14:09 (WEA-1)					
9	05:24	19:12 (WEA-4 E-160) 06:06	19:29 (WEA-4 E-160) 06:56	07:45	16:07 (WEA-3 E-160) 07:42	08:20 (WEA-01) 08:26	08:58 (WEA02)					
10	05:25	20:19 (WEA-4 E-160) 21:08	20:04 (WEA-4 E-160) 20:04	18:57	17:17 (WEA-3 E-160) 16:54	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
11	05:26	19:12 (WEA-4 E-160) 06:08	19:32 (WEA-4 E-160) 06:58	07:47	16:07 (WEA-3 E-160) 07:42	08:21 (WEA-01) 08:28	09:00 (WEA02)					
12	05:27	20:19 (WEA-4 E-160) 21:06	20:01 (WEA-4 E-160) 20:01	18:52	17:17 (WEA-3 E-160) 16:51	08:22 (WEA-01) 08:29	14:12 (WEA-1)					
13	05:28	19:12 (WEA-4 E-160) 06:11	19:40 (WEA-4 E-160) 07:01	07:51	16:06 (WEA-3 E-160) 07:43	08:23 (WEA-01) 08:30	09:03 (WEA02)					
14	05:29	20:19 (WEA-4 E-160) 21:04	19:50 (WEA-4 E-160) 19:57	18:48	17:15 (WEA-3 E-160) 16:48	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
15	05:30	19:12 (WEA-4 E-160) 06:14	19:57 (WEA-4 E-160) 07:03	07:52	16:07 (WEA-3 E-160) 07:47	08:23 (WEA-01) 08:31	09:04 (WEA02)					
16	05:32	20:20 (WEA-4 E-160) 21:02	20:02 (WEA-4 E-160) 20:02	18:46	17:15 (WEA-3 E-160) 16:47	08:31 (WEA-01) 08:34	14:13 (WEA-1)					
17	05:33	19:13 (WEA-4 E-160) 06:19	19:59 (WEA-4 E-160) 07:09	07:54	16:07 (WEA-3 E-160) 07:49	08:25 (WEA-01) 08:32	09:05 (WEA02)					
18	05:34	20:19 (WEA-4 E-160) 20:54	19:45 (WEA-4 E-160) 19:45	18:43	17:14 (WEA-3 E-160) 16:45	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
19	05:36	19:13 (WEA-4 E-160) 06:21	19:43 (WEA-4 E-160) 19:43	07:56	16:07 (WEA-3 E-160) 07:50	08:27 (WEA-01) 08:33	09:06 (WEA02)					
20	05:37	20:19 (WEA-4 E-160) 20:58	19:50 (WEA-4 E-160) 19:50	18:41	17:15 (WEA-3 E-160) 16:44	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
21	05:38	19:13 (WEA-4 E-160) 06:18	19:48 (WEA-4 E-160) 19:48	07:57	16:07 (WEA-3 E-160) 07:52	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
22	05:40	20:19 (WEA-4 E-160) 20:48	19:43 (WEA-4 E-160) 19:43	07:57 (WEA08) 07:59	17:12 (WEA-3 E-160) 16:42	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
23	05:41	19:14 (WEA-4 E-160) 06:24	19:40 (WEA-4 E-160) 19:40	07:58	16:07 (WEA-3 E-160) 07:52	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
24	05:42	20:19 (WEA-4 E-160) 20:48	19:38 (WEA-4 E-160) 19:38	07:59	17:13 (WEA-3 E-160) 16:37	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
25	05:44	19:14 (WEA-4 E-160) 06:26	19:36 (WEA-4 E-160) 19:36	07:59 (WEA08) 08:01	17:07 (WEA-3 E-160) 16:37	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
26	05:45	20:19 (WEA-4 E-160) 20:46	19:33 (WEA-4 E-160) 19:33	08:01	17:14 (WEA-3 E-160) 16:30	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
27	05:47	19:14 (WEA-4 E-160) 06:27	19:29 (WEA-4 E-160) 19:29	08:02	17:09 (WEA-3 E-160) 16:37	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
28	05:48	20:18 (WEA-4 E-160) 20:44	19:17 (WEA-4 E-160) 19:17	08:03	17:05 (WEA-3 E-160) 16:35	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
29	05:49	19:14 (WEA-4 E-160) 06:29	19:19 (WEA-4 E-160) 19:19	08:04	17:10 (WEA-3 E-160) 16:38	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
30	05:51	20:19 (WEA-4 E-160) 20:41	19:13 (WEA-4 E-160) 19:13	08:04	17:04 (WEA-3 E-160) 16:34	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
31	05:52	19:15 (WEA-4 E-160) 06:30	19:11 (WEA-4 E-160) 19:11	08:05	16:14 (WEA-3 E-160) 16:06	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
	21:25	20:14 (WEA-4 E-160) 20:24	19:15 (WEA-4 E-160) 19:15	08:06	15:47 (WEA-3 E-160) 16:27	08:31 (WEA-01) 08:34	14:14 (WEA-1)					
	Sonnenscheinstunden 501	453	381	332	267	244	244					
	astr.max.mögl.Beschattung 2010	461	892	1897	1611	2718	2718					
	Red.Sonnenscheinwahrsch. 0,41	0,43	0,36	0,32	0,23	0,15	0,15					
	Reduktion Betriebsdauer 0,84	0,84	0,84	0,84	0,84	0,84	0,84					
	Reduktion Windrichtung 0,62	0,62	0,71	0,71	0,57	0,59	0,59					
	Gesamte Reduktion 0,21	0,22	0,21	0,19	0,11	0,07	0,07					
	Met.wahrsch.Beschattung 430	102	190	355	174	198	198					

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 40 - IP 40 Kips Esch 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	09:22 (WEA09) 08:14	08:41 (WEA05) 07:20	07:10	07:57 (WEA08) 06:06	19:34 (WEA-4 E-160) 05:21	
2	16:32 70	14:30 (WEA-2 E-138) 17:20 133	16:13 (WEA-1) 18:11	20:05 50	18:45 (WEA-3 E-160) 20:56 36	20:10 (WEA-4 E-160) 21:41	
3	08:40	09:23 (WEA09) 08:12	08:41 (WEA05) 07:18	07:08	07:56 (WEA08) 06:04	19:33 (WEA-4 E-160) 05:20	
4	16:33 69	14:30 (WEA-2 E-138) 17:22 130	16:13 (WEA-1) 18:13	20:07 46	18:42 (WEA-3 E-160) 20:57 37	20:10 (WEA-4 E-160) 21:42	
5	08:40	09:23 (WEA09) 08:10	08:41 (WEA05) 07:16	07:06	07:57 (WEA08) 06:02	19:32 (WEA-4 E-160) 05:19	
6	16:35 70	14:31 (WEA-2 E-138) 17:24 127	16:12 (WEA-1) 18:15	20:08 39	18:40 (WEA-3 E-160) 20:59 38	20:10 (WEA-4 E-160) 21:43	
7	08:40	09:23 (WEA09) 08:09	08:42 (WEA05) 07:14	07:03	07:59 (WEA08) 06:00	19:33 (WEA-4 E-160) 05:18	
8	16:36 71	14:31 (WEA-2 E-138) 17:25 121	16:12 (WEA-1) 18:17	20:10 30	18:37 (WEA-3 E-160) 21:01 37	20:10 (WEA-4 E-160) 21:44	
9	08:39	09:24 (WEA09) 08:07	08:44 (WEA05) 07:12	07:01	08:02 (WEA08) 05:58	19:32 (WEA-4 E-160) 05:18	
10	16:37 72	14:33 (WEA-2 E-138) 17:27 113	16:12 (WEA-1) 18:18	20:12 8	08:10 (WEA08) 21:02 38	20:10 (WEA-4 E-160) 21:45	
11	08:39	09:25 (WEA09) 08:05	09:34 (WEA-01) 07:09	07:38 (WEA03) 06:59	07:33 (WEA03) 06:59	19:32 (WEA-4 E-160) 05:17	
12	16:38 72	14:34 (WEA-2 E-138) 17:29 99	16:11 (WEA-1) 18:20	20:13 8	07:41 (WEA03) 20:13	20:10 (WEA-4 E-160) 21:46	
13	08:39	09:25 (WEA09) 08:04	09:35 (WEA-01) 07:07	07:30 (WEA03) 06:56	07:30 (WEA03) 06:56	19:32 (WEA-4 E-160) 05:16	
14	16:39 73	14:34 (WEA-2 E-138) 17:31 93	16:10 (WEA-1) 18:22 12	20:15 12	07:42 (WEA03) 20:15	21:05 37	20:09 (WEA-4 E-160) 21:47
15	08:38	09:25 (WEA09) 08:02	09:37 (WEA-01) 07:05	07:28 (WEA03) 06:54	07:28 (WEA03) 06:54	19:32 (WEA-4 E-160) 05:16	
16	16:41 75	14:34 (WEA-2 E-138) 17:33 85	16:09 (WEA-1) 18:24 14	20:17 14	07:42 (WEA03) 20:17	21:07 38	20:10 (WEA-4 E-160) 21:48
17	08:38	09:26 (WEA09) 08:00	09:40 (WEA-01) 07:03	07:28 (WEA03) 06:52	07:28 (WEA03) 06:52	19:32 (WEA-4 E-160) 05:15	
18	16:42 77	14:36 (WEA-2 E-138) 17:35 72	16:07 (WEA-1) 18:25 15	20:19 15	07:43 (WEA03) 20:19	21:09 37	20:09 (WEA-4 E-160) 21:49
19	08:37	09:26 (WEA09) 07:59	13:57 (WEA-2 E-138) 07:01	07:27 (WEA03) 06:50	07:27 (WEA03) 06:50	19:33 (WEA-4 E-160) 05:15	
20	16:43 78	14:36 (WEA-2 E-138) 17:37 53	16:05 (WEA-1) 18:27 29	20:20 29	17:42 (WEA-3 E-160) 20:20	21:10 36	20:09 (WEA-4 E-160) 21:50
21	08:37	09:27 (WEA09) 07:57	14:00 (WEA-2 E-138) 06:58	07:27 (WEA03) 06:48	07:27 (WEA03) 06:48	19:33 (WEA-4 E-160) 05:15	
22	16:45 79	14:36 (WEA-2 E-138) 17:38 37	16:00 (WEA-1) 18:29 37	20:22 37	17:46 (WEA-3 E-160) 20:22	21:12 36	20:09 (WEA-4 E-160) 21:50
23	08:36	09:27 (WEA09) 07:55	14:02 (WEA-2 E-138) 06:56	07:28 (WEA03) 06:45	07:28 (WEA03) 06:45	19:34 (WEA-4 E-160) 05:14	
24	16:46 81	14:37 (WEA-2 E-138) 17:40 31	14:33 (WEA-2 E-138) 18:31 39	20:24 39	17:48 (WEA-3 E-160) 20:24	21:13 35	20:09 (WEA-4 E-160) 21:51
25	08:35	09:28 (WEA-01) 07:53	14:05 (WEA-2 E-138) 06:54	07:29 (WEA03) 06:43	07:29 (WEA03) 06:43	19:34 (WEA-4 E-160) 05:14	
26	16:48 92	15:57 (WEA-1) 17:42 25	14:30 (WEA-2 E-138) 18:32 41	20:25 41	17:50 (WEA-3 E-160) 20:25	21:15 34	20:08 (WEA-4 E-160) 21:52
27	08:35	09:28 (WEA-01) 07:51	14:09 (WEA-2 E-138) 06:51	07:31 (WEA03) 06:41	07:31 (WEA03) 06:41	19:35 (WEA-4 E-160) 05:14	
28	16:49 96	15:59 (WEA-1) 17:44 18	14:27 (WEA-2 E-138) 18:34 38	20:27 38	17:51 (WEA-3 E-160) 20:27	21:17 33	20:08 (WEA-4 E-160) 21:52
29	08:34	09:28 (WEA-01) 07:49	08:14 (WEA04) 06:49	07:17 (WEA-3 E-160) 06:39	07:17 (WEA-3 E-160) 06:39	19:35 (WEA-4 E-160) 05:14	
30	16:51 100	16:01 (WEA-1) 17:46 2	08:16 (WEA04) 18:36 35	20:29 35	17:52 (WEA-3 E-160) 20:29	21:18 31	20:06 (WEA-4 E-160) 21:53
31	08:33	09:27 (WEA-01) 07:47	08:12 (WEA04) 06:47	07:16 (WEA-3 E-160) 06:37	07:16 (WEA-3 E-160) 06:37	19:36 (WEA-4 E-160) 05:13	
32	16:52 106	16:03 (WEA-1) 17:48 6	08:18 (WEA04) 18:38 37	20:30 37	17:53 (WEA-3 E-160) 20:30	21:20 30	20:06 (WEA-4 E-160) 21:54
33	08:32	09:27 (WEA-01) 07:45	08:10 (WEA04) 06:45	07:14 (WEA-3 E-160) 06:34	07:14 (WEA-3 E-160) 06:34	19:37 (WEA-4 E-160) 05:13	
34	16:54 110	16:04 (WEA-1) 17:49 9	08:19 (WEA04) 18:39 39	20:32 39	17:53 (WEA-3 E-160) 20:32	21:21 29	20:06 (WEA-4 E-160) 21:54
35	08:31	09:27 (WEA-01) 07:43	08:07 (WEA04) 06:42	07:13 (WEA-3 E-160) 06:32	07:13 (WEA-3 E-160) 06:32	19:37 (WEA-4 E-160) 05:13	
36	16:56 112	16:05 (WEA-1) 17:51 12	08:19 (WEA04) 18:41 40	20:34 40	17:53 (WEA-3 E-160) 20:34	21:23 27	20:04 (WEA-4 E-160) 21:54
37	08:30	09:26 (WEA-01) 07:41	08:05 (WEA04) 06:40	07:13 (WEA-3 E-160) 06:30	07:13 (WEA-3 E-160) 06:30	19:38 (WEA-4 E-160) 05:13	
38	16:57 116	16:06 (WEA-1) 17:53 14	08:19 (WEA04) 18:43 41	20:35 41	17:54 (WEA-3 E-160) 20:35	21:24 26	20:04 (WEA-4 E-160) 21:55
39	08:29	09:26 (WEA-01) 07:39	08:06 (WEA04) 06:38	07:12 (WEA-3 E-160) 06:28	07:12 (WEA-3 E-160) 06:28	19:38 (WEA-4 E-160) 05:13	
40	16:59 118	16:07 (WEA-1) 17:55 13	08:19 (WEA04) 18:45 41	20:37 41	17:53 (WEA-3 E-160) 20:37	21:26 23	20:03 (WEA-4 E-160) 21:55
41	08:28	09:26 (WEA-01) 07:37	08:06 (WEA04) 06:35	07:11 (WEA-3 E-160) 06:26	07:11 (WEA-3 E-160) 06:26	19:41 (WEA-4 E-160) 05:14	
42	17:00 120	16:08 (WEA-1) 17:57 13	08:19 (WEA04) 18:46 42	20:39 42	17:53 (WEA-3 E-160) 20:39	21:27 21	20:02 (WEA-4 E-160) 21:55
43	08:27	09:27 (WEA-01) 07:35	08:07 (WEA04) 06:33	07:08 (WEA08) 06:24	07:08 (WEA08) 06:24	19:42 (WEA-4 E-160) 05:14	
44	17:02 122	16:09 (WEA-1) 17:59 11	08:18 (WEA04) 18:48 48	20:41 48	17:54 (WEA-3 E-160) 20:41	21:28 18	20:00 (WEA-4 E-160) 21:56
45	08:26	09:26 (WEA-01) 07:33	08:08 (WEA04) 06:31	07:03 (WEA08) 06:22	07:03 (WEA08) 06:22	19:43 (WEA-4 E-160) 05:14	
46	17:04 122	16:09 (WEA-1) 18:00 9	08:17 (WEA04) 18:50 56	20:42 56	17:53 (WEA-3 E-160) 20:42	21:30 14	19:58 (WEA-4 E-160) 21:56
47	08:25	09:27 (WEA-01) 07:31	08:11 (WEA04) 06:29	07:01 (WEA08) 06:20	07:01 (WEA08) 06:20	19:41 (WEA-4 E-160) 05:14	
48	17:06 125	16:11 (WEA-1) 18:02 3	08:14 (WEA04) 18:51 58	20:44 58	17:53 (WEA-3 E-160) 20:44	21:31 9	19:47 (WEA-4 E-160) 21:56
49	08:23	09:27 (WEA-01) 07:29	08:06 (WEA04) 06:26	07:00 (WEA08) 06:18	07:00 (WEA08) 06:18	19:39 (WEA-4 E-160) 05:13	
50	17:07 126	16:12 (WEA-1) 18:04 60	18:53 60	20:46 60	17:52 (WEA-3 E-160) 20:46	21:33 26	20:05 (WEA-4 E-160) 21:56
51	08:22	09:27 (WEA-01) 07:27	08:06 (WEA04) 06:24	06:58 (WEA08) 06:15	06:58 (WEA08) 06:15	19:38 (WEA-4 E-160) 05:13	
52	17:09 126	16:12 (WEA-1) 18:06 62	18:55 62	20:47 62	17:51 (WEA-3 E-160) 20:47	21:34 28	20:06 (WEA-4 E-160) 21:56
53	08:21	08:48 (WEA05) 07:25	08:06 (WEA04) 06:22	06:57 (WEA08) 06:13	06:57 (WEA08) 06:13	19:36 (WEA-4 E-160) 05:13	
54	17:11 129	16:13 (WEA-1) 18:08 62	18:56 62	20:49 62	17:51 (WEA-3 E-160) 20:49	21:35 31	20:07 (WEA-4 E-160) 21:56
55	08:19	08:46 (WEA05) 07:23	08:06 (WEA04) 06:21	06:57 (WEA08) 06:11	06:57 (WEA08) 06:11	19:35 (WEA-4 E-160) 05:14	
56	17:13 130	16:12 (WEA-1) 18:10 61	18:58 61	20:51 61	17:50 (WEA-3 E-160) 20:51	21:36 33	20:08 (WEA-4 E-160) 21:56
57	08:18	08:45 (WEA05) 07:21	08:07 (WEA04) 06:23	07:17 (WEA08) 06:10	07:17 (WEA08) 06:10	19:35 (WEA-4 E-160) 05:13	
58	17:14 132	16:13 (WEA-1) 18:09 60	18:49 60	20:52 60	18:49 (WEA-3 E-160) 20:52	21:38 34	20:09 (WEA-4 E-160) 21:56
59	08:17	08:43 (WEA05) 07:15	07:15 (WEA08) 06:08	07:56 (WEA08) 06:08	07:56 (WEA08) 06:08	19:34 (WEA-4 E-160) 05:13	
60	17:16 134	16:13 (WEA-1) 18:08 57	18:47 57	20:54 57	18:47 (WEA-3 E-160) 20:54	21:39 36	20:10 (WEA-4 E-160) 21:55
61	08:15	08:41 (WEA05) 07:12	07:12 (WEA08) 06:08	07:56 (WEA08) 06:08	07:56 (WEA08) 06:08	19:34 (WEA-4 E-160) 05:13	
62	17:18 135	16:13 (WEA-1) 18:10 54	18:46 54	20:54 54	18:46 (WEA-3 E-160) 20:54	21:40 36	20:10 (WEA-4 E-160) 21:55
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	3138	1229	1089	417	738		
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46		
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84		
Reduktion Windrichtung	0,64	0,64	0,68	0,65	0,62		
Gesamte Reduktion	0,10	0,16	0,17	0,22	0,24		
Met.wahrsch.Beschattung	328	202	186	92	176		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 40 - IP 40 Kips Esch 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember						
1	05:18	05:54	19:44 (WEA-4 E-160) 06:43	07:32	08:07 (WEA03) 07:26	09:14 (WEA-01) 08:16	09:09 (WEA09)					
2	21:55	21:23	35 20:19 (WEA-4 E-160) 20:22	19:13	40 18:28 (WEA-3 E-160) 17:07	56 15:35 (WEA-1) 16:27	78 14:18 (WEA-2 E-138)					
3	05:19	05:55	19:43 (WEA-4 E-160) 06:45	07:34	08:06 (WEA03) 07:27	09:09 (WEA-01) 08:18	09:09 (WEA09)					
4	21:54	21:22	36 20:19 (WEA-4 E-160) 20:19	19:10	38 18:26 (WEA-3 E-160) 17:05	74 15:37 (WEA-1) 16:26	78 14:19 (WEA-2 E-138)					
5	05:20	05:59	19:42 (WEA-4 E-160) 06:48	07:35	08:05 (WEA03) 07:29	09:06 (WEA-01) 08:19	09:09 (WEA09)					
6	21:54	21:18	38 20:20 (WEA-4 E-160) 20:15	19:08	33 18:22 (WEA-3 E-160) 17:03	87 15:39 (WEA-1) 16:25	77 14:19 (WEA-2 E-138)					
7	05:21	06:00	19:42 (WEA-4 E-160) 06:50	07:39	08:05 (WEA03) 07:33	09:03 (WEA-01) 08:22	09:10 (WEA09)					
8	21:54	21:17	37 20:19 (WEA-4 E-160) 20:13	19:03	15 18:20 (WEA03) 17:00	101 15:41 (WEA-1) 16:24	74 14:19 (WEA-2 E-138)					
9	05:21	06:02	19:42 (WEA-4 E-160) 06:51	07:40	08:06 (WEA03) 07:35	08:13 (WEA05) 08:23	09:10 (WEA09)					
10	21:53	21:15	38 20:20 (WEA-4 E-160) 20:10	19:01	13 18:19 (WEA03) 16:58	116 15:42 (WEA-1) 16:24	72 14:19 (WEA-2 E-138)					
11	05:22	06:03	19:41 (WEA-4 E-160) 06:53	07:42	08:07 (WEA03) 07:36	08:07 (WEA03) 08:24	09:11 (WEA09)					
12	21:52	21:13	38 20:19 (WEA-4 E-160) 20:08	7 08:04 (WEA08) 18:59	10 08:17 (WEA03) 16:56	122 15:43 (WEA-1) 16:23	72 14:20 (WEA-2 E-138)					
13	05:23	06:05	19:42 (WEA-4 E-160) 06:55	07:44	08:09 (WEA03) 07:38	08:12 (WEA05) 08:26	09:11 (WEA09)					
14	21:52	21:11	38 20:20 (WEA-4 E-160) 20:06	29 18:31 (WEA-3 E-160) 18:57	6 08:15 (WEA03) 16:54	126 15:43 (WEA-1) 16:23	72 14:20 (WEA-2 E-138)					
15	05:24	06:06	19:41 (WEA-4 E-160) 06:56	07:45	07:46 (WEA08) 18:57	07:45	08:15 (WEA05) 08:30	09:14 (WEA09)				
16	21:51	21:09	38 20:19 (WEA-4 E-160) 20:04	17 18:34 (WEA-3 E-160) 18:54	16:53	131 15:44 (WEA-1) 16:23	71 14:20 (WEA-2 E-138)					
17	05:25	06:08	19:42 (WEA-4 E-160) 06:58	07:47	07:50 (WEA08) 18:57	07:47	08:11 (WEA05) 08:28	09:12 (WEA09)				
18	21:50	21:08	37 20:19 (WEA-4 E-160) 20:01	45 18:38 (WEA-3 E-160) 18:52	16:51	133 15:44 (WEA-1) 16:23	71 14:20 (WEA-2 E-138)					
19	05:26	06:10	19:42 (WEA-4 E-160) 07:00	07:49	07:43	08:13 (WEA05) 08:29	09:13 (WEA09)					
20	21:50	21:06	36 20:18 (WEA-4 E-160) 19:59	50 18:37 (WEA-3 E-160) 18:50	16:50	135 15:45 (WEA-1) 16:22	70 14:21 (WEA-2 E-138)					
21	05:27	06:11	19:42 (WEA-4 E-160) 07:01	07:47	07:45	08:15 (WEA05) 08:30	09:14 (WEA09)					
22	21:49	21:04	36 20:18 (WEA-4 E-160) 19:57	54 18:37 (WEA-3 E-160) 18:48	16:48	133 15:45 (WEA-1) 16:22	69 14:21 (WEA-2 E-138)					
23	05:28	06:13	19:42 (WEA-4 E-160) 07:03	07:47	07:47	08:16 (WEA05) 08:31	09:14 (WEA09)					
24	21:48	21:02	35 20:17 (WEA-4 E-160) 19:54	57 18:38 (WEA-3 E-160) 18:46	16:47	132 15:44 (WEA-1) 16:22	68 14:21 (WEA-2 E-138)					
25	05:30	06:14	19:43 (WEA-4 E-160) 07:04	07:47	07:49	08:18 (WEA05) 08:32	09:15 (WEA09)					
26	21:47	21:00	34 20:17 (WEA-4 E-160) 19:52	59 18:39 (WEA-3 E-160) 18:43	16:45	130 15:44 (WEA-1) 16:22	67 14:21 (WEA-2 E-138)					
27	05:31	06:16	19:43 (WEA-4 E-160) 07:06	07:46	07:50	08:20 (WEA05) 08:33	09:14 (WEA09)					
28	21:46	20:58	32 20:15 (WEA-4 E-160) 19:50	61 18:39 (WEA-3 E-160) 18:41	16:44	127 15:44 (WEA-1) 16:22	68 14:21 (WEA-2 E-138)					
29	05:32	06:18	19:44 (WEA-4 E-160) 07:08	07:47	07:52	09:00 (WEA-01) 08:34	09:15 (WEA09)					
30	21:45	20:56	31 20:15 (WEA-4 E-160) 19:47	62 18:40 (WEA-3 E-160) 18:39	16:42	126 15:45 (WEA-1) 16:22	67 14:21 (WEA-2 E-138)					
31	05:33	06:19	19:44 (WEA-4 E-160) 07:09	07:46	07:54	09:00 (WEA-01) 08:34	09:16 (WEA09)					
1	21:44	20:54	29 20:13 (WEA-4 E-160) 19:45	61 18:39 (WEA-3 E-160) 18:37	16:41	126 15:45 (WEA-1) 16:23	66 14:22 (WEA-2 E-138)					
2	05:34	06:21	19:46 (WEA-4 E-160) 07:11	07:47	07:56	09:01 (WEA-01) 08:35	09:16 (WEA09)					
3	21:43	20:52	26 20:12 (WEA-4 E-160) 19:43	61 18:40 (WEA-3 E-160) 18:35	6 08:41 (WEA04) 16:40	125 15:45 (WEA-1) 16:23	66 14:22 (WEA-2 E-138)					
4	05:36	19:58 (WEA-4 E-160)	06:22	19:47 (WEA-4 E-160) 07:12	07:48	07:57	09:01 (WEA-01) 08:36	09:16 (WEA09)				
5	21:42	6 20:04 (WEA-4 E-160)	20:50	23 20:10 (WEA-4 E-160) 19:40	59 18:40 (WEA-3 E-160) 18:33	10 08:49 (WEA04) 16:38	122 15:44 (WEA-1) 16:23	66 14:22 (WEA-2 E-138)				
6	05:37	19:56 (WEA-4 E-160)	06:24	19:49 (WEA-4 E-160) 07:14	07:49	07:59	09:02 (WEA-01) 08:37	09:17 (WEA09)				
7	21:41	12 20:08 (WEA-4 E-160)	20:48	19 20:08 (WEA-4 E-160) 19:38	56 18:39 (WEA-3 E-160) 18:30	12 08:50 (WEA04) 16:37	122 15:44 (WEA-1) 16:24	66 14:23 (WEA-2 E-138)				
8	05:38	19:54 (WEA-4 E-160)	06:26	19:51 (WEA-4 E-160) 07:16	50 18:39 (WEA-3 E-160) 18:28	14 08:36 (WEA04) 16:36	120 15:43 (WEA-1) 16:24	66 14:24 (WEA-2 E-138)				
9	21:39	16 20:10 (WEA-4 E-160)	20:46	13 20:04 (WEA-4 E-160) 19:36	50 18:39 (WEA-3 E-160) 18:28	14 08:36 (WEA04) 16:35	118 15:43 (WEA-1) 16:24	66 14:24 (WEA-2 E-138)				
10	05:40	19:52 (WEA-4 E-160)	06:27	19:47 (WEA-4 E-160) 07:17	42 18:38 (WEA-3 E-160) 18:26	14 08:36 (WEA04) 16:34	116 15:43 (WEA-1) 16:25	66 14:25 (WEA-2 E-138)				
11	21:38	19:50 (WEA-4 E-160)	20:44	19:33	42 18:38 (WEA-3 E-160) 18:24	14 08:36 (WEA04) 16:34	116 15:43 (WEA-1) 16:25	66 14:25 (WEA-2 E-138)				
12	05:41	22 20:12 (WEA-4 E-160)	20:41	19:31	42 18:38 (WEA-3 E-160) 18:24	14 08:36 (WEA04) 16:34	116 15:43 (WEA-1) 16:25	66 14:25 (WEA-2 E-138)				
13	21:37	19:50 (WEA-4 E-160)	20:41	19:31	42 18:38 (WEA-3 E-160) 18:24	14 08:36 (WEA04) 16:34	116 15:43 (WEA-1) 16:25	66 14:25 (WEA-2 E-138)				
14	05:42	19:50 (WEA-4 E-160)	20:41	19:31	42 18:38 (WEA-3 E-160) 18:24	14 08:36 (WEA04) 16:34	116 15:43 (WEA-1) 16:25	66 14:25 (WEA-2 E-138)				
15	21:35	24 20:14 (WEA-4 E-160)	20:39	19:29	42 18:38 (WEA-3 E-160) 18:22	11 08:49 (WEA04) 16:33	113 15:43 (WEA-1) 16:26	66 14:25 (WEA-2 E-138)				
16	05:44	19:48 (WEA-4 E-160)	06:32	19:27	42 18:38 (WEA-3 E-160) 18:22	11 08:49 (WEA04) 16:33	113 15:43 (WEA-1) 16:26	66 14:25 (WEA-2 E-138)				
17	21:34	27 20:15 (WEA-4 E-160)	20:37	19:26	40 18:36 (WEA-3 E-160) 17:20	9 07:49 (WEA04) 16:32	110 15:41 (WEA-1) 16:26	66 14:25 (WEA-2 E-138)				
18	05:45	19:47 (WEA-4 E-160)	06:34	19:24	40 18:36 (WEA-3 E-160) 17:15	8 07:42 (WEA04) 16:31	106 15:41 (WEA-1) 16:27	66 14:26 (WEA-2 E-138)				
19	21:33	28 20:15 (WEA-4 E-160)	20:35	19:24	40 18:36 (WEA-3 E-160) 17:18	5 07:47 (WEA04) 16:31	106 15:41 (WEA-1) 16:27	66 14:26 (WEA-2 E-138)				
20	05:47	19:47 (WEA-4 E-160)	06:35	19:25	38 18:34 (WEA-3 E-160) 17:17	8 13:51 (WEA-2 E-138) 16:30	100 15:40 (WEA-1) 16:28	67 14:27 (WEA-2 E-138)				
21	21:35	30 20:17 (WEA-4 E-160)	20:33	19:22	38 18:34 (WEA-3 E-160) 17:16	20 13:37 (WEA-2 E-138) 16:29	96 15:39 (WEA-1) 16:28	68 14:28 (WEA-2 E-138)				
22	05:48	19:46 (WEA-4 E-160)	06:37	19:22	36 18:33 (WEA-3 E-160) 17:14	20 13:57 (WEA-2 E-138) 16:29	96 15:39 (WEA-1) 16:28	68 14:28 (WEA-2 E-138)				
23	21:30	31 20:17 (WEA-4 E-160)	20:31	19:19	36 18:33 (WEA-3 E-160) 17:14	20 13:57 (WEA-2 E-138) 16:29	96 15:39 (WEA-1) 16:28	68 14:28 (WEA-2 E-138)				
24	05:49	19:45 (WEA-4 E-160)	06:39	19:22	34 18:32 (WEA-3 E-160) 17:12	27 13:33 (WEA-2 E-138) 16:28	91 15:39 (WEA-1) 16:29	68 14:28 (WEA-2 E-138)				
25	21:28	32 20:17 (WEA-4 E-160)	20:28	19:17	34 18:32 (WEA-3 E-160) 17:12	27 14:00 (WEA-2 E-138) 16:28	91 15:39 (WEA-1) 16:29	68 14:28 (WEA-2 E-138)				
26	05:51	19:45 (WEA-4 E-160)	06:40	19:20	32 18:30 (WEA-3 E-160) 17:10	32 14:02 (WEA-2 E-138) 16:27	82 15:34 (WEA-1) 16:30	68 14:29 (WEA-2 E-138)				
27	21:27	33 20:18 (WEA-4 E-160)	20:26	19:15	39 18:29 (WEA-3 E-160) 17:10	32 14:02 (WEA-2 E-138) 16:27	82 15:34 (WEA-1) 16:30	68 14:29 (WEA-2 E-138)				
28	05:52	19:44 (WEA-4 E-160)	06:42	19:15	39 18:29 (WEA-3 E-160) 17:10	32 14:02 (WEA-2 E-138) 16:27	82 15:34 (WEA-1) 16:30	68 14:29 (WEA-2 E-138)				
29	21:25	34 20:18 (WEA-4 E-160)	20:24	19:15	42 17:09	42 15:31 (WEA-1) 16:31	70 14:30 (WEA-2 E-138)					
30	05:53	19:44 (WEA-4 E-160)	06:43	19:15	42 17:09	42 15:31 (WEA-1) 16:31	70 14:30 (WEA-2 E-138)					
31	21:25	34 20:18 (WEA-4 E-160)	20:24	19:15	42 17:09	42 15:31 (WEA-1) 16:31	70 14:30 (WEA-2 E-138)					
1	Sonnenscheinstunden	501	453	381	332	267	2150	1848	1101	402	151	1101
2	astr.max.mögl.Beschattung	314	686	1101	402	2150	1848	1101	402	2150	1848	1101
3	Red.Sonnenscheinwahrsch.	0,41	0,43	0,36	0,32	0,23	0,15	0,15	0,15	0,15	0,15	0,15
4	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
5	Reduktion Windrichtung	0,62	0,62	0,69	0,65	0,64	0,63	0,63	0,63	0,63	0,63	0,63
6	Gesamte Reduktion	0,22	0,22	0,21	0,17	0,12	0,08	0,08	0,08	0,08	0,08	0,08
7	Met.wahrsch.Beschattung	68	152	229	69	414	2150	1848	1101	402	151	1101

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 41 - IP 41 Kips Esch 26

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40		09:44 (WEA09) 08:14	08:53 (WEA05) 07:20	15:35 (WEA-2 E-138) 07:10	07:52 (WEA08) 06:06	19:46 (WEA-4 E-160) 05:21
16:32	49	10:33 (WEA-01) 17:20	16:07 (WEA-2 E-138) 18:11	16:11 (WEA-2 E-138) 20:05	19:15 (WEA-3 E-160) 20:56	20:16 (WEA-4 E-160) 21:41
2 08:40		09:45 (WEA09) 08:12	08:54 (WEA05) 07:18	15:37 (WEA-2 E-138) 07:08	07:48 (WEA08) 06:04	19:45 (WEA-4 E-160) 05:20
16:33	49	10:34 (WEA-01) 17:22	16:08 (WEA-2 E-138) 18:13	16:09 (WEA-2 E-138) 20:07	19:14 (WEA-3 E-160) 20:57	20:15 (WEA-4 E-160) 21:42
3 08:40		09:45 (WEA09) 08:10	08:55 (WEA05) 07:16	15:39 (WEA-2 E-138) 07:06	07:46 (WEA08) 06:02	19:45 (WEA-4 E-160) 05:19
16:35	50	10:35 (WEA-01) 17:24	16:10 (WEA-2 E-138) 18:15	16:06 (WEA-2 E-138) 20:08	19:13 (WEA-3 E-160) 20:59	20:15 (WEA-4 E-160) 21:43
4 08:40		09:46 (WEA09) 08:09	08:58 (WEA05) 07:14	15:42 (WEA-2 E-138) 07:03	07:44 (WEA08) 06:00	19:46 (WEA-4 E-160) 05:18
16:36	49	10:35 (WEA-01) 17:25	16:11 (WEA-2 E-138) 18:17	16:03 (WEA-2 E-138) 20:10	19:13 (WEA-3 E-160) 21:01	20:16 (WEA-4 E-160) 21:44
5 08:39		09:47 (WEA09) 08:07	10:10 (WEA-01) 07:12	15:46 (WEA-2 E-138) 07:01	07:43 (WEA08) 05:58	19:45 (WEA-4 E-160) 05:18
16:37	50	10:37 (WEA-01) 17:27	16:48 (WEA-1) 18:18	15:59 (WEA-2 E-138) 20:12	19:12 (WEA-3 E-160) 21:02	20:15 (WEA-4 E-160) 21:45
6 08:39		09:48 (WEA09) 08:05	10:11 (WEA-01) 07:09		07:42 (WEA08) 05:56	19:45 (WEA-4 E-160) 05:17
16:38	50	10:38 (WEA-01) 17:29	16:50 (WEA-1) 18:20		19:10 (WEA-3 E-160) 21:04	20:15 (WEA-4 E-160) 21:46
7 08:39		09:48 (WEA09) 08:04	10:13 (WEA-01) 07:07		07:41 (WEA08) 05:55	19:45 (WEA-4 E-160) 05:16
16:39	50	10:38 (WEA-01) 17:31	16:51 (WEA-1) 18:22		20:15	20:14 (WEA-4 E-160) 21:47
8 08:38		09:49 (WEA09) 08:02	10:15 (WEA-01) 07:05		07:40 (WEA08) 05:53	19:46 (WEA-4 E-160) 05:16
16:41	49	10:38 (WEA-01) 17:33	16:53 (WEA-1) 18:24		20:17	20:14 (WEA-4 E-160) 21:48
9 08:38		09:50 (WEA09) 08:00	10:17 (WEA-01) 07:03		07:40 (WEA08) 05:51	19:46 (WEA-4 E-160) 05:15
16:42	50	10:40 (WEA-01) 17:35	16:53 (WEA-1) 18:25		20:19	20:13 (WEA-4 E-160) 21:49
10 08:37		09:51 (WEA09) 07:58	10:23 (WEA-01) 07:01	07:27 (WEA03) 06:50	07:39 (WEA08) 05:49	19:47 (WEA-4 E-160) 05:15
16:43	49	10:40 (WEA-01) 17:37	16:54 (WEA-1) 18:27	7	07:34 (WEA03) 20:20	20:13 (WEA-4 E-160) 21:50
11 08:37		09:52 (WEA09) 07:57	15:29 (WEA-2 E-138) 06:58	07:24 (WEA03) 06:47	08:08 (WEA08) 05:48	19:48 (WEA-4 E-160) 05:15
16:45	49	10:41 (WEA-01) 17:38	16:56 (WEA-1) 18:29	13	07:37 (WEA03) 20:22	20:12 (WEA-4 E-160) 21:50
12 08:36		09:53 (WEA09) 07:55	15:29 (WEA-2 E-138) 06:56	07:23 (WEA03) 06:45	08:09 (WEA08) 05:46	19:49 (WEA-4 E-160) 05:14
16:46	48	10:41 (WEA-01) 17:40	16:56 (WEA-1) 18:31	15	07:38 (WEA03) 20:24	20:11 (WEA-4 E-160) 21:51
13 08:35		09:56 (WEA09) 07:53	15:28 (WEA-2 E-138) 06:54	07:22 (WEA03) 06:43	07:39 (WEA08) 05:44	19:50 (WEA-4 E-160) 05:14
16:48	47	10:43 (WEA-01) 17:42	16:56 (WEA-1) 18:32	17	07:39 (WEA03) 20:25	20:10 (WEA-4 E-160) 21:52
14 08:35		10:00 (WEA-01) 07:51	15:28 (WEA-2 E-138) 06:51	07:20 (WEA03) 06:41	08:07 (WEA08) 05:43	19:51 (WEA-4 E-160) 05:14
16:49	43	10:43 (WEA-01) 17:44	16:57 (WEA-1) 18:34	19	07:40 (WEA03) 20:27	20:09 (WEA-4 E-160) 21:52
15 08:34		10:00 (WEA-01) 07:49	08:15 (WEA04) 06:49	07:39 (WEA03) 20:27	07:40 (WEA08) 05:41	19:52 (WEA-4 E-160) 05:14
16:51	44	10:44 (WEA-01) 17:46	16:57 (WEA-1) 18:36	19	07:39 (WEA03) 20:29	20:05 (WEA-4 E-160) 21:53
16 08:33		10:00 (WEA-01) 07:47	08:13 (WEA04) 06:47	07:20 (WEA03) 06:36	07:40 (WEA08) 05:40	19:57 (WEA-4 E-160) 05:13
16:52	44	10:44 (WEA-01) 17:48	16:56 (WEA-1) 18:38	19	07:39 (WEA03) 20:30	20:05 (WEA-4 E-160) 21:53
17 08:32		10:00 (WEA-01) 07:45	08:11 (WEA04) 06:45	07:19 (WEA03) 06:34	08:03 (WEA08) 05:38	20:13 (WEA-4 E-160) 05:13
16:54	45	10:45 (WEA-01) 17:49	16:56 (WEA-1) 18:39	19	07:38 (WEA03) 20:32	20:01 (WEA08) 21:21
18 08:31		10:00 (WEA-01) 07:43	08:10 (WEA04) 06:42	07:20 (WEA03) 06:32	07:43 (WEA08) 05:37	20:13 (WEA-4 E-160) 05:13
16:55	46	10:46 (WEA-01) 17:51	16:55 (WEA-1) 18:41	17	07:37 (WEA03) 20:34	20:01 (WEA08) 21:23
19 08:30		10:00 (WEA-01) 07:41	08:09 (WEA04) 06:40	07:21 (WEA03) 06:30	07:45 (WEA08) 05:35	20:12 (WEA-4 E-160) 05:13
16:57	45	10:45 (WEA-01) 17:53	16:54 (WEA-1) 18:43	15	07:36 (WEA03) 20:35	20:01 (WEA08) 21:24
20 08:29		10:00 (WEA-01) 07:39	08:09 (WEA04) 06:38	07:21 (WEA03) 06:28	07:57 (WEA08) 05:34	20:15 (WEA-4 E-160) 05:13
16:59	46	10:46 (WEA-01) 17:55	16:53 (WEA-1) 18:45	27	18:09 (WEA-3 E-160) 20:37	21:26
21 08:28		08:56 (WEA05) 07:37	08:09 (WEA04) 06:35	07:23 (WEA03) 06:26		05:33
17:00	48	10:46 (WEA-01) 17:57	16:52 (WEA-1) 18:46	29	18:12 (WEA-3 E-160) 20:39	21:27
22 08:27		08:55 (WEA05) 07:35	08:09 (WEA04) 06:33	29	17:50 (WEA-3 E-160) 20:24	19:58 (WEA-4 E-160) 05:31
17:02	53	10:47 (WEA-01) 17:59	16:51 (WEA-1) 18:48	24	18:14 (WEA-3 E-160) 20:41	20:06 (WEA-4 E-160) 21:28
23 08:26		08:53 (WEA05) 07:33	08:10 (WEA04) 06:31	18	17:48 (WEA-3 E-160) 20:22	19:55 (WEA-4 E-160) 05:30
17:04	56	10:47 (WEA-01) 18:00	16:48 (WEA-1) 18:50	26	18:14 (WEA-3 E-160) 20:42	20:09 (WEA-4 E-160) 21:30
24 08:25		08:52 (WEA05) 07:31	08:11 (WEA04) 06:29	26	17:47 (WEA-3 E-160) 20:20	19:52 (WEA-4 E-160) 05:29
17:06	58	10:47 (WEA-01) 18:02	16:44 (WEA-1) 18:51	28	18:15 (WEA-3 E-160) 20:44	20:11 (WEA-4 E-160) 21:31
25 08:23		08:51 (WEA05) 07:29	08:12 (WEA04) 06:26	17	17:46 (WEA-3 E-160) 06:17	19:51 (WEA-4 E-160) 05:28
17:07	60	10:48 (WEA-01) 18:04	16:16 (WEA-2 E-138) 18:53	30	18:16 (WEA-3 E-160) 20:46	20:12 (WEA-4 E-160) 21:33
26 08:22		08:50 (WEA05) 07:27	08:14 (WEA04) 06:24	32	17:44 (WEA-3 E-160) 06:15	19:49 (WEA-4 E-160) 05:27
17:09	60	10:47 (WEA-01) 18:06	16:14 (WEA-2 E-138) 18:55	32	18:16 (WEA-3 E-160) 20:47	20:13 (WEA-4 E-160) 21:34
27 08:21		08:51 (WEA05) 07:25	15:32 (WEA-2 E-138) 06:22	32	17:44 (WEA-3 E-160) 06:13	19:48 (WEA-4 E-160) 05:25
17:11	60	10:48 (WEA-01) 18:08	16:13 (WEA-2 E-138) 18:56	32	18:16 (WEA-3 E-160) 20:49	20:14 (WEA-4 E-160) 21:35
28 08:19		08:50 (WEA05) 07:23	15:33 (WEA-2 E-138) 06:19	34	17:43 (WEA-3 E-160) 06:11	19:47 (WEA-4 E-160) 05:24
17:13	60	10:47 (WEA-01) 18:09	16:12 (WEA-2 E-138) 18:58	34	18:17 (WEA-3 E-160) 20:51	20:14 (WEA-4 E-160) 21:36
29 08:18		08:50 (WEA05) 07:21		34	18:42 (WEA-3 E-160) 06:09	19:47 (WEA-4 E-160) 05:23
17:14	75	15:58 (WEA-2 E-138) 08:51 (WEA05) 07:15		34	19:16 (WEA-3 E-160) 20:52	20:15 (WEA-4 E-160) 21:38
30 08:17		08:51 (WEA05) 07:15		34	18:42 (WEA-3 E-160) 06:08	19:46 (WEA-4 E-160) 05:22
17:16	80	16:02 (WEA-2 E-138) 08:51 (WEA05) 07:12		34	19:16 (WEA-3 E-160) 20:54	20:16 (WEA-4 E-160) 21:39
31 08:15		08:51 (WEA05) 07:12		34	18:42 (WEA-3 E-160) 06:06	19:46 (WEA-4 E-160) 05:21
17:18	82	16:04 (WEA-2 E-138) 08:51 (WEA05) 20:03		34	19:16 (WEA-3 E-160) 20:54	20:16 (WEA-4 E-160) 21:39
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	1644	2186	653	873	399	
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	
Reduktion Windrichtung	0,57	0,68	0,68	0,67	0,62	
Gesamte Reduktion	0,09	0,17	0,17	0,23	0,24	
Met.wahrsch.Beschattung	153	375	109	197	94	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: IP 41 - IP 41 Kips Esch 26

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember		
1 05:18	05:54	19:59 (WEA-4 E-160) 06:43	07:38 (WEA08) 07:32	08:01 (WEA03) 07:26	09:51 (WEA-01) 08:16	09:34 (WEA09)		
2 21:23	21:23	20:22 (WEA-4 E-160) 20:22	29 08:07 (WEA08) 19:13	16 08:17 (WEA03) 17:07	82 16:24 (WEA-1) 16:27	49 10:23 (WEA-01)		
3 05:19	05:55	19:58 (WEA-4 E-160) 06:45	07:38 (WEA08) 07:34	08:02 (WEA03) 07:27	09:46 (WEA-01) 08:18	09:34 (WEA09)		
4 05:20	21:22	20:22 (WEA-4 E-160) 20:19	29 08:07 (WEA08) 19:10	14 08:16 (WEA03) 17:05	87 16:23 (WEA-1) 16:26	49 10:23 (WEA-01)		
5 05:21	05:57	19:57 (WEA-4 E-160) 06:47	07:38 (WEA08) 07:35	08:03 (WEA03) 07:29	09:44 (WEA-01) 08:19	09:33 (WEA09)		
6 05:22	21:20	20:23 (WEA-4 E-160) 20:17	41 19:00 (WEA-3 E-160) 19:08	10 08:13 (WEA03) 17:03	89 16:22 (WEA-1) 16:25	50 10:23 (WEA-01)		
7 05:23	05:59	19:57 (WEA-4 E-160) 06:48	07:37 (WEA08) 07:37	07:31	09:42 (WEA-01) 08:20	09:34 (WEA09)		
8 05:24	21:18	20:24 (WEA-4 E-160) 20:15	47 19:03 (WEA-3 E-160) 19:06	17:01	90 16:21 (WEA-1) 16:25	50 10:24 (WEA-01)		
9 05:25	06:00	19:55 (WEA-4 E-160) 06:50	07:38 (WEA08) 07:39	07:33	09:41 (WEA-01) 08:22	09:33 (WEA09)		
10 05:26	21:17	20:24 (WEA-4 E-160) 20:13	50 19:05 (WEA-3 E-160) 19:03	17:00	87 16:19 (WEA-1) 16:24	50 10:23 (WEA-01)		
11 05:27	06:02	19:56 (WEA-4 E-160) 06:51	07:38 (WEA08) 07:40	07:34	09:40 (WEA-01) 08:23	09:33 (WEA09)		
12 05:28	21:15	20:24 (WEA-4 E-160) 20:10	52 19:06 (WEA-3 E-160) 19:01	16:58	83 16:17 (WEA-1) 16:24	50 10:23 (WEA-01)		
13 05:29	06:03	19:55 (WEA-4 E-160) 06:53	07:38 (WEA08) 07:42	07:36	08:28 (WEA05) 08:24	09:34 (WEA09)		
14 05:30	21:13	20:24 (WEA-4 E-160) 20:08	54 19:07 (WEA-3 E-160) 18:59	16:56	76 15:41 (WEA-2 E-138) 16:23	50 10:24 (WEA-01)		
15 05:31	06:05	19:55 (WEA-4 E-160) 06:55	07:39 (WEA08) 07:44	07:38	08:25 (WEA05) 08:26	09:34 (WEA09)		
16 05:32	21:11	20:25 (WEA-4 E-160) 20:06	53 19:07 (WEA-3 E-160) 18:57	16:29 (WEA-2 E-138) 16:54	82 15:40 (WEA-2 E-138) 16:23	50 10:24 (WEA-01)		
17 05:33	06:06	19:54 (WEA-4 E-160) 06:56	07:40 (WEA08) 07:45	16:19 (WEA-2 E-138) 07:45	08:23 (WEA05) 08:30	09:35 (WEA09)		
18 05:34	21:09	20:24 (WEA-4 E-160) 20:04	52 19:08 (WEA-3 E-160) 18:54	3 16:37 (WEA-2 E-138) 16:53	83 15:39 (WEA-2 E-138) 16:23	49 10:23 (WEA-01)		
19 05:35	06:08	19:54 (WEA-4 E-160) 06:58	07:41 (WEA08) 07:47	16:15 (WEA-2 E-138) 07:42	08:24 (WEA05) 08:28	09:34 (WEA09)		
20 05:36	21:07	20:25 (WEA-4 E-160) 20:01	49 19:07 (WEA-3 E-160) 18:52	25 16:40 (WEA-2 E-138) 16:51	83 15:38 (WEA-2 E-138) 16:23	49 10:23 (WEA-01)		
21 05:37	06:10	19:54 (WEA-4 E-160) 07:00	07:43 (WEA08) 07:49	16:12 (WEA-2 E-138) 07:43	08:23 (WEA05) 08:29	09:35 (WEA09)		
22 05:38	21:06	20:24 (WEA-4 E-160) 19:59	45 19:08 (WEA-3 E-160) 18:50	29 16:41 (WEA-2 E-138) 16:50	82 15:36 (WEA-2 E-138) 16:22	49 10:24 (WEA-01)		
23 05:39	06:11	19:54 (WEA-4 E-160) 07:01	18:34 (WEA-3 E-160) 07:51	16:09 (WEA-2 E-138) 07:45	08:23 (WEA05) 08:30	09:35 (WEA09)		
24 05:40	21:04	20:24 (WEA-4 E-160) 19:57	33 19:07 (WEA-3 E-160) 18:48	34 16:43 (WEA-2 E-138) 16:48	80 15:34 (WEA-2 E-138) 16:22	49 10:24 (WEA-01)		
25 05:41	06:13	19:54 (WEA-4 E-160) 07:03	18:33 (WEA-3 E-160) 07:52	16:08 (WEA-2 E-138) 07:47	08:22 (WEA05) 08:31	09:35 (WEA09)		
26 05:42	21:02	20:23 (WEA-4 E-160) 19:54	34 19:07 (WEA-3 E-160) 18:45	36 16:44 (WEA-2 E-138) 16:47	74 15:30 (WEA-2 E-138) 16:22	50 10:25 (WEA-01)		
27 05:43	06:14	19:55 (WEA-4 E-160) 07:04	18:34 (WEA-3 E-160) 07:54	16:06 (WEA-2 E-138) 07:49	08:22 (WEA05) 08:32	09:36 (WEA09)		
28 05:44	21:00	20:23 (WEA-4 E-160) 19:52	33 19:07 (WEA-3 E-160) 18:43	40 16:46 (WEA-2 E-138) 16:45	60 10:19 (WEA-01) 16:22	49 10:25 (WEA-01)		
29 05:45	06:16	19:55 (WEA-4 E-160) 07:06	18:33 (WEA-3 E-160) 07:56	16:04 (WEA-2 E-138) 07:50	08:23 (WEA05) 08:33	09:35 (WEA09)		
30 05:46	20:58	20:22 (WEA-4 E-160) 19:50	33 19:06 (WEA-3 E-160) 18:41	42 16:46 (WEA-2 E-138) 16:44	60 10:20 (WEA-01) 16:22	49 10:24 (WEA-01)		
31 05:47	06:18	19:56 (WEA-4 E-160) 07:08	18:33 (WEA-3 E-160) 07:57	08:45 (WEA04) 07:52	08:23 (WEA05) 08:34	09:36 (WEA09)		
1 05:48	21:05	20:21 (WEA-4 E-160) 19:47	33 19:06 (WEA-3 E-160) 18:39	52 16:47 (WEA-2 E-138) 16:42	60 10:20 (WEA-01) 16:22	49 10:25 (WEA-01)		
2 05:49	06:19	19:56 (WEA-4 E-160) 07:09	18:33 (WEA-3 E-160) 07:59	08:43 (WEA04) 07:54	08:24 (WEA05) 08:34	09:36 (WEA09)		
3 05:50	21:04	20:19 (WEA-4 E-160) 19:45	31 19:04 (WEA-3 E-160) 18:37	57 16:47 (WEA-2 E-138) 16:41	60 10:21 (WEA-01) 16:23	49 10:25 (WEA-01)		
4 05:51	06:21	19:57 (WEA-4 E-160) 07:11	18:33 (WEA-3 E-160) 08:01	08:42 (WEA04) 07:56	08:26 (WEA05) 08:35	09:37 (WEA09)		
5 05:52	21:03	20:19 (WEA-4 E-160) 19:43	31 19:04 (WEA-3 E-160) 18:35	69 17:17 (WEA-1) 16:40	58 10:21 (WEA-01) 16:23	49 10:26 (WEA-01)		
6 05:53	06:22	19:58 (WEA-4 E-160) 07:12	18:34 (WEA-3 E-160) 08:03	08:41 (WEA04) 07:57	08:28 (WEA05) 08:36	09:37 (WEA09)		
7 05:54	21:02	20:16 (WEA-4 E-160) 19:40	29 19:03 (WEA-3 E-160) 18:33	80 17:21 (WEA-1) 16:38	56 10:22 (WEA-01) 16:23	48 10:25 (WEA-01)		
8 05:55	06:24	20:01 (WEA-4 E-160) 07:14	18:34 (WEA-3 E-160) 08:04	08:40 (WEA04) 07:59	08:30 (WEA05) 08:37	09:38 (WEA09)		
9 05:56	21:01	20:14 (WEA-4 E-160) 19:38	27 19:01 (WEA-3 E-160) 18:30	85 17:23 (WEA-1) 16:37	53 10:22 (WEA-01) 16:24	48 10:26 (WEA-01)		
10 05:57	06:26	20:04 (WEA-4 E-160) 07:16	18:35 (WEA-3 E-160) 08:06	08:39 (WEA04) 08:01	08:31 (WEA05) 08:37	09:39 (WEA09)		
11 05:58	21:00	20:09 (WEA-4 E-160) 19:36	25 19:00 (WEA-3 E-160) 18:28	89 17:23 (WEA-1) 16:36	49 10:22 (WEA-01) 16:24	48 10:27 (WEA-01)		
12 05:59	06:27	07:17	08:09 (WEA03) 08:08	08:39 (WEA04) 08:02	09:36 (WEA-01) 08:38	09:39 (WEA09)		
13 06:00	21:00	20:44 19:31	27 18:57 (WEA-3 E-160) 18:26	93 17:24 (WEA-1) 16:35	46 10:22 (WEA-01) 16:24	48 10:28 (WEA-01)		
14 06:01	06:29	07:19	08:06 (WEA03) 08:10	08:40 (WEA04) 08:04	09:37 (WEA-01) 08:38	09:40 (WEA09)		
15 06:02	21:00	07:21	27 18:54 (WEA-3 E-160) 18:24	93 17:25 (WEA-1) 16:34	45 10:22 (WEA-01) 16:25	48 10:28 (WEA-01)		
16 06:03	06:30	07:23	08:05 (WEA03) 08:11	08:40 (WEA04) 08:06	09:37 (WEA-01) 08:39	09:40 (WEA09)		
17 06:04	21:00	08:01 (WEA08) 19:29	22 18:50 (WEA-3 E-160) 18:22	94 17:25 (WEA-1) 16:33	46 10:23 (WEA-01) 16:26	48 10:28 (WEA-01)		
18 06:05	06:32	07:25	08:03 (WEA03) 07:13	08:41 (WEA04) 08:07	09:37 (WEA-01) 08:39	09:40 (WEA09)		
19 06:06	21:00	08:03 (WEA08) 19:26	17 08:20 (WEA03) 17:20	93 16:26 (WEA-1) 16:32	45 10:22 (WEA-01) 16:26	49 10:29 (WEA-01)		
20 06:07	06:34	07:24	08:02 (WEA03) 07:15	08:42 (WEA04) 08:09	09:38 (WEA-01) 08:39	09:40 (WEA09)		
21 06:08	21:00	08:04 (WEA08) 19:24	18 08:20 (WEA03) 17:18	90 16:26 (WEA-1) 16:31	45 10:23 (WEA-01) 16:27	49 10:29 (WEA-01)		
22 06:09	06:35	07:25	08:01 (WEA03) 07:17	08:43 (WEA04) 08:10	09:39 (WEA-01) 08:40	09:42 (WEA09)		
23 06:10	21:00	08:06 (WEA08) 19:22	19 08:20 (WEA03) 17:16	86 16:26 (WEA-1) 16:30	44 10:23 (WEA-01) 16:28	48 10:30 (WEA-01)		
24 06:11	06:36	07:27	08:01 (WEA03) 07:18	08:44 (WEA04) 08:12	09:40 (WEA-01) 08:40	09:42 (WEA09)		
25 06:12	21:00	20:31 19:19	25 08:06 (WEA08) 19:19	19 16:26 (WEA-1) 16:29	43 10:23 (WEA-01) 16:28	49 10:31 (WEA-01)		
26 06:13	06:37	07:27	08:01 (WEA03) 07:18	08:45 (WEA-2 E-138) 08:12	09:36 (WEA09) 08:40	09:43 (WEA09)		
27 06:14	21:00	20:18 (WEA-4 E-160) 19:39	26 07:41 (WEA08) 07:29	19 16:25 (WEA-1) 16:28	47 10:23 (WEA-01) 16:29	49 10:32 (WEA-01)		
28 06:15	06:38	07:28	08:02 (WEA03) 07:19	08:46 (WEA-2 E-138) 08:13	09:36 (WEA09) 08:40	09:43 (WEA09)		
29 06:16	21:00	20:01 (WEA-4 E-160) 19:40	28 07:39 (WEA08) 07:30	18 14:57 (WEA-2 E-138) 08:15	09:36 (WEA09) 08:40	09:43 (WEA09)		
30 06:17	06:39	07:29	08:03 (WEA08) 19:15	08:18 (WEA03) 07:22	77 16:25 (WEA-1) 16:27	47 10:23 (WEA-01) 16:30	49 10:32 (WEA-01)	
31 06:18	21:00	20:00 (WEA-4 E-160) 06:42	07:39 (WEA08) 07:24	14:58 (WEA-2 E-138) 07:24	10:23 (WEA-01) 08:40	09:44 (WEA09)		
1 06:19	21:25	20:21 (WEA-4 E-160) 20:24	28 08:07 (WEA08) 17:09	74 16:24 (WEA-1) 16:31	49 10:23 (WEA-01) 16:31	49 10:33 (WEA-01)		
Sonnenscheinstunden	501	453	381	332	267	1942	244	1519
astr.max.mögl.Beschattung	74	705	996	1555	1942	244	1519	1519
Red.Sonnenscheinwahrsch.	0,41	0,43	0,36	0,32	0,23	0,15	0,15	0,15
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung	0,62	0,63	0,68	0,70	0,61	0,57	0,57	0,57
Gesamte Reduktion	0,21	0,22	0,20	0,18	0,12	0,07	0,07	0,07
Met.wahrsch.Beschattung	16	158	201	284	224	105	105	105

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung Schattenrezeptor: IP 42 - IP 42 Rhader Straße 22

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni						
1 08:40	09:41 (WEA10)	08:14	08:48 (WEA09)	07:20	08:18 (WEA-01)	07:10	07:35 (WEA03)	06:06	18:58 (WEA-3 E-160)	05:21	19:22 (WEA-3 E-160)	
2 16:32	5 09:46 (WEA10)	17:20	25 09:13 (WEA02)	18:11	172 16:42 (WEA-1)	20:05	123 15:32 (WEA-2 E-138)	20:56	52 19:50 (WEA-3 E-160)	21:41	7 19:29 (WEA-3 E-160)	
3 08:40	1 09:45 (WEA10)	17:22	23 09:11 (WEA02)	18:13	172 16:41 (WEA-1)	20:07	121 15:31 (WEA-2 E-138)	20:57	53 19:50 (WEA-3 E-160)	21:42		
4 16:35		17:24	20 09:08 (WEA02)	18:15	171 16:39 (WEA-1)	20:08	117 15:30 (WEA-2 E-138)	20:59	52 19:49 (WEA-3 E-160)	21:43		
5 08:40		17:25	20 09:07 (WEA02)	18:17	170 16:38 (WEA-1)	20:10	112 15:30 (WEA-2 E-138)	21:01	53 19:50 (WEA-3 E-160)	21:44		
6 16:37		17:27	20 09:08 (WEA02)	18:18	167 16:36 (WEA-1)	20:12	101 15:29 (WEA-2 E-138)	21:02	53 19:50 (WEA-3 E-160)	21:45		
7 08:39		17:29	19 09:07 (WEA02)	18:20	161 16:34 (WEA-1)	20:13	98 15:27 (WEA-2 E-138)	21:04	52 19:49 (WEA-3 E-160)	21:46		
8 16:38		17:31	30 08:49 (WEA09)	07:05	153 16:30 (WEA-1)	20:15	94 15:26 (WEA-2 E-138)	21:05	52 19:50 (WEA-3 E-160)	21:47		
9 08:38		17:33	36 16:33 (WEA-1)	18:24	139 14:37 (WEA-2 E-138)	20:17	91 15:25 (WEA-2 E-138)	21:07	51 19:49 (WEA-3 E-160)	21:48		
10 16:41		17:35	39 16:36 (WEA-1)	18:25	136 14:37 (WEA-2 E-138)	20:19	85 15:23 (WEA-2 E-138)	21:09	51 19:48 (WEA-3 E-160)	21:49		
11 08:37		17:37	40 08:52 (WEA09)	07:01	138 14:37 (WEA-2 E-138)	20:20	81 15:21 (WEA-2 E-138)	21:10	51 19:49 (WEA-3 E-160)	21:50		
12 16:45		17:38	61 16:40 (WEA-1)	18:29	137 14:38 (WEA-2 E-138)	20:22	75 15:19 (WEA-2 E-138)	21:12	50 19:48 (WEA-3 E-160)	21:50		
13 08:36		17:40	67 13:24 (WEA-2 E-138)	06:54	132 14:38 (WEA-2 E-138)	20:24	73 15:17 (WEA-2 E-138)	21:13	49 19:48 (WEA-3 E-160)	21:51		
14 16:46		17:42	77 16:42 (WEA-1)	18:32	129 14:39 (WEA-2 E-138)	20:25	72 15:15 (WEA-2 E-138)	21:15	48 19:47 (WEA-3 E-160)	21:52		
15 08:35		17:44	85 13:21 (WEA-2 E-138)	06:51	129 14:38 (WEA-2 E-138)	20:27	67 15:12 (WEA-2 E-138)	21:17	47 19:47 (WEA-3 E-160)	21:52	5 20:56 (WEA-4 E-160)	
16 16:49		17:46	93 16:43 (WEA-1)	18:34	129 14:38 (WEA-2 E-138)	20:29	67 15:12 (WEA-2 E-138)	21:17	47 19:47 (WEA-3 E-160)	21:52	5 21:01 (WEA-4 E-160)	
17 08:34		17:48	99 16:45 (WEA-1)	18:38	128 14:39 (WEA-2 E-138)	20:30	67 15:12 (WEA-2 E-138)	21:18	46 19:46 (WEA-3 E-160)	21:53	8 21:03 (WEA-4 E-160)	
18 16:51		17:50	116 08:32 (WEA-01)	06:45	124 14:38 (WEA-2 E-138)	20:32	67 15:12 (WEA-2 E-138)	21:18	46 19:46 (WEA-3 E-160)	21:54	9 21:03 (WEA-4 E-160)	
19 08:33		17:52	127 16:45 (WEA-1)	18:39	124 14:38 (WEA-2 E-138)	20:32	67 15:12 (WEA-2 E-138)	21:18	46 19:46 (WEA-3 E-160)	21:54	9 21:03 (WEA-4 E-160)	
20 16:52		17:54	136 08:28 (WEA-01)	06:42	118 14:38 (WEA-2 E-138)	20:34	67 15:12 (WEA-2 E-138)	21:18	46 19:46 (WEA-3 E-160)	21:54	11 21:05 (WEA-4 E-160)	
21 08:29		17:55	147 16:45 (WEA-1)	18:43	118 14:38 (WEA-2 E-138)	20:35	67 15:12 (WEA-2 E-138)	21:18	46 19:46 (WEA-3 E-160)	21:54	12 21:06 (WEA-4 E-160)	
22 16:59		17:57	157 08:03 (WEA05)	06:38	119 14:38 (WEA-2 E-138)	20:37	67 15:12 (WEA-2 E-138)	21:18	46 19:46 (WEA-3 E-160)	21:54	12 21:06 (WEA-4 E-160)	
23 08:28		17:59	166 16:45 (WEA-1)	18:46	119 14:38 (WEA-2 E-138)	20:39	67 15:12 (WEA-2 E-138)	21:18	46 19:46 (WEA-3 E-160)	21:54	12 21:06 (WEA-4 E-160)	
24 17:00		18:00	171 07:59 (WEA05)	06:33	119 14:38 (WEA-2 E-138)	20:41	61 19:46 (WEA-3 E-160)	21:28	36 19:41 (WEA-3 E-160)	21:56	12 21:06 (WEA-4 E-160)	
25 08:27		18:02	176 16:46 (WEA-1)	18:50	119 14:37 (WEA-2 E-138)	20:42	62 19:47 (WEA-3 E-160)	21:30	34 19:41 (WEA-3 E-160)	21:56	12 21:06 (WEA-4 E-160)	
26 17:02		18:04	179 07:56 (WEA05)	06:26	118 14:37 (WEA-2 E-138)	20:44	62 19:48 (WEA-3 E-160)	21:31	32 19:40 (WEA-3 E-160)	21:56	12 21:07 (WEA-4 E-160)	
27 08:26		18:06	179 16:45 (WEA-1)	18:53	118 14:37 (WEA-2 E-138)	20:46	60 19:48 (WEA-3 E-160)	21:33	30 19:39 (WEA-3 E-160)	21:56	11 21:06 (WEA-4 E-160)	
28 17:04		18:08	171 07:56 (WEA05)	06:24	116 14:35 (WEA-2 E-138)	20:47	55 19:48 (WEA-3 E-160)	21:34	28 19:38 (WEA-3 E-160)	21:56	9 21:06 (WEA-4 E-160)	
29 08:25		18:10	176 16:46 (WEA-1)	18:51	118 14:37 (WEA-2 E-138)	20:44	50 19:49 (WEA-3 E-160)	21:35	25 19:37 (WEA-3 E-160)	21:56	8 21:05 (WEA-4 E-160)	
30 17:06		18:14	179 07:56 (WEA05)	06:26	118 14:37 (WEA-2 E-138)	20:46	60 19:48 (WEA-3 E-160)	21:33	30 19:39 (WEA-3 E-160)	21:56	11 21:06 (WEA-4 E-160)	
31 08:22		18:16	179 16:44 (WEA-1)	18:55	116 14:35 (WEA-2 E-138)	20:47	55 19:48 (WEA-3 E-160)	21:34	28 19:38 (WEA-3 E-160)	21:56	9 21:06 (WEA-4 E-160)	
32 17:09		18:18	179 07:58 (WEA05)	06:22	116 14:35 (WEA-2 E-138)	20:49	50 19:49 (WEA-3 E-160)	21:35	25 19:37 (WEA-3 E-160)	21:56	8 21:05 (WEA-4 E-160)	
33 08:21		18:20	172 08:18 (WEA-01)	06:19	120 14:35 (WEA-2 E-138)	20:51	51 19:49 (WEA-3 E-160)	21:36	23 19:36 (WEA-3 E-160)	21:56	6 21:05 (WEA-4 E-160)	
34 17:13		18:24	172 16:43 (WEA-1)	18:58	120 14:35 (WEA-2 E-138)	20:51	51 19:49 (WEA-3 E-160)	21:36	23 19:36 (WEA-3 E-160)	21:56	6 21:05 (WEA-4 E-160)	
35 08:18		18:26		07:17		06:10						
36 17:15		18:27		07:15		06:08						
37 08:17		18:28		07:12		06:05						
38 17:16		18:29		07:12		06:05						
39 08:15		18:30		07:12		06:05						
40 17:18		18:31		07:12		06:05						
Sonnenscheinstunden	259	278	367	416	416	2227	485	1269	498	158		
astr.max.mögl.Beschattung	249	269	416	416	416	2227	485	1269	498	158		
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,41	0,41	0,46	0,46	0,36	0,36		
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84	0,84		
Reduktion Windrichtung	0,57	0,66	0,65	0,65	0,65	0,65	0,64	0,64	0,59	0,59		
Gesamte Reduktion	0,09	0,17	0,16	0,22	0,22	0,22	0,25	0,25	0,18	0,18		
Met.wahrsch.Beschattung	23	446	675	497	497	314			28			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 43 - IP 43 Marbecker Straße 101

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	09:44 (WEA-1) 08:14	08:43 (WEA-2 E-138) 07:21	07:10	08:18 (WEA-4 E-160) 06:06	08:24 (WEA-4 E-160) 05:21	
2	16:32 26	10:10 (WEA-1) 17:20 39	09:32 (WEA-3 E-160) 18:11	20:05 61	09:19 (WEA-4 E-160) 20:56 27	08:51 (WEA-4 E-160) 21:41	
3	08:40	09:45 (WEA-1) 08:12	08:41 (WEA-2 E-138) 07:18	07:08	08:16 (WEA-4 E-160) 06:04	08:27 (WEA-4 E-160) 05:20	
4	16:33 25	10:10 (WEA-1) 17:22 45	09:33 (WEA-3 E-160) 18:13	20:07 62	09:18 (WEA-4 E-160) 20:57 21	08:48 (WEA-4 E-160) 21:42	
5	08:40	09:45 (WEA-1) 08:11	08:39 (WEA-2 E-138) 07:16	07:06	08:16 (WEA-4 E-160) 06:02	08:31 (WEA-4 E-160) 05:19	
6	16:35 26	10:11 (WEA-1) 17:24 50	09:34 (WEA-3 E-160) 18:15	20:08 63	09:19 (WEA-4 E-160) 20:59 12	08:43 (WEA-4 E-160) 21:43	
7	08:40	09:46 (WEA-1) 08:09	08:39 (WEA-2 E-138) 07:14	07:03	08:15 (WEA-4 E-160) 06:00	08:18 (WEA-4 E-160) 05:18	
8	16:36 25	10:11 (WEA-1) 17:26 54	09:36 (WEA-3 E-160) 18:17	20:10 64	09:19 (WEA-4 E-160) 21:01	08:43 (WEA-4 E-160) 21:44	
9	08:40	09:46 (WEA-1) 08:07	08:38 (WEA-2 E-138) 07:12	07:01	08:15 (WEA-4 E-160) 05:58	08:18 (WEA-4 E-160) 05:18	
10	16:37 25	10:11 (WEA-1) 17:27 58	09:37 (WEA-3 E-160) 18:19	20:12 64	09:19 (WEA-4 E-160) 21:02	08:43 (WEA-4 E-160) 21:45	
11	08:39	09:47 (WEA-1) 08:06	08:38 (WEA-2 E-138) 07:10	06:59	08:13 (WEA-4 E-160) 05:56	08:18 (WEA-4 E-160) 05:17	
12	16:38 25	10:12 (WEA-1) 17:29 59	09:37 (WEA-3 E-160) 18:20	20:14 65	09:18 (WEA-4 E-160) 21:04	08:13 (WEA-4 E-160) 21:46	
13	08:39	09:48 (WEA-1) 08:04	08:37 (WEA-2 E-138) 07:07	06:57	08:13 (WEA-4 E-160) 05:55	08:18 (WEA-4 E-160) 05:16	
14	16:39 23	10:11 (WEA-1) 17:31 61	09:38 (WEA-3 E-160) 18:22	20:15 65	09:18 (WEA-4 E-160) 21:06	08:13 (WEA-4 E-160) 21:47	
15	08:38	09:49 (WEA-1) 08:02	08:37 (WEA-2 E-138) 07:05	06:54	08:13 (WEA-4 E-160) 05:53	08:18 (WEA-4 E-160) 05:16	
16	16:41 23	10:12 (WEA-1) 17:33 61	09:38 (WEA-3 E-160) 18:24	20:17 65	09:18 (WEA-4 E-160) 21:07	08:13 (WEA-4 E-160) 21:48	
17	08:38	09:49 (WEA-1) 08:00	08:37 (WEA-2 E-138) 07:03	06:52	08:13 (WEA-4 E-160) 05:51	08:18 (WEA-4 E-160) 05:15	
18	16:42 23	10:12 (WEA-1) 17:35 62	09:39 (WEA-3 E-160) 18:26	20:19 65	09:18 (WEA-4 E-160) 21:09	08:13 (WEA-4 E-160) 21:49	
19	08:37	09:50 (WEA-1) 07:59	08:38 (WEA-2 E-138) 07:01	06:50	08:12 (WEA-4 E-160) 05:49	08:18 (WEA-4 E-160) 05:15	
20	16:43 21	10:11 (WEA-1) 17:37 62	09:40 (WEA-3 E-160) 18:27	20:20 66	09:18 (WEA-4 E-160) 21:10	08:13 (WEA-4 E-160) 21:50	
21	08:37	09:51 (WEA-1) 07:57	08:39 (WEA-2 E-138) 06:58	06:48	08:11 (WEA-4 E-160) 05:48	08:18 (WEA-4 E-160) 05:15	
22	16:45 20	10:11 (WEA-1) 17:38 61	09:40 (WEA-3 E-160) 18:29	20:22 66	09:17 (WEA-4 E-160) 21:12	08:13 (WEA-4 E-160) 21:51	
23	08:36	09:52 (WEA-1) 07:55	08:39 (WEA-2 E-138) 06:56	06:45	08:11 (WEA-4 E-160) 05:46	08:18 (WEA-4 E-160) 05:14	
24	16:46 20	10:12 (WEA-1) 17:40 61	09:40 (WEA-3 E-160) 18:31	20:24 66	09:17 (WEA-4 E-160) 21:14	08:13 (WEA-4 E-160) 21:51	
25	08:36	09:53 (WEA-1) 07:53	08:40 (WEA-2 E-138) 06:54	06:43	08:11 (WEA-4 E-160) 05:44	08:18 (WEA-4 E-160) 05:14	
26	16:48 18	10:11 (WEA-1) 17:42 60	09:40 (WEA-3 E-160) 18:33	20:25 65	09:16 (WEA-4 E-160) 21:15	08:13 (WEA-4 E-160) 21:52	
27	08:35	09:55 (WEA-1) 07:51	08:41 (WEA-2 E-138) 06:52	06:41	08:11 (WEA-4 E-160) 05:43	08:18 (WEA-4 E-160) 05:14	
28	16:49 16	10:11 (WEA-1) 17:44 58	09:40 (WEA-3 E-160) 18:34	20:27 65	09:16 (WEA-4 E-160) 21:17	08:13 (WEA-4 E-160) 21:53	
29	08:34	09:56 (WEA-1) 07:49	08:43 (WEA-2 E-138) 06:49	06:39	08:12 (WEA-4 E-160) 05:41	08:18 (WEA-4 E-160) 05:14	
30	16:51 14	10:10 (WEA-1) 17:46 54	09:40 (WEA-3 E-160) 18:36	20:29 63	09:15 (WEA-4 E-160) 21:18	08:13 (WEA-4 E-160) 21:53	
31	08:33	09:58 (WEA-1) 07:47	08:46 (WEA-2 E-138) 06:47	06:37	08:12 (WEA-4 E-160) 05:40	08:18 (WEA-4 E-160) 05:13	
32	16:52 10	10:08 (WEA-1) 17:48 48	09:40 (WEA-3 E-160) 18:38	20:30 62	09:14 (WEA-4 E-160) 21:20	08:13 (WEA-4 E-160) 21:54	
33	08:32	10:01 (WEA-1) 07:45	08:57 (WEA-3 E-160) 06:45	06:34	08:11 (WEA-4 E-160) 05:38	08:18 (WEA-4 E-160) 05:13	
34	16:54 5	10:06 (WEA-1) 17:50 43	09:40 (WEA-3 E-160) 18:39	20:32 62	09:13 (WEA-4 E-160) 21:21	08:13 (WEA-4 E-160) 21:54	
35	08:31	07:43	08:57 (WEA-3 E-160) 06:42	06:32	08:11 (WEA-4 E-160) 05:37	08:18 (WEA-4 E-160) 05:13	
36	16:56	17:51	42 09:39 (WEA-3 E-160) 18:41	20:34 61	09:12 (WEA-4 E-160) 21:23	08:13 (WEA-4 E-160) 21:54	
37	08:30	07:41	41 08:58 (WEA-3 E-160) 06:40	06:30	08:12 (WEA-4 E-160) 05:35	08:18 (WEA-4 E-160) 05:13	
38	16:57	17:53	41 09:39 (WEA-3 E-160) 18:43	20:36 59	09:11 (WEA-4 E-160) 21:24	08:13 (WEA-4 E-160) 21:55	
39	08:29	07:39	39 08:58 (WEA-3 E-160) 06:38	06:28	08:12 (WEA-4 E-160) 05:34	08:18 (WEA-4 E-160) 05:14	
40	16:59	17:55	39 09:37 (WEA-3 E-160) 18:45	20:37 58	09:10 (WEA-4 E-160) 21:26	08:13 (WEA-4 E-160) 21:55	
41	08:28	07:37	38 08:58 (WEA-3 E-160) 06:36	06:26	08:13 (WEA-4 E-160) 05:33	08:18 (WEA-4 E-160) 05:14	
42	17:01	17:57	38 09:36 (WEA-3 E-160) 18:46	20:39 56	09:09 (WEA-4 E-160) 21:27	08:13 (WEA-4 E-160) 21:55	
43	08:27	07:35	37 08:59 (WEA-3 E-160) 06:33	06:24	08:13 (WEA-4 E-160) 05:31	08:18 (WEA-4 E-160) 05:14	
44	17:02	17:59	36 09:35 (WEA-3 E-160) 18:48	20:41 54	09:07 (WEA-4 E-160) 21:29	08:13 (WEA-4 E-160) 21:56	
45	08:26	07:33	36 09:01 (WEA-3 E-160) 06:31	06:22	08:14 (WEA-4 E-160) 05:30	08:18 (WEA-4 E-160) 05:14	
46	17:04	18:01	33 09:34 (WEA-3 E-160) 18:50	20:42 52	09:06 (WEA-4 E-160) 21:30	08:14 (WEA-4 E-160) 21:56	
47	08:25	07:31	33 09:02 (WEA-3 E-160) 06:29	06:20	08:14 (WEA-4 E-160) 05:29	08:18 (WEA-4 E-160) 05:14	
48	17:06	18:02	30 09:32 (WEA-3 E-160) 18:51	20:44 51	09:05 (WEA-4 E-160) 21:31	08:14 (WEA-4 E-160) 21:56	
49	08:23	07:29	30 09:04 (WEA-3 E-160) 06:26	06:18	08:15 (WEA-4 E-160) 05:28	08:18 (WEA-4 E-160) 05:15	
50	17:07	18:04	27 09:31 (WEA-3 E-160) 18:53	20:46 48	09:03 (WEA-4 E-160) 21:33	08:14 (WEA-4 E-160) 21:56	
51	08:22	07:27	27 09:06 (WEA-3 E-160) 06:24	06:16	08:16 (WEA-4 E-160) 05:27	08:18 (WEA-4 E-160) 05:15	
52	17:09	18:06	22 09:28 (WEA-3 E-160) 18:55	20:47 45	09:01 (WEA-4 E-160) 21:34	08:14 (WEA-4 E-160) 21:56	
53	08:21	07:25	22 09:08 (WEA-3 E-160) 06:22	06:14	08:17 (WEA-4 E-160) 05:26	08:18 (WEA-4 E-160) 05:16	
54	17:11 5	09:19 (WEA-3 E-160) 18:08 16	09:24 (WEA-3 E-160) 18:57 51	08:15 (WEA-4 E-160) 20:49 43	09:00 (WEA-4 E-160) 21:35	08:14 (WEA-4 E-160) 21:56	
55	08:19	09:09 (WEA-3 E-160) 07:23 16	09:14 (WEA-3 E-160) 06:19 53	07:23 (WEA-4 E-160) 06:12 40	08:19 (WEA-4 E-160) 05:24	08:18 (WEA-4 E-160) 05:16	
56	17:13 14	09:23 (WEA-3 E-160) 18:10 4	09:18 (WEA-3 E-160) 18:58 53	08:16 (WEA-4 E-160) 20:51 40	08:59 (WEA-4 E-160) 21:37	08:14 (WEA-4 E-160) 21:56	
57	08:18	09:07 (WEA-3 E-160) 07:17 16	09:17 (WEA-3 E-160) 06:17 55	08:22 (WEA-4 E-160) 06:10 35	08:21 (WEA-4 E-160) 05:23	08:18 (WEA-4 E-160) 05:17	
58	17:15 20	09:27 (WEA-3 E-160) 07:15 16	09:15 (WEA-3 E-160) 06:15 55	09:17 (WEA-4 E-160) 20:52 35	08:56 (WEA-4 E-160) 21:38	08:14 (WEA-4 E-160) 21:56	
59	08:17	09:05 (WEA-3 E-160) 07:15 16	09:15 (WEA-3 E-160) 06:15 55	08:20 (WEA-4 E-160) 06:08 32	08:22 (WEA-4 E-160) 05:22	08:18 (WEA-4 E-160) 05:17	
60	17:16 24	09:29 (WEA-3 E-160) 07:15 16	09:17 (WEA-3 E-160) 06:15 55	09:17 (WEA-4 E-160) 20:54 32	08:54 (WEA-4 E-160) 21:39	08:14 (WEA-4 E-160) 21:55	
61	08:15	08:45 (WEA-2 E-138) 07:12 16	09:12 (WEA-3 E-160) 06:12 59	08:19 (WEA-4 E-160) 20:52 32	08:54 (WEA-4 E-160) 21:39	08:14 (WEA-4 E-160) 21:55	
62	17:18 30	09:30 (WEA-3 E-160) 07:12 16	09:18 (WEA-3 E-160) 06:12 59	09:18 (WEA-4 E-160) 21:40 32	08:54 (WEA-4 E-160) 21:39	08:14 (WEA-4 E-160) 21:55	
63	Sonnenscheinstunden	259	278	367	416	485	498
64	astr.max.mögl.Beschattung	438	1264	509	1723	60	
65	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	
67	Reduktion Windrichtung	0,57	0,58	0,64	0,64	0,64	
68	Gesamte Reduktion	0,09	0,15	0,16	0,22	0,24	
69	Met.wahrsch.Beschattung	41	183	81	374	15	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 43 - IP 43 Marbecker Straße 101

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	08:10 (WEA-4 E-160) 07:32 09:16 (WEA-4 E-160) 19:13	07:26 17:07	08:07 (WEA-2 E-138) 08:16 09:09 (WEA-3 E-160) 16:27
2	05:18 21:55	05:56 21:22	06:45 20:20	08:10 (WEA-4 E-160) 07:34 09:16 (WEA-4 E-160) 19:10	07:27 17:05	08:07 (WEA-2 E-138) 08:18 09:08 (WEA-3 E-160) 16:26
3	05:19 21:54	05:57 21:20	06:47 20:17	08:11 (WEA-4 E-160) 07:35 09:16 (WEA-4 E-160) 19:08	07:29 17:03	08:07 (WEA-2 E-138) 08:19 09:08 (WEA-3 E-160) 16:25
4	05:20 21:54	05:59 21:19	06:48 20:15	08:10 (WEA-4 E-160) 07:37 09:15 (WEA-4 E-160) 19:06	07:31 17:01	08:07 (WEA-2 E-138) 08:21 09:08 (WEA-3 E-160) 16:25
5	05:21 21:54	06:00 21:17	06:50 20:13	08:10 (WEA-4 E-160) 07:39 09:16 (WEA-4 E-160) 19:03	07:33 17:00	08:08 (WEA-2 E-138) 08:22 09:07 (WEA-3 E-160) 16:24
6	05:22 21:53	06:02 21:15	06:52 20:11	08:10 (WEA-4 E-160) 07:40 09:14 (WEA-4 E-160) 19:01	07:35 16:58	08:08 (WEA-2 E-138) 08:23 09:06 (WEA-3 E-160) 16:24
7	05:22 21:53	06:03 21:13	06:53 20:08	08:10 (WEA-4 E-160) 07:42 09:14 (WEA-4 E-160) 18:59	07:36 16:56	08:09 (WEA-2 E-138) 08:24 09:06 (WEA-3 E-160) 16:24
8	05:23 21:52	06:05 21:11	06:55 20:06	08:09 (WEA-4 E-160) 07:44 09:13 (WEA-4 E-160) 18:57	07:38 16:55	08:10 (WEA-2 E-138) 08:26 09:05 (WEA-3 E-160) 16:23
9	05:24 21:51	06:06 21:10	06:56 20:04	08:10 (WEA-4 E-160) 07:46 09:13 (WEA-4 E-160) 18:54	07:40 16:53	08:12 (WEA-2 E-138) 08:27 09:04 (WEA-3 E-160) 16:23
10	05:25 21:50	06:08 21:08	06:58 20:01	08:10 (WEA-4 E-160) 07:47 09:11 (WEA-4 E-160) 18:52	07:42 16:51	08:14 (WEA-2 E-138) 08:28 09:03 (WEA-3 E-160) 16:23
11	05:26 21:50	06:10 21:06	07:00 19:59	08:10 (WEA-4 E-160) 07:49 09:11 (WEA-4 E-160) 18:50	07:43 16:50	08:35 (WEA-3 E-160) 08:29 09:02 (WEA-3 E-160) 16:23
12	05:27 21:49	06:11 21:04	07:01 19:57	08:11 (WEA-4 E-160) 07:51 09:10 (WEA-4 E-160) 18:48	07:45 16:48	08:37 (WEA-3 E-160) 08:30 09:00 (WEA-3 E-160) 16:22
13	05:28 21:48	06:13 21:02	07:03 19:54	08:11 (WEA-4 E-160) 07:52 09:09 (WEA-4 E-160) 18:46	07:47 16:47	08:39 (WEA-3 E-160) 08:31 08:59 (WEA-3 E-160) 16:22
14	05:30 21:47	06:14 21:00	07:04 19:52	08:12 (WEA-4 E-160) 07:54 09:08 (WEA-4 E-160) 18:43	07:49 16:45	08:41 (WEA-3 E-160) 08:32 09:55 (WEA-3 E-160) 16:22
15	05:31 21:46	06:16 20:58	07:06 19:50	08:12 (WEA-4 E-160) 07:56 09:06 (WEA-4 E-160) 18:41	07:51 16:44	08:47 (WEA-3 E-160) 08:33 08:50 (WEA-3 E-160) 16:22
16	05:32 21:45	06:18 20:56	07:08 19:47	08:13 (WEA-4 E-160) 07:57 09:04 (WEA-4 E-160) 18:39	07:52 16:42	08:47 (WEA-3 E-160) 08:33 09:36 (WEA-3 E-160) 16:22
17	05:33 21:44	06:19 20:54	07:09 19:45	08:14 (WEA-4 E-160) 07:59 09:02 (WEA-4 E-160) 18:37	07:54 16:41	08:47 (WEA-3 E-160) 08:34 10:03 (WEA-3 E-160) 16:21
18	05:34 21:43	06:21 20:52	07:11 19:43	08:16 (WEA-4 E-160) 08:01 09:01 (WEA-4 E-160) 18:35	07:56 16:40	09:33 (WEA-3 E-160) 08:35 10:04 (WEA-3 E-160) 16:21
19	05:36 21:42	06:22 20:50	07:13 19:40	08:17 (WEA-4 E-160) 08:03 08:59 (WEA-4 E-160) 18:33	07:57 16:38	09:31 (WEA-3 E-160) 08:36 10:06 (WEA-3 E-160) 16:21
20	05:37 21:41	06:24 20:48	07:14 19:38	08:19 (WEA-4 E-160) 08:04 08:56 (WEA-4 E-160) 18:31	07:59 16:37	09:30 (WEA-3 E-160) 08:37 10:07 (WEA-3 E-160) 16:21
21	05:38 21:39	06:26 20:46	07:16 19:36	08:21 (WEA-4 E-160) 08:06 08:53 (WEA-4 E-160) 18:28	08:01 16:36	09:29 (WEA-3 E-160) 08:37 10:07 (WEA-3 E-160) 16:21
22	05:40 21:38	06:27 20:44	07:17 19:33	08:23 (WEA-4 E-160) 08:08 08:49 (WEA-4 E-160) 18:26	08:02 16:35	09:28 (WEA-3 E-160) 08:38 10:08 (WEA-3 E-160) 16:21
23	05:41 21:37	06:29 20:42	07:19 19:31	08:28 (WEA-4 E-160) 08:10 08:44 (WEA-4 E-160) 18:24	08:04 16:34	09:27 (WEA-3 E-160) 08:38 10:08 (WEA-3 E-160) 16:21
24	05:42 21:36	06:31 20:39	07:21 19:29	08:11 (WEA-4 E-160) 08:11 18:22	08:06 16:33	09:27 (WEA-3 E-160) 08:39 10:09 (WEA-3 E-160) 16:21
25	05:44 21:34	06:32 20:37	07:22 19:26	08:15 (WEA-4 E-160) 08:13 17:20	08:07 16:32	09:39 (WEA-1) 08:39 09:09 (WEA-3 E-160) 16:21
26	05:45 21:33	06:34 20:35	07:24 19:24	08:14 (WEA-4 E-160) 08:14 17:18	08:07 16:31	09:44 (WEA-1) 08:39 09:09 (WEA-3 E-160) 16:21
27	05:47 21:31	06:35 20:33	07:26 19:22	08:14 (WEA-4 E-160) 08:14 17:17	08:09 16:30	09:36 (WEA-1) 08:39 09:09 (WEA-3 E-160) 16:21
28	05:48 21:30	06:37 20:31	07:27 19:20	08:12 (WEA-4 E-160) 08:12 17:16	08:10 16:29	09:35 (WEA-1) 08:40 09:10 (WEA-3 E-160) 16:21
29	05:50 21:28	06:39 20:28	07:29 19:17	08:12 (WEA-4 E-160) 08:13 17:14	08:12 16:28	09:35 (WEA-1) 08:40 09:10 (WEA-3 E-160) 16:21
30	05:51 21:27	06:40 20:26	07:31 19:15	08:11 (WEA-4 E-160) 08:13 17:12	08:15 16:27	09:34 (WEA-1) 08:40 09:10 (WEA-3 E-160) 16:21
31	05:53 21:25	06:42 20:24	07:31 19:15	08:11 (WEA-4 E-160) 08:13 17:11	08:15 16:27	09:34 (WEA-1) 08:40 09:53 (WEA-1) 16:20
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung		1086	1229	741	715	788
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	0,15
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung		0,64	0,64	0,57	0,58	0,57
Gesamte Reduktion		0,23	0,19	0,15	0,11	0,07
Met.wahrsch.Beschattung		247	235	112	78	55

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 43/1 - IP 43/1 Marbecker Straße 101b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	09:41 (WEA-1) 08:14	08:43 (WEA-2 E-138) 07:21	07:10	08:16 (WEA-4 E-160) 06:06	08:21 (WEA-4 E-160) 05:21	
2	16:32 26	10:07 (WEA-1) 17:20	09:27 (WEA-3 E-160) 18:11	20:05	09:14 (WEA-4 E-160) 20:56	27 08:48 (WEA-4 E-160) 21:41	
3	08:40	09:42 (WEA-1) 08:12	08:40 (WEA-2 E-138) 07:18	07:08	08:14 (WEA-4 E-160) 06:04	08:24 (WEA-4 E-160) 05:20	
4	16:33 26	10:08 (WEA-1) 17:22	09:28 (WEA-3 E-160) 18:13	20:07	09:14 (WEA-4 E-160) 20:57	20 08:44 (WEA-4 E-160) 21:42	
5	08:40	09:43 (WEA-1) 08:11	08:39 (WEA-2 E-138) 07:16	07:06	08:13 (WEA-4 E-160) 06:02	08:28 (WEA-4 E-160) 05:19	
6	16:35 25	10:08 (WEA-1) 17:24	09:29 (WEA-3 E-160) 18:15	20:08	09:14 (WEA-4 E-160) 20:59	11 08:39 (WEA-4 E-160) 21:43	
7	08:40	09:43 (WEA-1) 08:09	08:38 (WEA-2 E-138) 07:14	07:03	08:13 (WEA-4 E-160) 06:00	08:28 (WEA-4 E-160) 05:18	
8	16:36 26	10:09 (WEA-1) 17:26	09:31 (WEA-3 E-160) 18:17	20:10	09:15 (WEA-4 E-160) 21:01	08:39 (WEA-4 E-160) 21:43	
9	08:40	09:43 (WEA-1) 08:07	08:37 (WEA-2 E-138) 07:12	07:01	08:12 (WEA-4 E-160) 05:58	08:28 (WEA-4 E-160) 05:18	
10	16:37 26	10:09 (WEA-1) 17:27	09:32 (WEA-3 E-160) 18:19	20:12	09:15 (WEA-4 E-160) 21:02	08:39 (WEA-4 E-160) 21:45	
11	08:39	09:45 (WEA-1) 08:06	08:37 (WEA-2 E-138) 07:10	06:59	08:11 (WEA-4 E-160) 05:56	08:11 (WEA-4 E-160) 05:17	
12	16:38 24	10:09 (WEA-1) 17:29	09:33 (WEA-3 E-160) 18:20	20:14	09:14 (WEA-4 E-160) 21:04	08:11 (WEA-4 E-160) 21:46	
13	08:39	09:45 (WEA-1) 08:04	08:36 (WEA-2 E-138) 07:07	06:57	08:11 (WEA-4 E-160) 05:55	08:11 (WEA-4 E-160) 05:16	
14	16:39 24	10:09 (WEA-1) 17:31	09:34 (WEA-3 E-160) 18:22	20:15	09:14 (WEA-4 E-160) 21:06	08:11 (WEA-4 E-160) 21:47	
15	08:38	09:46 (WEA-1) 08:02	08:36 (WEA-2 E-138) 07:05	06:54	08:10 (WEA-4 E-160) 05:53	08:10 (WEA-4 E-160) 05:16	
16	16:41 24	10:10 (WEA-1) 17:33	09:34 (WEA-3 E-160) 18:24	20:17	09:14 (WEA-4 E-160) 21:07	08:10 (WEA-4 E-160) 21:48	
17	08:38	09:46 (WEA-1) 08:00	08:36 (WEA-2 E-138) 07:03	06:52	08:10 (WEA-4 E-160) 05:51	08:10 (WEA-4 E-160) 05:15	
18	16:42 24	10:10 (WEA-1) 17:35	09:35 (WEA-3 E-160) 18:26	20:19	09:14 (WEA-4 E-160) 21:09	08:10 (WEA-4 E-160) 21:49	
19	08:37	09:47 (WEA-1) 07:59	08:37 (WEA-2 E-138) 07:01	06:50	08:10 (WEA-4 E-160) 05:49	08:10 (WEA-4 E-160) 05:15	
20	16:43 22	10:09 (WEA-1) 17:37	09:36 (WEA-3 E-160) 18:27	20:20	09:14 (WEA-4 E-160) 21:10	08:10 (WEA-4 E-160) 21:50	
21	08:37	09:47 (WEA-1) 07:57	08:37 (WEA-2 E-138) 06:58	06:48	08:09 (WEA-4 E-160) 05:48	08:09 (WEA-4 E-160) 05:15	
22	16:45 22	10:09 (WEA-1) 17:38	09:36 (WEA-3 E-160) 18:29	20:22	09:13 (WEA-4 E-160) 21:12	08:09 (WEA-4 E-160) 21:51	
23	08:36	09:49 (WEA-1) 07:55	08:37 (WEA-2 E-138) 06:56	06:45	08:09 (WEA-4 E-160) 05:46	08:09 (WEA-4 E-160) 05:14	
24	16:46 21	10:10 (WEA-1) 17:40	09:37 (WEA-3 E-160) 18:31	20:24	09:13 (WEA-4 E-160) 21:14	08:09 (WEA-4 E-160) 21:51	
25	08:36	09:50 (WEA-1) 07:53	08:38 (WEA-2 E-138) 06:54	06:43	08:09 (WEA-4 E-160) 05:44	08:09 (WEA-4 E-160) 05:14	
26	16:48 20	10:10 (WEA-1) 17:42	09:37 (WEA-3 E-160) 18:33	20:25	09:12 (WEA-4 E-160) 21:15	08:09 (WEA-4 E-160) 21:52	
27	08:35	09:51 (WEA-1) 07:51	08:39 (WEA-2 E-138) 06:52	06:41	08:09 (WEA-4 E-160) 05:43	08:09 (WEA-4 E-160) 05:14	
28	16:49 18	10:09 (WEA-1) 17:44	09:37 (WEA-3 E-160) 18:34	20:27	09:12 (WEA-4 E-160) 21:17	08:09 (WEA-4 E-160) 21:53	
29	08:34	09:52 (WEA-1) 07:49	08:40 (WEA-2 E-138) 06:49	06:39	08:09 (WEA-4 E-160) 05:41	08:09 (WEA-4 E-160) 05:14	
30	16:51 16	10:08 (WEA-1) 17:46	09:37 (WEA-3 E-160) 18:36	20:29	09:11 (WEA-4 E-160) 21:18	08:09 (WEA-4 E-160) 21:53	
31	08:33	09:54 (WEA-1) 07:47	08:42 (WEA-2 E-138) 06:47	06:37	08:09 (WEA-4 E-160) 05:40	08:09 (WEA-4 E-160) 05:13	
32	16:52 14	10:08 (WEA-1) 17:48	09:37 (WEA-3 E-160) 18:38	20:30	09:11 (WEA-4 E-160) 21:20	08:09 (WEA-4 E-160) 21:54	
33	08:32	09:56 (WEA-1) 07:45	08:54 (WEA-3 E-160) 06:45	06:34	08:08 (WEA-4 E-160) 05:38	08:08 (WEA-4 E-160) 05:13	
34	16:54 11	10:07 (WEA-1) 17:50	09:36 (WEA-3 E-160) 18:39	20:32	09:09 (WEA-4 E-160) 21:21	08:09 (WEA-4 E-160) 21:54	
35	08:31	09:59 (WEA-1) 07:43	08:54 (WEA-3 E-160) 06:42	06:32	08:09 (WEA-4 E-160) 05:37	08:09 (WEA-4 E-160) 05:13	
36	16:56 5	10:04 (WEA-1) 17:51	09:36 (WEA-3 E-160) 18:41	20:34	09:08 (WEA-4 E-160) 21:23	08:09 (WEA-4 E-160) 21:54	
37	08:30	07:41	08:55 (WEA-3 E-160) 06:40	06:30	08:09 (WEA-4 E-160) 05:35	08:09 (WEA-4 E-160) 05:13	
38	16:57	17:53	09:36 (WEA-3 E-160) 18:43	20:36	09:07 (WEA-4 E-160) 21:24	08:09 (WEA-4 E-160) 21:55	
39	08:29	07:39	08:54 (WEA-3 E-160) 06:38	06:28	08:09 (WEA-4 E-160) 05:34	08:09 (WEA-4 E-160) 05:14	
40	16:59	17:55	09:34 (WEA-3 E-160) 18:45	20:37	09:06 (WEA-4 E-160) 21:26	08:09 (WEA-4 E-160) 21:55	
41	08:28	07:37	08:55 (WEA-3 E-160) 06:36	06:26	08:10 (WEA-4 E-160) 05:33	08:10 (WEA-4 E-160) 05:14	
42	17:01	17:57	09:33 (WEA-3 E-160) 18:46	20:39	09:05 (WEA-4 E-160) 21:27	08:09 (WEA-4 E-160) 21:55	
43	08:27	07:35	08:56 (WEA-3 E-160) 06:33	06:24	08:10 (WEA-4 E-160) 05:31	08:10 (WEA-4 E-160) 05:14	
44	17:02	17:59	09:33 (WEA-3 E-160) 18:48	20:41	09:04 (WEA-4 E-160) 21:29	08:09 (WEA-4 E-160) 21:55	
45	08:26	07:33	08:57 (WEA-3 E-160) 06:31	06:22	08:11 (WEA-4 E-160) 05:30	08:11 (WEA-4 E-160) 05:14	
46	17:04	18:01	09:32 (WEA-3 E-160) 18:50	20:42	09:02 (WEA-4 E-160) 21:30	08:11 (WEA-4 E-160) 21:56	
47	08:25	07:31	08:58 (WEA-3 E-160) 06:29	06:20	08:12 (WEA-4 E-160) 05:29	08:12 (WEA-4 E-160) 05:14	
48	17:06	18:02	09:30 (WEA-3 E-160) 18:51	20:44	09:01 (WEA-4 E-160) 21:31	08:12 (WEA-4 E-160) 21:56	
49	08:23	07:29	08:59 (WEA-3 E-160) 06:26	06:18	08:12 (WEA-4 E-160) 05:28	08:12 (WEA-4 E-160) 05:15	
50	17:07	18:04	09:29 (WEA-3 E-160) 18:53	20:46	09:00 (WEA-4 E-160) 21:33	08:12 (WEA-4 E-160) 21:56	
51	08:22	07:27	09:01 (WEA-3 E-160) 06:24	06:16	08:13 (WEA-4 E-160) 05:27	08:13 (WEA-4 E-160) 05:15	
52	17:09	18:06	09:27 (WEA-3 E-160) 18:55	20:47	08:58 (WEA-4 E-160) 21:34	08:13 (WEA-4 E-160) 21:56	
53	08:21	07:25	09:02 (WEA-3 E-160) 06:22	06:14	08:14 (WEA-4 E-160) 05:26	08:14 (WEA-4 E-160) 05:16	
54	17:11	18:08	09:24 (WEA-3 E-160) 18:57	20:49	08:56 (WEA-4 E-160) 21:35	08:14 (WEA-4 E-160) 21:56	
55	08:19	07:23	09:05 (WEA-3 E-160) 06:19	06:12	08:16 (WEA-4 E-160) 05:24	08:16 (WEA-4 E-160) 05:16	
56	17:13	18:10	09:20 (WEA-3 E-160) 18:58	20:51	08:55 (WEA-4 E-160) 21:37	08:16 (WEA-4 E-160) 21:56	
57	08:18	07:17	08:20 (WEA-3 E-160) 06:10	06:10	08:18 (WEA-4 E-160) 05:23	08:18 (WEA-4 E-160) 05:17	
58	17:15	09:19 (WEA-3 E-160)	20:00	20:52	08:53 (WEA-4 E-160) 21:38	08:18 (WEA-4 E-160) 21:56	
59	08:17	09:05 (WEA-3 E-160)	07:15	06:08	08:19 (WEA-4 E-160) 05:22	08:19 (WEA-4 E-160) 05:17	
60	17:16 17	09:22 (WEA-3 E-160)	20:02	20:54	09:13 (WEA-4 E-160) 21:39	08:50 (WEA-4 E-160) 21:55	
61	08:15	09:02 (WEA-3 E-160)	07:12	06:12	08:17 (WEA-4 E-160) 05:22	08:17 (WEA-4 E-160) 05:17	
62	17:18 22	09:24 (WEA-3 E-160)	20:03	20:40	09:13 (WEA-4 E-160) 21:40	08:50 (WEA-4 E-160) 21:55	
63	Sonnenscheinstunden	259	278	367	416	485	498
64	astr.max.mögl.Beschattung	424	1255	451	1684	58	
65	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	
67	Reduktion Windrichtung	0,57	0,58	0,64	0,64	0,64	
68	Gesamte Reduktion	0,09	0,15	0,16	0,22	0,24	
69	Met.wahrsch.Beschattung	39	183	72	367	14	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 43/1 - IP 43/1 Marbecker Straße 101b

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	08:08 (WEA-4 E-160) 07:32 09:12 (WEA-4 E-160) 19:13	07:26 17:07	08:05 (WEA-2 E-138) 08:16 09:05 (WEA-3 E-160) 16:27
2	05:18 21:55	05:56 21:22	06:45 20:20	08:08 (WEA-4 E-160) 07:34 09:12 (WEA-4 E-160) 19:10	07:27 17:05	08:05 (WEA-2 E-138) 08:18 09:04 (WEA-3 E-160) 16:26
3	05:19 21:54	05:57 21:20	06:47 20:17	08:08 (WEA-4 E-160) 07:35 09:12 (WEA-4 E-160) 19:08	07:29 17:03	08:05 (WEA-2 E-138) 08:19 09:04 (WEA-3 E-160) 16:25
4	05:20 21:54	05:59 21:19	06:48 20:15	08:07 (WEA-4 E-160) 07:37 09:11 (WEA-4 E-160) 19:06	07:31 17:01	08:06 (WEA-2 E-138) 08:21 09:03 (WEA-3 E-160) 16:25
5	05:21 21:54	06:00 21:17	06:50 20:13	08:08 (WEA-4 E-160) 07:39 09:11 (WEA-4 E-160) 19:03	07:33 17:00	08:06 (WEA-2 E-138) 08:22 09:03 (WEA-3 E-160) 16:24
6	05:22 21:53	06:02 21:15	06:52 20:11	08:07 (WEA-4 E-160) 07:40 09:10 (WEA-4 E-160) 19:01	07:35 16:58	08:07 (WEA-2 E-138) 08:23 09:02 (WEA-3 E-160) 16:24
7	05:22 21:53	06:03 21:13	06:53 20:08	08:07 (WEA-4 E-160) 07:42 09:10 (WEA-4 E-160) 18:59	07:36 16:56	08:08 (WEA-2 E-138) 08:24 09:01 (WEA-3 E-160) 16:24
8	05:23 21:52	06:05 21:11	06:55 20:06	08:07 (WEA-4 E-160) 07:44 09:09 (WEA-4 E-160) 18:57	07:38 16:55	08:09 (WEA-2 E-138) 08:26 09:00 (WEA-3 E-160) 16:23
9	05:24 21:51	06:06 21:10	06:56 20:04	08:08 (WEA-4 E-160) 07:46 09:08 (WEA-4 E-160) 18:54	07:40 16:53	08:11 (WEA-2 E-138) 08:27 08:59 (WEA-3 E-160) 16:23
10	05:25 21:50	06:08 21:08	06:58 20:01	08:07 (WEA-4 E-160) 07:47 09:07 (WEA-4 E-160) 18:52	07:42 16:51	08:15 (WEA-2 E-138) 08:28 09:58 (WEA-3 E-160) 16:23
11	05:26 21:50	06:10 21:06	07:00 19:59	08:08 (WEA-4 E-160) 07:49 09:06 (WEA-4 E-160) 18:50	07:43 16:50	08:34 (WEA-3 E-160) 08:29 08:56 (WEA-3 E-160) 16:23
12	05:27 21:49	06:11 21:04	07:01 19:57	08:09 (WEA-4 E-160) 07:51 09:06 (WEA-4 E-160) 18:48	07:45 16:48	08:37 (WEA-3 E-160) 08:30 08:54 (WEA-3 E-160) 16:22
13	05:28 21:48	06:13 21:02	07:03 19:54	08:09 (WEA-4 E-160) 07:52 09:04 (WEA-4 E-160) 18:46	07:47 16:47	08:40 (WEA-3 E-160) 08:31 09:51 (WEA-3 E-160) 16:22
14	05:30 21:47	06:14 21:00	07:04 19:52	08:10 (WEA-4 E-160) 07:54 09:03 (WEA-4 E-160) 18:43	07:49 16:45	08:51 (WEA-3 E-160) 08:32 09:37 (WEA-3 E-160) 16:22
15	05:31 21:46	06:16 20:58	07:06 19:50	08:10 (WEA-4 E-160) 07:56 09:01 (WEA-4 E-160) 18:41	07:51 16:44	09:34 (WEA-3 E-160) 08:33 09:58 (WEA-3 E-160) 16:22
16	05:32 21:45	06:18 20:56	07:08 19:47	08:12 (WEA-4 E-160) 07:57 09:00 (WEA-4 E-160) 18:39	07:52 16:42	09:31 (WEA-3 E-160) 08:34 09:59 (WEA-3 E-160) 16:23
17	05:33 21:44	06:19 20:54	07:09 19:45	08:12 (WEA-4 E-160) 07:59 08:57 (WEA-4 E-160) 18:37	07:54 16:41	09:30 (WEA-3 E-160) 08:35 10:01 (WEA-3 E-160) 16:23
18	05:34 21:43	06:21 20:52	07:11 19:43	08:14 (WEA-4 E-160) 08:01 08:55 (WEA-4 E-160) 18:35	07:56 16:40	09:29 (WEA-3 E-160) 08:36 10:02 (WEA-3 E-160) 16:23
19	05:36 21:42	06:22 20:50	07:13 19:40	08:16 (WEA-4 E-160) 08:03 08:53 (WEA-4 E-160) 18:33	07:57 16:38	10:03 (WEA-3 E-160) 08:37 09:27 (WEA-3 E-160) 16:24
20	05:37 21:41	06:24 20:48	07:14 19:38	08:18 (WEA-4 E-160) 08:04 08:50 (WEA-4 E-160) 18:31	07:59 16:37	10:04 (WEA-3 E-160) 08:38 09:25 (WEA-3 E-160) 16:24
21	05:38 21:39	06:26 20:46	07:16 19:36	08:21 (WEA-4 E-160) 08:06 08:47 (WEA-4 E-160) 18:28	08:01 16:36	10:04 (WEA-3 E-160) 08:39 09:24 (WEA-3 E-160) 16:24
22	05:40 21:38	06:27 20:44	07:17 19:33	08:24 (WEA-4 E-160) 08:08 08:41 (WEA-4 E-160) 18:26	08:02 16:35	09:24 (WEA-3 E-160) 08:40 10:05 (WEA-3 E-160) 16:25
23	05:41 21:37	06:29 20:42	07:19 19:31	08:10 (WEA-4 E-160) 08:10 08:24 (WEA-4 E-160) 18:24	08:04 16:34	09:24 (WEA-3 E-160) 08:41 10:05 (WEA-3 E-160) 16:25
24	05:42 21:36	06:31 20:39	07:21 19:29	08:13 (WEA-4 E-160) 08:11 08:11 (WEA-4 E-160) 18:22	08:06 16:33	09:23 (WEA-3 E-160) 08:42 10:06 (WEA-3 E-160) 16:26
25	05:44 21:34	06:32 20:37	07:22 19:26	08:12 (WEA-4 E-160) 08:12 09:06 (WEA-3 E-160) 16:32	08:07 16:32	08:16 (WEA-2 E-138) 08:43 09:06 (WEA-3 E-160) 16:32
26	05:45 21:33	06:34 20:35	07:24 19:24	08:11 (WEA-4 E-160) 08:13 09:06 (WEA-3 E-160) 16:31	08:09 16:31	08:11 (WEA-2 E-138) 08:44 09:06 (WEA-3 E-160) 16:32
27	05:47 21:31	06:35 20:33	07:26 19:22	08:11 (WEA-4 E-160) 08:14 09:09 (WEA-2 E-138) 08:10	08:10 16:30	09:32 (WEA-1) 08:39 09:31 (WEA-1) 08:40
28	05:48 21:30	06:37 20:31	07:27 19:20	08:10 (WEA-4 E-160) 08:15 09:06 (WEA-3 E-160) 16:29	08:11 16:29	09:31 (WEA-1) 08:40 09:48 (WEA-1) 16:28
29	05:50 21:28	06:39 20:28	07:29 19:17	08:10 (WEA-4 E-160) 08:16 08:09 (WEA-4 E-160) 07:31	08:12 16:28	09:30 (WEA-1) 08:40 09:30 (WEA-1) 16:29
30	05:51 21:27	06:40 20:26	07:31 19:15	08:13 (WEA-4 E-160) 08:17 09:12 (WEA-4 E-160) 19:15	08:13 16:27	09:30 (WEA-1) 08:40 09:51 (WEA-1) 16:30
31	05:53 21:25	06:42 20:24	07:32 19:13	08:09 (WEA-4 E-160) 08:18 09:13 (WEA-4 E-160) 19:16	08:14 16:27	09:51 (WEA-1) 08:40 09:05 (WEA-3 E-160) 16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung		1068	1147	770	664	797
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	0,15
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung		0,64	0,64	0,58	0,58	0,57
Gesamte Reduktion		0,23	0,19	0,15	0,11	0,07
Met.wahrsch.Beschattung		244	221	117	73	55

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 44 - IP 44 Helle 20

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	11:55 (WEA-4 E-160)	08:14	12:05 (WEA-4 E-160)	07:20	06:06
	16:32	70 13:05 (WEA-4 E-160)	17:20	71 13:16 (WEA-4 E-160)	18:11	20:05
2	08:40	11:55 (WEA-4 E-160)	08:12	12:06 (WEA-4 E-160)	07:18	06:04
	16:33	71 13:06 (WEA-4 E-160)	17:22	70 13:16 (WEA-4 E-160)	18:13	20:07
3	08:40	11:56 (WEA-4 E-160)	08:11	12:06 (WEA-4 E-160)	07:16	06:02
	16:35	71 13:07 (WEA-4 E-160)	17:24	69 13:15 (WEA-4 E-160)	18:15	20:08
4	08:40	11:57 (WEA-4 E-160)	08:09	12:08 (WEA-4 E-160)	07:14	06:00
	16:36	71 13:08 (WEA-4 E-160)	17:25	67 13:15 (WEA-4 E-160)	18:17	20:10
5	08:40	11:56 (WEA-4 E-160)	08:07	12:08 (WEA-4 E-160)	07:12	05:58
	16:37	72 13:08 (WEA-4 E-160)	17:27	66 13:14 (WEA-4 E-160)	18:18	20:12
6	08:39	11:57 (WEA-4 E-160)	08:06	12:09 (WEA-4 E-160)	07:10	05:59
	16:38	72 13:09 (WEA-4 E-160)	17:29	65 13:14 (WEA-4 E-160)	18:20	20:14
7	08:39	11:57 (WEA-4 E-160)	08:04	12:10 (WEA-4 E-160)	07:07	05:57
	16:39	72 13:09 (WEA-4 E-160)	17:31	63 13:13 (WEA-4 E-160)	18:22	20:15
8	08:38	11:58 (WEA-4 E-160)	08:02	12:11 (WEA-4 E-160)	07:05	05:54
	16:41	72 13:10 (WEA-4 E-160)	17:33	60 13:11 (WEA-4 E-160)	18:24	20:17
9	08:38	11:58 (WEA-4 E-160)	08:00	12:12 (WEA-4 E-160)	07:03	05:52
	16:42	72 13:10 (WEA-4 E-160)	17:35	58 13:10 (WEA-4 E-160)	18:26	20:19
10	08:37	11:58 (WEA-4 E-160)	07:59	12:14 (WEA-4 E-160)	07:01	05:50
	16:43	73 13:11 (WEA-4 E-160)	17:37	56 13:10 (WEA-4 E-160)	18:27	20:20
11	08:37	11:58 (WEA-4 E-160)	07:57	12:16 (WEA-4 E-160)	06:58	05:48
	16:45	73 13:11 (WEA-4 E-160)	17:38	52 13:08 (WEA-4 E-160)	18:29	20:22
12	08:36	11:59 (WEA-4 E-160)	07:55	12:17 (WEA-4 E-160)	06:56	05:46
	16:46	73 13:12 (WEA-4 E-160)	17:40	50 13:07 (WEA-4 E-160)	18:31	20:24
13	08:36	11:59 (WEA-4 E-160)	07:53	12:19 (WEA-4 E-160)	06:54	05:44
	16:48	74 13:13 (WEA-4 E-160)	17:42	46 13:05 (WEA-4 E-160)	18:33	20:25
14	08:35	11:59 (WEA-4 E-160)	07:51	08:16 (WEA03)	06:52	05:41
	16:49	74 13:13 (WEA-4 E-160)	17:44	41 13:02 (WEA-4 E-160)	18:34	20:27
15	08:34	11:59 (WEA-4 E-160)	07:49	08:14 (WEA03)	06:49	05:39
	16:51	74 13:13 (WEA-4 E-160)	17:46	37 12:59 (WEA-4 E-160)	18:36	20:29
16	08:33	11:59 (WEA-4 E-160)	07:47	12:28 (WEA-4 E-160)	06:47	05:37
	16:52	75 13:14 (WEA-4 E-160)	17:48	27 12:55 (WEA-4 E-160)	18:38	20:30
17	08:32	12:00 (WEA-4 E-160)	07:45	12:34 (WEA-4 E-160)	06:45	05:34
	16:54	74 13:14 (WEA-4 E-160)	17:50	15 12:49 (WEA-4 E-160)	18:39	20:32
18	08:31	12:00 (WEA-4 E-160)	07:43	06:42	06:32	18 07:22 (WEA-5 E-160)
	16:56	75 13:15 (WEA-4 E-160)	17:51	18:41	20:34	22 07:24 (WEA-5 E-160)
19	08:30	11:59 (WEA-4 E-160)	07:41	06:40	06:30	22 07:01 (WEA-5 E-160)
	16:57	76 13:15 (WEA-4 E-160)	17:53	18:43	20:36	24 07:25 (WEA-5 E-160)
20	08:29	12:00 (WEA-4 E-160)	07:39	06:38	06:28	24 06:59 (WEA-5 E-160)
	16:59	75 13:15 (WEA-4 E-160)	17:55	18:45	20:37	27 07:26 (WEA-5 E-160)
21	08:28	12:00 (WEA-4 E-160)	07:37	06:35	06:26	27 06:58 (WEA-5 E-160)
	17:01	76 13:16 (WEA-4 E-160)	17:57	18:46	20:39	28 07:26 (WEA-5 E-160)
22	08:27	12:01 (WEA-4 E-160)	07:35	06:33	06:24	28 06:58 (WEA-5 E-160)
	17:02	75 13:16 (WEA-4 E-160)	17:59	18:48	20:41	29 07:27 (WEA-5 E-160)
23	08:26	12:01 (WEA-4 E-160)	07:33	06:31	06:22	29 06:57 (WEA-5 E-160)
	17:04	75 13:16 (WEA-4 E-160)	18:01	18:50	20:42	30 07:27 (WEA-5 E-160)
24	08:25	12:01 (WEA-4 E-160)	07:31	06:29	06:20	30 06:56 (WEA-5 E-160)
	17:06	75 13:16 (WEA-4 E-160)	18:02	18:51	20:44	31 07:27 (WEA-5 E-160)
25	08:23	12:02 (WEA-4 E-160)	07:29	06:26	06:18	31 06:56 (WEA-5 E-160)
	17:07	75 13:17 (WEA-4 E-160)	18:04	18:53	20:46	31 07:27 (WEA-5 E-160)
26	08:22	12:02 (WEA-4 E-160)	07:27	06:24	06:16	31 06:56 (WEA-5 E-160)
	17:09	74 13:16 (WEA-4 E-160)	18:06	18:55	20:47	31 07:27 (WEA-5 E-160)
27	08:21	12:03 (WEA-4 E-160)	07:25	06:22	06:14	31 06:55 (WEA-5 E-160)
	17:11	74 13:17 (WEA-4 E-160)	18:08	18:57	20:49	31 07:26 (WEA-5 E-160)
28	08:19	12:03 (WEA-4 E-160)	07:23	06:19	06:12	31 06:55 (WEA-5 E-160)
	17:13	74 13:17 (WEA-4 E-160)	18:10	18:58	20:51	31 07:26 (WEA-5 E-160)
29	08:18	12:04 (WEA-4 E-160)		07:17	06:10	31 06:56 (WEA-5 E-160)
	17:15	73 13:17 (WEA-4 E-160)		20:00	20:52	30 07:26 (WEA-5 E-160)
30	08:17	12:04 (WEA-4 E-160)		07:15	06:08	30 06:56 (WEA-5 E-160)
	17:16	72 13:16 (WEA-4 E-160)		20:02	20:54	30 07:26 (WEA-5 E-160)
31	08:15	12:04 (WEA-4 E-160)		07:12		05:22
	17:18	72 13:16 (WEA-4 E-160)		20:03		21:40
Sonnenscheinstunden	259	278		367	416	485
astr.max.mögl.Beschattung	2274	913		410		171
Red.Sonnenscheinwahrsch.	0,20	0,30		0,41		0,46
Reduktion Betriebsdauer	0,84	0,84		0,84		0,84
Reduktion Windrichtung	0,61	0,61		0,70		0,70
Gesamte Reduktion	0,10	0,15		0,24		0,26
Met.wahrsch.Beschattung	224	139		96		45

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 44 - IP 44 Helle 20

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	05:54		06:43	07:32	07:26		11:43 (WEA-4 E-160)	08:16		11:40 (WEA-4 E-160)
	21:55	21:24		20:22	19:13	17:07	56	12:39 (WEA-4 E-160)	16:27	73	12:53 (WEA-4 E-160)
2	05:18	05:56		06:45	07:34	07:27		11:41 (WEA-4 E-160)	08:18		11:41 (WEA-4 E-160)
	21:55	21:22		20:20	19:10	17:05	59	12:40 (WEA-4 E-160)	16:26	73	12:54 (WEA-4 E-160)
3	05:19	05:57		06:47	07:35	07:29		11:40 (WEA-4 E-160)	08:19		11:41 (WEA-4 E-160)
	21:54	21:20		20:17	19:08	17:03	61	12:41 (WEA-4 E-160)	16:25	72	12:53 (WEA-4 E-160)
4	05:20	05:59	07:18 (WEA-5 E-160)	06:48	07:37	07:31		11:39 (WEA-4 E-160)	08:21		11:42 (WEA-4 E-160)
	21:54	21:19	4	20:22 (WEA-5 E-160)	19:06	17:01	63	12:42 (WEA-4 E-160)	16:25	72	12:54 (WEA-4 E-160)
5	05:21	06:00	07:13 (WEA-5 E-160)	06:50	07:39	07:33		11:39 (WEA-4 E-160)	08:22		11:42 (WEA-4 E-160)
	21:54	21:17	12	20:25 (WEA-5 E-160)	19:03	17:00	64	12:43 (WEA-4 E-160)	16:24	72	12:54 (WEA-4 E-160)
6	05:21	06:02	07:12 (WEA-5 E-160)	06:52	07:40	07:35		11:38 (WEA-4 E-160)	08:23		11:43 (WEA-4 E-160)
	21:53	21:15	16	20:28 (WEA-5 E-160)	19:01	16:58	66	12:44 (WEA-4 E-160)	16:24	72	12:55 (WEA-4 E-160)
7	05:22	06:03	07:09 (WEA-5 E-160)	06:53	07:42	07:36		11:37 (WEA-4 E-160)	08:24		11:43 (WEA-4 E-160)
	21:52	21:13	20	20:29 (WEA-5 E-160)	18:59	16:56	68	12:45 (WEA-4 E-160)	16:23	72	12:55 (WEA-4 E-160)
8	05:23	06:05	07:09 (WEA-5 E-160)	06:55	07:44	07:38		11:37 (WEA-4 E-160)	08:26		11:44 (WEA-4 E-160)
	21:52	21:11	22	20:31 (WEA-5 E-160)	18:57	16:54	69	12:46 (WEA-4 E-160)	16:23	71	12:55 (WEA-4 E-160)
9	05:24	06:06	07:07 (WEA-5 E-160)	06:56	07:46	07:40		11:37 (WEA-4 E-160)	08:27		11:44 (WEA-4 E-160)
	21:51	21:10	24	20:33 (WEA-5 E-160)	18:54	16:53	70	12:47 (WEA-4 E-160)	16:23	71	12:55 (WEA-4 E-160)
10	05:25	06:08	07:06 (WEA-5 E-160)	06:58	07:47	07:42		11:36 (WEA-4 E-160)	08:28		11:45 (WEA-4 E-160)
	21:50	21:08	26	20:32 (WEA-5 E-160)	18:52	16:51	71	12:47 (WEA-4 E-160)	16:23	71	12:56 (WEA-4 E-160)
11	05:26	06:10	07:05 (WEA-5 E-160)	07:00	07:49	07:43		11:36 (WEA-4 E-160)	08:29		11:46 (WEA-4 E-160)
	21:50	21:06	28	20:33 (WEA-5 E-160)	18:50	16:50	72	12:48 (WEA-4 E-160)	16:22	70	12:56 (WEA-4 E-160)
12	05:27	06:11	07:05 (WEA-5 E-160)	07:01	07:51	07:45		11:36 (WEA-4 E-160)	08:30		11:46 (WEA-4 E-160)
	21:49	21:04	29	20:34 (WEA-5 E-160)	18:48	16:48	72	12:48 (WEA-4 E-160)	16:22	70	12:56 (WEA-4 E-160)
13	05:28	06:13	07:04 (WEA-5 E-160)	07:03	07:52	07:47		11:36 (WEA-4 E-160)	08:31		11:47 (WEA-4 E-160)
	21:48	21:02	29	20:33 (WEA-5 E-160)	18:46	16:47	73	12:49 (WEA-4 E-160)	16:22	70	12:57 (WEA-4 E-160)
14	05:30	06:14	07:04 (WEA-5 E-160)	07:04	07:54	07:49		11:35 (WEA-4 E-160)	08:32		11:47 (WEA-3 E-160)
	21:47	21:00	30	20:34 (WEA-5 E-160)	18:43	16:45	73	12:48 (WEA-4 E-160)	16:22	70	12:57 (WEA-4 E-160)
15	05:31	06:16	07:03 (WEA-5 E-160)	07:06	07:56	07:50		11:35 (WEA-4 E-160)	08:33		11:45 (WEA-3 E-160)
	21:46	20:58	31	20:34 (WEA-5 E-160)	18:41	16:44	74	12:49 (WEA-4 E-160)	16:22	72	12:57 (WEA-4 E-160)
16	05:32	06:18	07:03 (WEA-5 E-160)	07:08	07:57	07:52		11:35 (WEA-4 E-160)	08:34		11:43 (WEA-3 E-160)
	21:45	20:56	31	20:34 (WEA-5 E-160)	18:39	16:42	74	12:49 (WEA-4 E-160)	16:22	74	12:57 (WEA-4 E-160)
17	05:33	06:19	07:02 (WEA-5 E-160)	07:09	07:59	07:54		11:35 (WEA-4 E-160)	08:35		11:43 (WEA-3 E-160)
	21:44	20:54	31	20:33 (WEA-5 E-160)	18:37	16:41	75	12:50 (WEA-4 E-160)	16:23	75	12:58 (WEA-4 E-160)
18	05:34	06:21	07:03 (WEA-5 E-160)	07:11	08:01	07:56		11:35 (WEA-4 E-160)	08:35		10:06 (WEA-2 E-138)
	21:43	20:52	31	20:34 (WEA-5 E-160)	18:35	16:40	75	12:50 (WEA-4 E-160)	16:23	76	12:58 (WEA-4 E-160)
19	05:36	06:22	07:02 (WEA-5 E-160)	07:13	08:03	07:57		11:36 (WEA-4 E-160)	08:36		10:05 (WEA-2 E-138)
	21:42	20:50	31	20:33 (WEA-5 E-160)	18:33	16:38	75	12:51 (WEA-4 E-160)	16:23	80	12:59 (WEA-4 E-160)
20	05:37	06:24	07:03 (WEA-5 E-160)	07:14	08:04	07:59		11:36 (WEA-4 E-160)	08:37		10:05 (WEA-2 E-138)
	21:41	20:48	30	20:33 (WEA-5 E-160)	18:31	16:37	75	12:51 (WEA-4 E-160)	16:24	80	12:59 (WEA-4 E-160)
21	05:38	06:26	07:02 (WEA-5 E-160)	07:16	08:06	08:01		11:36 (WEA-4 E-160)	08:37		10:06 (WEA-2 E-138)
	21:39	20:46	29	20:31 (WEA-5 E-160)	18:28	16:36	76	12:52 (WEA-4 E-160)	16:24	80	13:00 (WEA-4 E-160)
22	05:40	06:27	07:03 (WEA-5 E-160)	07:17	08:08	08:02		11:36 (WEA-4 E-160)	08:38		10:05 (WEA-2 E-138)
	21:38	20:44	28	20:31 (WEA-5 E-160)	18:26	16:35	75	12:51 (WEA-4 E-160)	16:24	81	13:00 (WEA-4 E-160)
23	05:41	06:29	07:04 (WEA-5 E-160)	07:19	08:10	08:04		11:36 (WEA-4 E-160)	08:38		10:07 (WEA-2 E-138)
	21:37	20:41	26	20:30 (WEA-5 E-160)	18:24	16:34	76	12:52 (WEA-4 E-160)	16:25	80	13:01 (WEA-4 E-160)
24	05:42	06:30	07:05 (WEA-5 E-160)	07:21	08:11	08:06		11:37 (WEA-4 E-160)	08:39		10:07 (WEA-2 E-138)
	21:36	20:39	24	20:29 (WEA-5 E-160)	18:22	16:33	75	12:52 (WEA-4 E-160)	16:26	80	13:01 (WEA-4 E-160)
25	05:44	06:32	07:06 (WEA-5 E-160)	07:22	07:13	11:38 (WEA-4 E-160)	08:07	11:38 (WEA-4 E-160)	08:39		10:08 (WEA-2 E-138)
	21:34	20:37	21	20:27 (WEA-5 E-160)	17:20	12:21 (WEA-4 E-160)	16:32	12:53 (WEA-4 E-160)	16:26	77	13:01 (WEA-4 E-160)
26	05:45	06:34	07:07 (WEA-5 E-160)	07:24	07:15	11:57 (WEA-4 E-160)	08:09	11:37 (WEA-4 E-160)	08:39		11:46 (WEA-3 E-160)
	21:33	20:35	18	20:25 (WEA-5 E-160)	17:18	12:26 (WEA-4 E-160)	16:31	12:52 (WEA-4 E-160)	16:27	75	13:01 (WEA-4 E-160)
27	05:47	06:35	07:10 (WEA-5 E-160)	07:26	07:17	07:44 (WEA03)	08:10	11:38 (WEA-4 E-160)	08:40		11:48 (WEA-3 E-160)
	21:31	20:33	13	20:23 (WEA-5 E-160)	17:16	12:30 (WEA-4 E-160)	16:30	12:53 (WEA-4 E-160)	16:28	75	13:03 (WEA-4 E-160)
28	05:48	06:37	07:27 (WEA-5 E-160)	07:27	07:18	07:46 (WEA03)	08:12	11:39 (WEA-4 E-160)	08:40		11:50 (WEA-3 E-160)
	21:30	20:31		19:20	17:14	12:32 (WEA-4 E-160)	16:29	12:53 (WEA-4 E-160)	16:28	73	13:03 (WEA-4 E-160)
29	05:49	06:39	07:29 (WEA-5 E-160)	07:29	07:20	11:48 (WEA-4 E-160)	08:13	11:39 (WEA-4 E-160)	08:40		11:52 (WEA-3 E-160)
	21:28	20:28		19:17	17:12	12:35 (WEA-4 E-160)	16:28	12:53 (WEA-4 E-160)	16:29	72	13:04 (WEA-4 E-160)
30	05:51	06:40	07:30 (WEA-5 E-160)	07:22	07:11	11:45 (WEA-4 E-160)	08:15	11:40 (WEA-4 E-160)	08:40		11:55 (WEA-4 E-160)
	21:27	20:26		19:15	17:10	12:36 (WEA-4 E-160)	16:27	12:53 (WEA-4 E-160)	16:30	69	13:04 (WEA-4 E-160)
31	05:52	06:42	07:24 (WEA-5 E-160)	07:24	07:13	11:44 (WEA-4 E-160)	08:16	11:40 (WEA-4 E-160)	08:40		11:55 (WEA-4 E-160)
	21:25	20:24		17:09	17:09	12:37 (WEA-4 E-160)	16:27	12:53 (WEA-4 E-160)	16:31	70	13:05 (WEA-4 E-160)
Sonnenscheinstunden	501	453		381	332		267		244		
astr.max.mögl.Beschattung			584		280		2133			2288	
Red.Sonnenscheinwahrsch.			0,43		0,32		0,23			0,15	
Reduktion Betriebsdauer			0,84		0,84		0,84			0,84	
Reduktion Windrichtung			0,70		0,61		0,61			0,61	
Gesamte Reduktion			0,25		0,16		0,11			0,07	
Met.wahrsch.Beschattung			144		45		245			169	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 44/1 - IP 44/1 Helle 20a

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	11:58 (WEA-4 E-160)	08:14	12:09 (WEA-4 E-160)	07:20	06:06
	16:32	71 13:09 (WEA-4 E-160)	17:20	71 13:20 (WEA-4 E-160)	18:11	20:05
2	08:40	11:59 (WEA-4 E-160)	08:12	12:09 (WEA-4 E-160)	07:18	06:04
	16:33	70 13:09 (WEA-4 E-160)	17:22	71 13:20 (WEA-4 E-160)	18:13	20:07
3	08:40	11:59 (WEA-4 E-160)	08:11	12:09 (WEA-4 E-160)	07:16	06:02
	16:35	71 13:10 (WEA-4 E-160)	17:24	70 13:19 (WEA-4 E-160)	18:15	20:08
4	08:40	12:00 (WEA-4 E-160)	08:09	12:11 (WEA-4 E-160)	07:14	06:00
	16:36	71 13:11 (WEA-4 E-160)	17:25	68 13:19 (WEA-4 E-160)	18:17	20:10
5	08:40	12:00 (WEA-4 E-160)	08:07	12:11 (WEA-4 E-160)	07:12	05:58
	16:37	71 13:11 (WEA-4 E-160)	17:27	67 13:18 (WEA-4 E-160)	18:18	20:12
6	08:39	12:00 (WEA-4 E-160)	08:06	12:12 (WEA-4 E-160)	07:10	05:59
	16:38	72 13:12 (WEA-4 E-160)	17:29	66 13:18 (WEA-4 E-160)	18:20	20:14
7	08:39	12:00 (WEA-4 E-160)	08:04	12:13 (WEA-4 E-160)	07:07	05:55
	16:39	72 13:12 (WEA-4 E-160)	17:31	64 13:17 (WEA-4 E-160)	18:22	20:15
8	08:38	12:01 (WEA-4 E-160)	08:02	12:14 (WEA-4 E-160)	07:05	05:54
	16:41	73 13:14 (WEA-4 E-160)	17:33	62 13:16 (WEA-4 E-160)	18:24	20:17
9	08:38	12:01 (WEA-4 E-160)	08:00	12:15 (WEA-4 E-160)	07:03	05:52
	16:42	73 13:14 (WEA-4 E-160)	17:35	59 13:14 (WEA-4 E-160)	18:26	20:19
10	08:37	12:01 (WEA-4 E-160)	07:59	12:17 (WEA-4 E-160)	07:01	05:50
	16:43	73 13:14 (WEA-4 E-160)	17:37	57 13:14 (WEA-4 E-160)	18:27	20:20
11	08:37	12:01 (WEA-4 E-160)	07:57	12:18 (WEA-4 E-160)	06:58	05:48
	16:45	73 13:14 (WEA-4 E-160)	17:38	55 13:13 (WEA-4 E-160)	18:29	20:22
12	08:36	12:02 (WEA-4 E-160)	07:55	12:20 (WEA-4 E-160)	06:56	05:46
	16:46	74 13:16 (WEA-4 E-160)	17:40	51 13:11 (WEA-4 E-160)	18:31	20:24
13	08:36	12:02 (WEA-4 E-160)	07:53	12:22 (WEA-4 E-160)	06:54	05:44
	16:48	74 13:16 (WEA-4 E-160)	17:42	47 13:09 (WEA-4 E-160)	18:33	20:25
14	08:35	12:02 (WEA-4 E-160)	07:51	08:16 (WEA03)	06:52	05:41
	16:49	75 13:17 (WEA-4 E-160)	17:44	44 13:07 (WEA-4 E-160)	18:34	20:27
15	08:34	12:02 (WEA-4 E-160)	07:49	08:14 (WEA03)	06:49	05:39
	16:51	75 13:17 (WEA-4 E-160)	17:46	39 13:04 (WEA-4 E-160)	18:36	20:29
16	08:33	12:03 (WEA-4 E-160)	07:47	12:30 (WEA-4 E-160)	06:47	05:37
	16:52	75 13:18 (WEA-4 E-160)	17:48	31 13:01 (WEA-4 E-160)	18:38	20:30
17	08:32	12:03 (WEA-4 E-160)	07:45	12:35 (WEA-4 E-160)	06:45	05:34
	16:54	75 13:18 (WEA-4 E-160)	17:50	21 12:56 (WEA-4 E-160)	18:39	20:32
18	08:31	12:03 (WEA-4 E-160)	07:43	06:42	06:32	05:32
	16:56	76 13:19 (WEA-4 E-160)	17:51	18:41	20:34	21
19	08:30	12:03 (WEA-4 E-160)	07:41	06:40	06:30	05:30
	16:57	75 13:18 (WEA-4 E-160)	17:53	18:43	20:36	24
20	08:29	12:03 (WEA-4 E-160)	07:39	06:38	06:28	05:28
	16:59	76 13:19 (WEA-4 E-160)	17:55	18:45	20:37	26
21	08:28	12:04 (WEA-4 E-160)	07:37	06:35	06:26	05:26
	17:01	75 13:19 (WEA-4 E-160)	17:57	18:46	20:39	28
22	08:27	12:04 (WEA-4 E-160)	07:35	06:33	06:24	05:24
	17:02	76 13:20 (WEA-4 E-160)	17:59	18:48	20:41	29
23	08:26	12:04 (WEA-4 E-160)	07:33	06:31	06:22	05:22
	17:04	75 13:19 (WEA-4 E-160)	18:01	18:50	20:42	30
24	08:25	12:05 (WEA-4 E-160)	07:31	06:29	06:20	05:20
	17:06	75 13:20 (WEA-4 E-160)	18:02	18:51	20:44	30
25	08:23	12:05 (WEA-4 E-160)	07:29	06:26	06:18	05:18
	17:07	76 13:21 (WEA-4 E-160)	18:04	18:53	20:46	31
26	08:22	12:05 (WEA-4 E-160)	07:27	06:24	06:16	05:16
	17:09	75 13:20 (WEA-4 E-160)	18:06	18:55	20:47	31
27	08:21	12:06 (WEA-4 E-160)	07:25	06:22	06:14	05:14
	17:11	75 13:21 (WEA-4 E-160)	18:08	18:57	20:49	31
28	08:19	12:06 (WEA-4 E-160)	07:23	06:19	06:12	05:12
	17:13	74 13:20 (WEA-4 E-160)	18:10	18:58	20:51	31
29	08:18	12:07 (WEA-4 E-160)		07:17	06:10	05:10
	17:15	74 13:21 (WEA-4 E-160)		20:00	20:52	31
30	08:17	12:07 (WEA-4 E-160)		07:15	06:08	05:08
	17:16	73 13:20 (WEA-4 E-160)		20:02	20:54	30
31	08:15	12:07 (WEA-4 E-160)		07:12		05:22
	17:18	73 13:20 (WEA-4 E-160)		20:03		21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	2286	943	401	192		
Red.Sonnenscheinwahrsch.	0,20	0,30	0,41	0,46		
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		
Reduktion Windrichtung	0,61	0,61	0,70	0,70		
Gesamte Reduktion	0,10	0,15	0,24	0,26		
Met.wahrsch.Beschattung	226	145	94	51		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 44/1 - IP 44/1 Helle 20a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	05:54		06:43	07:32			07:26	11:45 (WEA-4 E-160)	08:16	11:43 (WEA-4 E-160)
	21:55	21:24		20:22	19:13			17:07	58 12:43 (WEA-4 E-160)	16:27	74 12:57 (WEA-4 E-160)
2	05:18	05:56		06:45	07:34			07:27	11:44 (WEA-4 E-160)	08:18	11:44 (WEA-4 E-160)
	21:55	21:22		20:20	19:10			17:05	60 12:44 (WEA-4 E-160)	16:26	73 12:57 (WEA-4 E-160)
3	05:19	05:57		06:47	07:35			07:29	11:43 (WEA-4 E-160)	08:19	11:44 (WEA-4 E-160)
	21:54	21:20		20:17	19:08			17:03	62 12:45 (WEA-4 E-160)	16:25	73 12:57 (WEA-4 E-160)
4	05:20	05:59		06:48	07:37			07:31	11:42 (WEA-4 E-160)	08:21	11:45 (WEA-4 E-160)
	21:54	21:19	10	07:24 (WEA-5 E-160)	20:15	19:06		17:01	64 12:46 (WEA-4 E-160)	16:25	73 12:58 (WEA-4 E-160)
5	05:21	06:00		06:50	07:39			07:33	11:42 (WEA-4 E-160)	08:22	11:45 (WEA-4 E-160)
	21:54	21:17	15	07:26 (WEA-5 E-160)	20:13	19:03		17:00	65 12:47 (WEA-4 E-160)	16:24	73 12:58 (WEA-4 E-160)
6	05:21	06:02		06:52	07:40			07:35	11:41 (WEA-4 E-160)	08:23	11:47 (WEA-4 E-160)
	21:53	21:15	19	07:29 (WEA-5 E-160)	20:10	19:01		16:58	67 12:48 (WEA-4 E-160)	16:24	71 12:58 (WEA-4 E-160)
7	05:22	06:03		06:53	07:42			07:36	11:41 (WEA-4 E-160)	08:24	11:47 (WEA-4 E-160)
	21:52	21:13	21	07:29 (WEA-5 E-160)	20:08	18:59		16:56	68 12:49 (WEA-4 E-160)	16:23	71 12:58 (WEA-4 E-160)
8	05:23	06:05		06:55	07:44			07:38	11:40 (WEA-4 E-160)	08:26	11:47 (WEA-4 E-160)
	21:52	21:11	24	07:31 (WEA-5 E-160)	20:06	18:57		16:54	70 12:50 (WEA-4 E-160)	16:23	71 12:58 (WEA-4 E-160)
9	05:24	06:06		06:56	07:46			07:40	11:40 (WEA-4 E-160)	08:27	11:47 (WEA-4 E-160)
	21:51	21:10	25	07:31 (WEA-5 E-160)	20:04	18:54		16:53	70 12:50 (WEA-4 E-160)	16:23	71 12:58 (WEA-4 E-160)
10	05:25	06:08		06:58	07:47			07:42	11:39 (WEA-4 E-160)	08:28	11:49 (WEA-4 E-160)
	21:50	21:08	27	07:32 (WEA-5 E-160)	20:01	18:52		16:51	72 12:51 (WEA-4 E-160)	16:23	70 12:59 (WEA-4 E-160)
11	05:26	06:10		07:00	07:49			07:43	11:39 (WEA-4 E-160)	08:29	11:49 (WEA-4 E-160)
	21:50	21:06	28	07:32 (WEA-5 E-160)	19:59	18:50		16:50	73 12:52 (WEA-4 E-160)	16:22	71 13:00 (WEA-4 E-160)
12	05:27	06:11		07:01	07:51			07:45	11:39 (WEA-4 E-160)	08:30	11:50 (WEA-4 E-160)
	21:49	21:04	29	07:33 (WEA-5 E-160)	19:57	18:48		16:48	73 12:52 (WEA-4 E-160)	16:22	70 13:00 (WEA-4 E-160)
13	05:28	06:13		07:03	07:52			07:47	11:39 (WEA-4 E-160)	08:31	11:50 (WEA-4 E-160)
	21:48	21:02	30	07:33 (WEA-5 E-160)	19:54	18:46		16:47	74 12:53 (WEA-4 E-160)	16:22	70 13:00 (WEA-4 E-160)
14	05:30	06:14		07:04	07:54			07:49	11:38 (WEA-4 E-160)	08:32	11:47 (WEA-4 E-160)
	21:47	21:00	31	07:34 (WEA-5 E-160)	19:52	18:43		16:45	74 12:52 (WEA-4 E-160)	16:22	74 13:01 (WEA-4 E-160)
15	05:31	06:16		07:06	07:56			07:50	11:38 (WEA-4 E-160)	08:33	11:46 (WEA-4 E-160)
	21:46	20:58	31	07:33 (WEA-5 E-160)	19:50	18:41		16:44	75 12:53 (WEA-4 E-160)	16:22	75 13:01 (WEA-4 E-160)
16	05:32	06:18		07:08	07:57			07:52	11:38 (WEA-4 E-160)	08:34	11:45 (WEA-4 E-160)
	21:45	20:56	32	07:34 (WEA-5 E-160)	19:47	18:39		16:42	75 12:53 (WEA-4 E-160)	16:22	76 13:01 (WEA-4 E-160)
17	05:33	06:19		07:09	07:59			07:54	11:38 (WEA-4 E-160)	08:35	11:44 (WEA-4 E-160)
	21:44	20:54	31	07:33 (WEA-5 E-160)	19:45	18:37		16:41	76 12:54 (WEA-4 E-160)	16:23	77 13:01 (WEA-4 E-160)
18	05:34	06:21		07:11	08:01			07:56	11:39 (WEA-4 E-160)	08:35	11:45 (WEA-4 E-160)
	21:43	20:52	31	07:33 (WEA-5 E-160)	19:43	18:35		16:40	75 12:54 (WEA-4 E-160)	16:23	77 13:02 (WEA-4 E-160)
19	05:36	06:22		07:13	08:03			07:57	11:39 (WEA-4 E-160)	08:36	11:45 (WEA-4 E-160)
	21:42	20:50	30	07:32 (WEA-5 E-160)	19:40	18:33		16:38	75 12:54 (WEA-4 E-160)	16:23	78 13:03 (WEA-4 E-160)
20	05:37	06:24		07:14	08:04			07:59	11:39 (WEA-4 E-160)	08:37	10:07 (WEA-2 E-138)
	21:41	20:48	30	07:32 (WEA-5 E-160)	19:38	18:31		16:37	76 12:55 (WEA-4 E-160)	16:24	79 13:02 (WEA-4 E-160)
21	05:38	06:26		07:16	08:06			08:01	11:40 (WEA-4 E-160)	08:37	10:07 (WEA-2 E-138)
	21:39	20:46	29	07:31 (WEA-5 E-160)	19:36	18:28		16:36	75 12:55 (WEA-4 E-160)	16:24	81 13:03 (WEA-4 E-160)
22	05:40	06:27		07:17	08:08			08:02	11:39 (WEA-4 E-160)	08:38	10:07 (WEA-2 E-138)
	21:38	20:44	27	07:30 (WEA-5 E-160)	19:33	18:26		16:35	76 12:55 (WEA-4 E-160)	16:24	81 13:03 (WEA-4 E-160)
23	05:41	06:29		07:19	08:10			08:04	11:40 (WEA-4 E-160)	08:38	10:08 (WEA-2 E-138)
	21:37	20:41	25	07:29 (WEA-5 E-160)	19:31	18:24		16:34	75 12:55 (WEA-4 E-160)	16:25	80 13:04 (WEA-4 E-160)
24	05:42	06:30		07:21	08:11			08:06	11:40 (WEA-4 E-160)	08:39	10:09 (WEA-2 E-138)
	21:36	20:39	23	07:27 (WEA-5 E-160)	19:29	18:22	6	13:12 (WEA-4 E-160)	76 12:56 (WEA-4 E-160)	16:26	78 13:04 (WEA-4 E-160)
25	05:44	06:32		07:22	08:13			08:07	11:41 (WEA-4 E-160)	08:39	11:47 (WEA-4 E-160)
	21:34	20:37	20	07:26 (WEA-5 E-160)	19:26	18:20	24	12:27 (WEA-4 E-160)	75 12:56 (WEA-4 E-160)	16:26	78 13:05 (WEA-4 E-160)
26	05:45	06:34		07:24	08:15			08:09	11:41 (WEA-4 E-160)	08:39	11:48 (WEA-4 E-160)
	21:33	20:35	16	07:23 (WEA-5 E-160)	19:24	18:18	32	12:31 (WEA-4 E-160)	75 12:56 (WEA-4 E-160)	16:27	77 13:05 (WEA-4 E-160)
27	05:47	06:35		07:26	08:17			07:44 (WEA03)	11:41 (WEA-4 E-160)	08:40	11:50 (WEA-4 E-160)
	21:31	20:33	11	07:21 (WEA-5 E-160)	19:22	18:16	40	12:34 (WEA-4 E-160)	75 12:56 (WEA-4 E-160)	16:28	76 13:06 (WEA-4 E-160)
28	05:48	06:37		07:27	08:18			07:46 (WEA03)	11:42 (WEA-4 E-160)	08:40	11:51 (WEA-4 E-160)
	21:30	20:31		19:20	18:14		45	12:37 (WEA-4 E-160)	75 12:57 (WEA-4 E-160)	16:28	76 13:07 (WEA-4 E-160)
29	05:49	06:39		07:29	08:20			11:51 (WEA-4 E-160)	11:42 (WEA-4 E-160)	08:40	11:53 (WEA-4 E-160)
	21:28	20:28		19:17	18:12		48	12:39 (WEA-4 E-160)	74 12:56 (WEA-4 E-160)	16:29	74 13:07 (WEA-4 E-160)
30	05:51	06:40		07:30	08:22			11:48 (WEA-4 E-160)	11:43 (WEA-4 E-160)	08:40	11:58 (WEA-4 E-160)
	21:27	20:26		19:15	18:10		52	12:40 (WEA-4 E-160)	74 12:57 (WEA-4 E-160)	16:30	70 13:08 (WEA-4 E-160)
31	05:52	06:42		07:24	08:19			11:47 (WEA-4 E-160)	11:44 (WEA-4 E-160)	08:40	11:59 (WEA-4 E-160)
	21:25	20:24		19:09	18:05		55	12:42 (WEA-4 E-160)	70 13:09 (WEA-4 E-160)	16:31	70 13:09 (WEA-4 E-160)
Sonnenscheinstunden	501	453		381	332			267		244	
astr.max.mögl.Beschattung					302			2152			2308
Red.Sonnenscheinwahrsch.		595			0,43			0,23			0,15
Reduktion Betriebsdauer		0,84			0,84			0,84			0,84
Reduktion Windrichtung		0,70			0,61			0,61			0,61
Gesamte Reduktion		0,25			0,16			0,12			0,07
Met.wahrsch.Beschattung		146			48			248			171

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 45/1 - IP 45/1 Helle 24

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni					
1	08:40	13:27 (WEA-4 E-160)	08:14	13:37 (WEA-4 E-160)	07:20	06:06					
1	16:32	60 14:27 (WEA-4 E-160)	17:20	63 14:40 (WEA-4 E-160)	18:11	20:56					
2	08:40	13:27 (WEA-4 E-160)	08:12	13:37 (WEA-4 E-160)	07:18	06:04					
1	16:33	61 14:28 (WEA-4 E-160)	17:22	62 14:39 (WEA-4 E-160)	18:13	20:57					
3	08:40	13:28 (WEA-4 E-160)	08:10	13:38 (WEA-4 E-160)	07:16	06:02					
1	16:35	61 14:29 (WEA-4 E-160)	17:24	61 14:39 (WEA-4 E-160)	18:15	20:59					
4	08:40	13:29 (WEA-4 E-160)	08:09	13:40 (WEA-4 E-160)	07:14	06:00					
1	16:36	61 14:30 (WEA-4 E-160)	17:25	59 14:39 (WEA-4 E-160)	18:17	21:01					
5	08:40	13:28 (WEA-4 E-160)	08:07	13:40 (WEA-4 E-160)	07:12	05:58					
1	16:37	62 14:30 (WEA-4 E-160)	17:27	58 14:38 (WEA-4 E-160)	18:18	21:02					
6	08:39	13:29 (WEA-4 E-160)	08:06	13:41 (WEA-4 E-160)	07:10	05:56					
1	16:38	62 14:31 (WEA-4 E-160)	17:29	56 14:37 (WEA-4 E-160)	18:20	21:04					
7	08:39	13:29 (WEA-4 E-160)	08:04	13:42 (WEA-4 E-160)	07:07	05:55					
1	16:39	62 14:31 (WEA-4 E-160)	17:31	55 14:37 (WEA-4 E-160)	18:22	21:06					
8	08:38	13:30 (WEA-4 E-160)	08:02	08:27 (WEA03)	07:05	05:54					
1	16:41	63 14:33 (WEA-4 E-160)	17:33	53 14:35 (WEA-4 E-160)	18:24	21:07					
9	08:38	13:29 (WEA-4 E-160)	08:00	08:25 (WEA03)	07:03	05:52					
1	16:42	64 14:33 (WEA-4 E-160)	17:35	53 14:34 (WEA-4 E-160)	18:26	21:09					
10	08:37	13:29 (WEA-4 E-160)	07:59	08:24 (WEA03)	07:01	05:50					
1	16:43	64 14:33 (WEA-4 E-160)	17:37	51 14:34 (WEA-4 E-160)	18:27	21:10					
11	08:37	13:29 (WEA-4 E-160)	07:57	13:48 (WEA-4 E-160)	06:58	05:48					
1	16:45	65 14:34 (WEA-4 E-160)	17:38	44 14:32 (WEA-4 E-160)	18:29	21:12					
12	08:36	13:30 (WEA-4 E-160)	07:55	13:50 (WEA-4 E-160)	06:56	05:46					
1	16:46	65 14:35 (WEA-4 E-160)	17:40	41 14:31 (WEA-4 E-160)	18:31	21:14					
13	08:36	13:30 (WEA-4 E-160)	07:53	13:53 (WEA-4 E-160)	06:54	05:44					
1	16:48	65 14:35 (WEA-4 E-160)	17:42	36 14:29 (WEA-4 E-160)	18:33	21:15					
14	08:35	13:30 (WEA-4 E-160)	07:51	13:56 (WEA-4 E-160)	06:52	05:43					
1	16:49	66 14:36 (WEA-4 E-160)	17:44	30 14:26 (WEA-4 E-160)	18:34	21:17					
15	08:34	13:31 (WEA-4 E-160)	07:49	13:59 (WEA-4 E-160)	06:49	05:41					
1	16:51	65 14:36 (WEA-4 E-160)	17:46	24 14:23 (WEA-4 E-160)	18:36	21:18					
16	08:33	13:31 (WEA-4 E-160)	07:47	14:06 (WEA-4 E-160)	06:47	05:40					
1	16:52	66 14:37 (WEA-4 E-160)	17:48	11 14:17 (WEA-4 E-160)	18:38	21:20					
17	08:32	13:31 (WEA-4 E-160)	07:45		06:45	05:38					
1	16:54	66 14:37 (WEA-4 E-160)	17:50		18:39	21:21					
18	08:31	13:32 (WEA-4 E-160)	07:43		06:42	05:37					
1	16:56	66 14:38 (WEA-4 E-160)	17:51		18:41	21:23					
19	08:30	13:31 (WEA-4 E-160)	07:41		06:40	05:35					
1	16:57	67 14:38 (WEA-4 E-160)	17:53		18:43	21:24					
20	08:29	13:31 (WEA-4 E-160)	07:39		06:38	05:34					
1	16:59	67 14:38 (WEA-4 E-160)	17:55		18:45	21:26					
21	08:28	13:32 (WEA-4 E-160)	07:37		06:35	05:33					
1	17:00	67 14:39 (WEA-4 E-160)	17:57		18:46	21:27					
22	08:27	13:32 (WEA-4 E-160)	07:35		06:33	05:31					
1	17:02	67 14:39 (WEA-4 E-160)	17:59		18:48	21:29					
23	08:26	13:32 (WEA-4 E-160)	07:33		06:31	05:30					
1	17:04	67 14:39 (WEA-4 E-160)	18:00		18:50	21:30					
24	08:25	13:33 (WEA-4 E-160)	07:31		06:29	05:29					
1	17:06	67 14:40 (WEA-4 E-160)	18:02		18:51	21:31					
25	08:23	13:34 (WEA-4 E-160)	07:29		06:26	05:28					
1	17:07	66 14:40 (WEA-4 E-160)	18:04		18:53	21:33					
26	08:22	13:33 (WEA-4 E-160)	07:27		06:24	05:27					
1	17:09	67 14:40 (WEA-4 E-160)	18:06		18:55	21:34					
27	08:21	13:34 (WEA-4 E-160)	07:25		06:22	05:25					
1	17:11	66 14:40 (WEA-4 E-160)	18:08		18:57	21:35					
28	08:19	13:34 (WEA-4 E-160)	07:23		06:19	05:24					
1	17:13	66 14:40 (WEA-4 E-160)	18:10		18:58	21:36					
29	08:18	13:35 (WEA-4 E-160)			07:17	06:11					
1	17:15	66 14:41 (WEA-4 E-160)			20:00	20:52					
30	08:17	08:43 (WEA04)			07:15	06:08					
1	17:16	65 14:40 (WEA-4 E-160)			20:02	20:54					
31	08:15	08:41 (WEA04)			07:12						
1	17:18	66 14:40 (WEA-4 E-160)			20:03						
Sonnenscheinstunden	259		278		367	416	485				498
astr.max.mögl.Beschattung	2008		757			379	532				
Red.Sonnenscheinwahrsch.	0,20		0,30			0,41	0,46				
Reduktion Betriebsdauer	0,84		0,84			0,84	0,84				
Reduktion Windrichtung	0,66		0,66			0,70	0,70				
Gesamte Reduktion	0,11		0,17			0,24	0,27				
Met.wahrsch.Beschattung	215		126			90	141				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 45/1 - IP 45/1 Helle 24

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember			
1	05:18	05:54	07:07 (WEA-5 E-160)	06:43	07:32	07:26	07:53 (WEA03)	08:16	13:11 (WEA-4 E-160)
2	21:55	21:24	07:37 (WEA-5 E-160)	20:22	19:13	17:07	14:03 (WEA-4 E-160)	16:27	65 14:16 (WEA-4 E-160)
3	05:19	05:55	07:06 (WEA-5 E-160)	06:45	07:34	07:27	07:55 (WEA03)	08:18	13:12 (WEA-4 E-160)
4	21:54	21:22	07:37 (WEA-5 E-160)	20:20	19:10	17:05	14:04 (WEA-4 E-160)	16:26	64 14:16 (WEA-4 E-160)
5	05:20	05:57	07:06 (WEA-5 E-160)	06:47	07:35	07:29	07:57 (WEA03)	08:19	13:12 (WEA-4 E-160)
6	21:54	21:20	07:38 (WEA-5 E-160)	20:17	19:08	17:03	14:05 (WEA-4 E-160)	16:25	64 14:16 (WEA-4 E-160)
7	05:21	05:59	07:05 (WEA-5 E-160)	06:48	07:37	07:31	13:12 (WEA-4 E-160)	08:21	13:14 (WEA-4 E-160)
8	21:54	21:19	07:38 (WEA-5 E-160)	20:15	19:06	17:01	14:06 (WEA-4 E-160)	16:25	63 14:17 (WEA-4 E-160)
9	05:21	06:00	07:04 (WEA-5 E-160)	06:50	07:39	07:33	13:11 (WEA-4 E-160)	08:22	13:14 (WEA-4 E-160)
10	21:54	21:17	07:38 (WEA-5 E-160)	20:13	19:03	17:00	14:07 (WEA-4 E-160)	16:24	63 14:17 (WEA-4 E-160)
11	05:21	06:02	07:04 (WEA-5 E-160)	06:52	07:40	07:35	13:10 (WEA-4 E-160)	08:23	13:15 (WEA-4 E-160)
12	21:55	21:15	07:39 (WEA-5 E-160)	20:10	19:01	16:58	14:08 (WEA-4 E-160)	16:24	62 14:17 (WEA-4 E-160)
13	05:22	06:03	07:03 (WEA-5 E-160)	06:53	07:42	07:36	13:09 (WEA-4 E-160)	08:24	13:15 (WEA-4 E-160)
14	21:52	21:13	07:39 (WEA-5 E-160)	20:08	18:59	16:56	14:09 (WEA-4 E-160)	16:23	62 14:17 (WEA-4 E-160)
15	05:23	06:05	07:03 (WEA-5 E-160)	06:55	07:44	07:38	13:09 (WEA-4 E-160)	08:26	13:16 (WEA-4 E-160)
16	21:52	21:11	07:40 (WEA-5 E-160)	20:06	18:57	16:54	14:10 (WEA-4 E-160)	16:23	61 14:17 (WEA-4 E-160)
17	05:24	06:06	07:02 (WEA-5 E-160)	06:56	07:46	07:40	13:08 (WEA-4 E-160)	08:27	13:16 (WEA-4 E-160)
18	21:50	21:10	07:40 (WEA-5 E-160)	20:04	18:54	16:53	14:11 (WEA-4 E-160)	16:23	61 14:17 (WEA-4 E-160)
19	05:25	06:08	07:03 (WEA-5 E-160)	06:58	07:47	07:42	13:08 (WEA-4 E-160)	08:28	13:18 (WEA-4 E-160)
20	21:50	21:08	07:40 (WEA-5 E-160)	20:01	18:52	16:51	14:11 (WEA-4 E-160)	16:23	60 14:18 (WEA-4 E-160)
21	05:26	06:10	07:02 (WEA-5 E-160)	07:00	07:49	07:43	08:13 (WEA04)	08:29	13:18 (WEA-4 E-160)
22	21:50	21:06	07:40 (WEA-5 E-160)	19:59	18:50	16:50	14:11 (WEA-4 E-160)	16:22	60 14:18 (WEA-4 E-160)
23	05:27	06:11	07:02 (WEA-5 E-160)	07:01	07:51	07:45	08:15 (WEA04)	08:30	13:19 (WEA-4 E-160)
24	21:49	21:04	07:40 (WEA-5 E-160)	19:57	18:48	16:48	14:12 (WEA-4 E-160)	16:22	60 14:19 (WEA-4 E-160)
25	05:28	06:13	07:02 (WEA-5 E-160)	07:03	07:52	07:47	13:07 (WEA-4 E-160)	08:31	13:19 (WEA-4 E-160)
26	21:48	21:02	07:39 (WEA-5 E-160)	19:54	18:46	16:47	14:12 (WEA-4 E-160)	16:22	60 14:19 (WEA-4 E-160)
27	05:30	06:14	07:02 (WEA-5 E-160)	07:04	07:54	07:49	13:06 (WEA-4 E-160)	08:32	13:20 (WEA-4 E-160)
28	21:47	21:00	07:39 (WEA-5 E-160)	19:52	18:43	16:45	14:12 (WEA-4 E-160)	16:22	59 14:19 (WEA-4 E-160)
29	05:31	06:16	07:02 (WEA-5 E-160)	07:06	07:56	07:50	13:06 (WEA-4 E-160)	08:33	13:20 (WEA-4 E-160)
30	21:46	20:58	07:38 (WEA-5 E-160)	19:50	18:41	16:44	14:12 (WEA-4 E-160)	16:22	60 14:20 (WEA-4 E-160)
31	05:32	06:18	07:03 (WEA-5 E-160)	07:08	07:57	07:52	13:06 (WEA-4 E-160)	08:34	13:20 (WEA-4 E-160)
32	21:45	20:56	07:38 (WEA-5 E-160)	19:47	18:39	16:42	14:13 (WEA-4 E-160)	16:22	59 14:19 (WEA-4 E-160)
33	05:33	06:19	07:02 (WEA-5 E-160)	07:09	07:59	07:54	13:07 (WEA-4 E-160)	08:35	13:21 (WEA-4 E-160)
34	21:44	20:54	07:37 (WEA-5 E-160)	19:45	18:37	16:41	14:13 (WEA-4 E-160)	16:23	59 14:20 (WEA-4 E-160)
35	05:34	06:21	07:03 (WEA-5 E-160)	07:11	08:01	07:56	13:07 (WEA-4 E-160)	08:35	13:22 (WEA-4 E-160)
36	21:43	20:52	07:37 (WEA-5 E-160)	19:43	18:35	16:40	14:14 (WEA-4 E-160)	16:23	58 14:20 (WEA-4 E-160)
37	05:36	06:22	07:03 (WEA-5 E-160)	07:12	08:03	07:57	13:07 (WEA-4 E-160)	08:36	13:23 (WEA-4 E-160)
38	21:42	20:50	07:35 (WEA-5 E-160)	19:40	18:33	16:38	14:14 (WEA-4 E-160)	16:23	58 14:21 (WEA-4 E-160)
39	05:37	06:24	07:04 (WEA-5 E-160)	07:14	08:04	07:59	13:08 (WEA-4 E-160)	08:37	13:23 (WEA-4 E-160)
40	21:41	20:48	07:34 (WEA-5 E-160)	19:38	18:30	16:37	14:14 (WEA-4 E-160)	16:24	58 14:21 (WEA-4 E-160)
41	05:38	06:26	07:05 (WEA-5 E-160)	07:16	08:06	08:01	13:07 (WEA-4 E-160)	08:37	13:23 (WEA-4 E-160)
42	21:39	20:46	07:32 (WEA-5 E-160)	19:36	18:28	16:36	14:14 (WEA-4 E-160)	16:24	59 14:22 (WEA-4 E-160)
43	05:40	06:27	07:07 (WEA-5 E-160)	07:17	08:08	08:02	13:07 (WEA-4 E-160)	08:38	13:23 (WEA-4 E-160)
44	21:38	20:44	07:31 (WEA-5 E-160)	19:33	18:26	16:35	14:14 (WEA-4 E-160)	16:24	59 14:22 (WEA-4 E-160)
45	05:41	06:29	07:09 (WEA-5 E-160)	07:19	08:10	08:04	13:08 (WEA-4 E-160)	08:38	13:25 (WEA-4 E-160)
46	21:37	20:41	07:30 (WEA-5 E-160)	19:31	18:24	16:34	14:15 (WEA-4 E-160)	16:25	58 14:23 (WEA-4 E-160)
47	05:42	06:30	07:10 (WEA-5 E-160)	07:21	08:11	08:06	13:09 (WEA-4 E-160)	08:39	13:25 (WEA-4 E-160)
48	21:36	20:39	07:26 (WEA-5 E-160)	19:29	18:22	16:33	14:15 (WEA-4 E-160)	16:26	58 14:23 (WEA-4 E-160)
49	05:44	07:19 (WEA-5 E-160)	07:15 (WEA-5 E-160)	07:22	07:13	08:07	13:09 (WEA-4 E-160)	08:39	13:25 (WEA-4 E-160)
50	21:34	20:37	07:24 (WEA-5 E-160)	19:26	17:20	16:32	14:16 (WEA-4 E-160)	16:26	58 14:23 (WEA-4 E-160)
51	05:45	07:15 (WEA-5 E-160)	07:15 (WEA-5 E-160)	07:24	07:15	08:09	13:09 (WEA-4 E-160)	08:39	13:25 (WEA-4 E-160)
52	21:33	20:35	07:28 (WEA-5 E-160)	19:24	17:18	16:31	14:15 (WEA-4 E-160)	16:27	59 14:24 (WEA-4 E-160)
53	05:47	07:13 (WEA-5 E-160)	07:13 (WEA-5 E-160)	07:26	07:17	08:10	13:10 (WEA-4 E-160)	08:40	13:26 (WEA-4 E-160)
54	21:31	20:33	07:30 (WEA-5 E-160)	19:22	17:16	16:30	14:16 (WEA-4 E-160)	16:28	59 14:25 (WEA-4 E-160)
55	05:48	07:11 (WEA-5 E-160)	07:11 (WEA-5 E-160)	07:27	07:18	08:12	13:11 (WEA-4 E-160)	08:40	13:26 (WEA-4 E-160)
56	21:30	20:31	07:32 (WEA-5 E-160)	19:19	17:14	16:29	14:16 (WEA-4 E-160)	16:28	60 14:26 (WEA-4 E-160)
57	05:49	07:10 (WEA-5 E-160)	07:10 (WEA-5 E-160)	07:29	07:20	08:13	13:10 (WEA-4 E-160)	08:40	13:27 (WEA-4 E-160)
58	21:28	20:28	07:33 (WEA-5 E-160)	19:17	17:12	16:28	14:16 (WEA-4 E-160)	16:29	59 14:26 (WEA-4 E-160)
59	05:51	07:09 (WEA-5 E-160)	07:09 (WEA-5 E-160)	07:30	07:22	08:15	13:11 (WEA-4 E-160)	08:40	13:27 (WEA-4 E-160)
60	21:27	20:26	07:35 (WEA-5 E-160)	19:15	17:10	16:27	14:16 (WEA-4 E-160)	16:30	60 14:27 (WEA-4 E-160)
61	05:52	07:08 (WEA-5 E-160)	07:08 (WEA-5 E-160)	07:24	07:16	08:16	13:11 (WEA-4 E-160)	08:40	13:27 (WEA-4 E-160)
62	21:25	20:24	07:35 (WEA-5 E-160)	19:14	17:09	16:26	14:01 (WEA-4 E-160)	16:31	60 14:27 (WEA-4 E-160)
63	Sonnenscheinstunden	501	453	381	332	267	244		
64	astr.max.mögl.Beschattung	132	790		194	1893		1865	
65	Red.Sonnenscheinwahrsch.	0,41	0,43		0,32	0,23		0,15	
66	Reduktion Betriebsdauer	0,84	0,84		0,84	0,84		0,84	
67	Reduktion Windrichtung	0,70	0,70		0,66	0,66		0,66	
68	Gesamte Reduktion	0,24	0,25		0,17	0,12		0,08	
69	Met.wahrsch.Beschattung	32	196		34	236		150	

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 45/2 - IP 45/2 Helle 24a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	13:32 (WEA-4 E-160)	08:14	13:52 (WEA-4 E-160)	07:20	06:06
1	16:32	58 14:30 (WEA-4 E-160)	17:20	41 14:33 (WEA-4 E-160)	18:11	20:05
2	08:40	13:33 (WEA-4 E-160)	08:12	13:54 (WEA-4 E-160)	07:18	07:08
1	16:33	58 14:31 (WEA-4 E-160)	17:22	38 14:32 (WEA-4 E-160)	18:13	20:07
3	08:40	13:33 (WEA-4 E-160)	08:10	13:55 (WEA-4 E-160)	07:16	07:06
1	16:35	58 14:31 (WEA-4 E-160)	17:24	35 14:30 (WEA-4 E-160)	18:15	20:08
4	08:40	13:34 (WEA-4 E-160)	08:09	08:35 (WEA03)	07:14	07:03
1	16:36	58 14:32 (WEA-4 E-160)	17:25	33 14:29 (WEA-4 E-160)	18:17	20:10
5	08:40	13:34 (WEA-4 E-160)	08:07	08:33 (WEA03)	07:12	07:01
1	16:37	58 14:32 (WEA-4 E-160)	17:27	29 14:27 (WEA-4 E-160)	18:18	20:12
6	08:39	13:35 (WEA-4 E-160)	08:06	08:31 (WEA03)	07:10	06:59
1	16:38	58 14:33 (WEA-4 E-160)	17:29	23 14:23 (WEA-4 E-160)	18:20	20:14
7	08:39	13:35 (WEA-4 E-160)	08:04	14:10 (WEA-4 E-160)	07:07	06:57
1	16:39	58 14:33 (WEA-4 E-160)	17:31	8 14:18 (WEA-4 E-160)	18:22	20:15
8	08:38	13:36 (WEA-4 E-160)	08:02	07:05	06:54	05:53
1	16:41	58 14:34 (WEA-4 E-160)	17:33	18:24	20:17	21:07
9	08:38	13:36 (WEA-4 E-160)	08:00	07:03	06:52	05:51
1	16:42	58 14:34 (WEA-4 E-160)	17:35	18:26	20:19	21:09
10	08:37	13:36 (WEA-4 E-160)	07:59	07:01	06:50	05:49
1	16:43	58 14:34 (WEA-4 E-160)	17:37	18:27	20:20	6 07:30 (WEA-5 E-160)
11	08:37	13:36 (WEA-4 E-160)	07:57	06:58	06:48	07:25 (WEA-5 E-160)
1	16:45	59 14:35 (WEA-4 E-160)	17:38	18:29	20:22	16 07:41 (WEA-5 E-160)
12	08:36	13:37 (WEA-4 E-160)	07:55	06:56	06:45	07:22 (WEA-5 E-160)
1	16:46	59 14:36 (WEA-4 E-160)	17:40	18:31	20:24	22 07:44 (WEA-5 E-160)
13	08:36	13:38 (WEA-4 E-160)	07:53	06:54	06:43	07:20 (WEA-5 E-160)
1	16:48	58 14:36 (WEA-4 E-160)	17:42	18:33	20:25	26 07:46 (WEA-5 E-160)
14	08:35	13:38 (WEA-4 E-160)	07:51	06:52	06:41	07:18 (WEA-5 E-160)
1	16:49	58 14:36 (WEA-4 E-160)	17:44	18:34	20:27	29 07:47 (WEA-5 E-160)
15	08:34	13:38 (WEA-4 E-160)	07:49	06:49	06:39	07:17 (WEA-5 E-160)
1	16:51	59 14:37 (WEA-4 E-160)	17:46	18:36	20:29	31 07:48 (WEA-5 E-160)
16	08:33	13:39 (WEA-4 E-160)	07:47	06:47	06:37	07:16 (WEA-5 E-160)
1	16:52	58 14:37 (WEA-4 E-160)	17:48	18:38	20:30	33 07:49 (WEA-5 E-160)
17	08:32	13:39 (WEA-4 E-160)	07:45	06:45	06:34	07:14 (WEA-5 E-160)
1	16:54	58 14:37 (WEA-4 E-160)	17:50	18:39	20:32	35 07:49 (WEA-5 E-160)
18	08:31	13:40 (WEA-4 E-160)	07:43	06:42	06:32	07:13 (WEA-5 E-160)
1	16:56	57 14:37 (WEA-4 E-160)	17:51	18:41	20:34	36 07:49 (WEA-5 E-160)
19	08:30	13:40 (WEA-4 E-160)	07:41	06:40	06:30	07:12 (WEA-5 E-160)
1	16:57	57 14:37 (WEA-4 E-160)	17:53	18:43	20:36	37 07:49 (WEA-5 E-160)
20	08:29	13:40 (WEA-4 E-160)	07:39	06:38	06:28	07:12 (WEA-5 E-160)
1	16:59	57 14:37 (WEA-4 E-160)	17:55	18:45	20:37	38 07:50 (WEA-5 E-160)
21	08:28	13:41 (WEA-4 E-160)	07:37	06:35	06:26	07:11 (WEA-5 E-160)
1	17:00	56 14:37 (WEA-4 E-160)	17:57	18:46	20:39	39 07:50 (WEA-5 E-160)
22	08:27	13:42 (WEA-4 E-160)	07:35	06:33	06:24	07:11 (WEA-5 E-160)
1	17:02	56 14:38 (WEA-4 E-160)	17:59	18:48	20:41	39 07:50 (WEA-5 E-160)
23	08:26	13:42 (WEA-4 E-160)	07:33	06:31	06:22	07:10 (WEA-5 E-160)
1	17:04	55 14:37 (WEA-4 E-160)	18:00	18:50	20:42	40 07:50 (WEA-5 E-160)
24	08:25	13:43 (WEA-4 E-160)	07:31	06:29	06:20	07:10 (WEA-5 E-160)
1	17:06	54 14:37 (WEA-4 E-160)	18:02	18:51	20:44	39 07:49 (WEA-5 E-160)
25	08:23	08:51 (WEA04)	07:29	06:26	06:18	07:10 (WEA-5 E-160)
1	17:07	53 14:37 (WEA-4 E-160)	18:04	18:53	20:46	39 07:49 (WEA-5 E-160)
26	08:22	08:49 (WEA04)	07:27	06:24	06:15	07:10 (WEA-5 E-160)
1	17:09	54 14:37 (WEA-4 E-160)	18:06	18:55	20:47	39 07:49 (WEA-5 E-160)
27	08:21	08:48 (WEA04)	07:25	06:22	06:13	07:10 (WEA-5 E-160)
1	17:11	52 14:37 (WEA-4 E-160)	18:08	18:57	20:49	38 07:48 (WEA-5 E-160)
28	08:19	13:47 (WEA-4 E-160)	07:23	06:19	06:11	07:10 (WEA-5 E-160)
1	17:13	49 14:36 (WEA-4 E-160)	18:10	18:58	20:51	37 07:47 (WEA-5 E-160)
29	08:18	13:48 (WEA-4 E-160)		07:17	06:10	07:11 (WEA-5 E-160)
1	17:15	48 14:36 (WEA-4 E-160)		20:00	20:52	37 07:48 (WEA-5 E-160)
30	08:17	13:49 (WEA-4 E-160)		07:15	06:08	07:11 (WEA-5 E-160)
1	17:16	46 14:35 (WEA-4 E-160)		20:02	20:54	36 07:47 (WEA-5 E-160)
31	08:15	13:50 (WEA-4 E-160)		07:12		05:21
1	17:18	43 14:33 (WEA-4 E-160)		20:03		21:40
Sonnenscheinstunden	259	278		367	416	485
astr.max.mögl.Beschattung	1726	207		692		215
Red.Sonnenscheinwahrsch.	0,20	0,30		0,41		0,46
Reduktion Betriebsdauer	0,84	0,84		0,84		0,84
Reduktion Windrichtung	0,66	0,65		0,69		0,69
Gesamte Reduktion	0,11	0,17		0,24		0,26
Met.wahrsch.Beschattung	185	34		163		57

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 45/2 - IP 45/2 Helle 24a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32 (WEA-5 E-160)	07:26	08:16
	21:55	21:24	20:22	16 07:24 (WEA-5 E-160)	19:13	17:07
2	05:18	05:55	06:45	07:34 (WEA-5 E-160)	07:34	08:18
	21:55	21:22	20:20	6 07:35 (WEA-5 E-160)	19:10	17:05
3	05:19	05:57	06:47		07:35	08:19
	21:54	21:20	20:17		19:08	17:03
4	05:20	05:59	06:48		07:37	08:21
	21:54	21:19	20:15		19:06	17:01
5	05:21	06:00	06:50		07:39	08:22
	21:54	21:17	20:13		19:03	17:00
6	05:21	06:02	06:51		07:40	08:23
	21:53	21:15	20:10		19:01	16:58
7	05:22	06:03	06:53		07:42	08:24
	21:52	21:13	20:08		18:59	16:56
8	05:23	06:05	06:55		07:44	08:26
	21:52	21:11	20:06		18:57	16:54
9	05:24	06:06	06:56		07:46	08:27
	21:51	21:10	20:04		18:54	16:53
10	05:25	06:08	06:58		07:47	08:28
	21:50	21:08	20:01		18:52	16:51
11	05:26	06:10	07:00		07:49	08:29
	21:50	21:06	19:59		18:50	16:50
12	05:27	06:11	07:01		07:51	08:30
	21:49	21:04	19:57		18:48	16:48
13	05:28	06:13	07:03		07:52	08:31
	21:48	21:02	19:54		18:46	16:47
14	05:30	06:14	07:04		07:54	08:32
	21:47	21:00	19:52		18:43	16:45
15	05:31	06:16	07:06		07:56	08:33
	21:46	20:58	19:50		18:41	16:44
16	05:32	06:18	07:08		07:57	08:34
	21:45	20:56	19:47		18:39	16:42
17	05:33	06:19	07:09		07:59	08:35
	21:44	20:54	19:45		18:37	16:41
18	05:34	06:21	07:11		08:01	08:35
	21:43	20:52	19:43		18:35	16:40
19	05:36	06:22	07:12		08:03	08:36
	21:42	20:50	19:40		18:33	16:38
20	05:37	06:24	07:14		08:04	08:37
	21:41	20:48	19:38		18:30	16:37
21	05:38	06:26	07:16		08:06	08:37
	21:39	20:46	19:36		18:28	16:36
22	05:40	06:27	07:17		08:08	08:38
	21:38	20:44	19:33		18:26	16:35
23	05:41	06:29	07:19		08:10	08:38
	21:37	20:41	19:31		18:24	16:34
24	05:42	06:30	07:21		08:11	08:39
	21:36	20:39	19:29		18:22	16:33
25	05:44	06:32	07:22		08:13	08:39
	21:34	20:37	19:26		17:20	16:32
26	05:45	06:34	07:24		08:15	08:39
	21:33	20:35	19:24		17:18	16:31
27	05:47	06:35	07:26		08:17	08:40
	21:31	20:33	19:22		17:16	16:30
28	05:48	06:37	07:27		08:18	08:40
	21:30	20:31	19:19		17:14	16:29
29	05:49	06:39	07:29		08:20	08:40
	21:28	20:28	19:17		17:12	16:28
30	05:51	06:40	07:30		08:22	08:40
	21:27	20:26	19:15		17:10	16:27
31	05:52	06:42	07:31		08:24	08:40
	21:25	20:24	19:13		17:09	16:26
Sonneneinstrahlung	501	453	381	332	267	244
astr.max.mögl.Beschattung			22			1782
Red.Sonneneinstrahlung		888	0,36		1301	0,15
Reduktion Betriebsdauer		0,43	0,84		0,23	0,84
Reduktion Windrichtung		0,84	0,69		0,84	0,66
Gesamte Reduktion		0,69	0,21		0,66	0,08
Met.wahrsch.Beschattung		0,25	5		0,13	144
		219			163	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 46/1 - IP 46/1 Rhader Straße 16

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni				
1	08:40	09:15 (WEA-01)	08:14	14:32 (WEA-3 E-160)	07:20	07:47 (WEA08)	07:10	17:24 (WEA-4 E-160)	06:06	05:21
2	16:32	63 15:06 (WEA-3 E-160)	17:20	43 15:15 (WEA-3 E-160)	18:11	15 08:02 (WEA08)	20:05	56 18:20 (WEA-4 E-160)	20:56	21:41
3	08:40	09:15 (WEA-01)	08:12	14:33 (WEA-3 E-160)	07:18	07:47 (WEA08)	07:08	17:24 (WEA-4 E-160)	06:04	05:20
4	16:33	65 15:07 (WEA-3 E-160)	17:22	41 15:14 (WEA-3 E-160)	18:13	15 08:02 (WEA08)	20:07	54 18:18 (WEA-4 E-160)	20:57	21:42
5	08:40	09:16 (WEA-01)	08:10	14:34 (WEA-3 E-160)	07:16	07:46 (WEA08)	07:06	17:25 (WEA-4 E-160)	06:02	05:19
6	16:35	65 15:08 (WEA-3 E-160)	17:24	39 15:13 (WEA-3 E-160)	18:15	26 17:03 (WEA-4 E-160)	20:08	53 18:18 (WEA-4 E-160)	20:59	21:43
7	08:40	09:16 (WEA-01)	08:09	14:35 (WEA04)	07:14	07:46 (WEA08)	07:03	17:26 (WEA-4 E-160)	06:00	05:18
8	16:36	67 15:09 (WEA-3 E-160)	17:25	39 15:13 (WEA-3 E-160)	18:17	37 17:09 (WEA-4 E-160)	20:10	50 18:16 (WEA-4 E-160)	21:01	21:44
9	08:40	09:16 (WEA-01)	08:07	14:36 (WEA04)	07:12	07:47 (WEA08)	07:01	17:28 (WEA-4 E-160)	05:58	05:18
10	16:37	68 15:09 (WEA-3 E-160)	17:27	38 15:11 (WEA-3 E-160)	18:18	44 17:13 (WEA-4 E-160)	20:12	47 18:15 (WEA-4 E-160)	21:02	21:45
11	08:39	09:16 (WEA-01)	08:06	14:37 (WEA04)	07:10	07:48 (WEA08)	06:59	17:28 (WEA-4 E-160)	05:56	05:17
12	16:38	69 15:10 (WEA-3 E-160)	17:29	37 15:10 (WEA-3 E-160)	18:20	47 17:16 (WEA-4 E-160)	20:13	45 18:13 (WEA-4 E-160)	21:04	21:46
13	08:39	09:16 (WEA-01)	08:04	14:38 (WEA04)	07:07	07:49 (WEA08)	06:56	17:30 (WEA-4 E-160)	05:55	05:16
14	16:39	70 15:10 (WEA-3 E-160)	17:31	34 15:08 (WEA-3 E-160)	18:22	47 17:17 (WEA-4 E-160)	20:15	41 18:11 (WEA-4 E-160)	21:06	21:47
15	08:38	09:16 (WEA-01)	08:02	14:39 (WEA04)	07:05	16:36 (WEA-4 E-160)	06:54	17:32 (WEA-4 E-160)	05:53	05:16
16	16:41	70 15:10 (WEA-3 E-160)	17:33	25 15:05 (WEA-3 E-160)	18:24	43 17:19 (WEA-4 E-160)	20:17	38 18:10 (WEA-4 E-160)	21:07	21:48
17	08:38	09:17 (WEA-01)	08:00	14:40 (WEA-3 E-160)	07:03	16:34 (WEA-4 E-160)	06:52	17:34 (WEA-4 E-160)	05:51	05:15
18	16:42	70 15:11 (WEA-3 E-160)	17:35	13 15:01 (WEA-3 E-160)	18:26	47 17:21 (WEA-4 E-160)	20:19	34 18:08 (WEA-4 E-160)	21:09	21:49
19	08:37	09:17 (WEA-01)	07:59	14:41 (WEA04)	07:01	16:32 (WEA-4 E-160)	06:50	17:36 (WEA-4 E-160)	05:49	05:15
20	16:43	72 15:12 (WEA-3 E-160)	17:37	18:27	49 17:21 (WEA-4 E-160)	20:20	28 18:04 (WEA-4 E-160)	21:10	21:50	21:50
21	08:37	09:17 (WEA-01)	07:57	14:42 (WEA04)	06:58	16:31 (WEA-4 E-160)	06:48	17:39 (WEA-4 E-160)	05:48	05:15
22	16:45	72 15:12 (WEA-3 E-160)	17:38	18:29	51 17:22 (WEA-4 E-160)	20:22	22 18:01 (WEA-4 E-160)	21:12	21:51	21:51
23	08:36	09:18 (WEA-01)	07:55	14:43 (WEA04)	06:56	16:29 (WEA-4 E-160)	06:45	17:45 (WEA-4 E-160)	05:46	05:14
24	16:46	72 15:13 (WEA-3 E-160)	17:40	18:31	54 17:23 (WEA-4 E-160)	20:24	11 17:56 (WEA-4 E-160)	21:14	21:51	21:51
25	08:35	09:18 (WEA-01)	07:53	14:44 (WEA04)	06:54	16:29 (WEA-4 E-160)	06:43	17:56 (WEA-4 E-160)	05:44	05:14
26	16:48	74 15:14 (WEA-3 E-160)	17:42	18:33	55 17:24 (WEA-4 E-160)	20:25	21:15	21:52	21:52	21:52
27	08:35	09:18 (WEA-01)	07:51	14:45 (WEA04)	06:52	16:27 (WEA-4 E-160)	06:41	17:57 (WEA-4 E-160)	05:43	05:14
28	16:49	74 15:14 (WEA-3 E-160)	17:44	18:34	57 17:24 (WEA-4 E-160)	20:27	21:17	21:52	21:52	21:52
29	08:34	09:19 (WEA-01)	07:49	14:46 (WEA04)	06:49	16:26 (WEA-4 E-160)	06:39	17:58 (WEA-4 E-160)	05:41	05:14
30	16:51	72 15:14 (WEA-3 E-160)	17:46	1 08:14 (WEA03)	18:36	59 17:25 (WEA-4 E-160)	20:29	21:18	21:53	21:53
31	08:33	09:19 (WEA-01)	07:47	14:47 (WEA04)	06:47	16:26 (WEA-4 E-160)	06:37	17:59 (WEA-4 E-160)	05:40	05:13
32	16:52	73 15:15 (WEA-3 E-160)	17:48	3 08:15 (WEA03)	18:38	60 17:26 (WEA-4 E-160)	20:30	21:19	21:54	21:54
33	08:32	09:20 (WEA-01)	07:45	14:48 (WEA04)	06:45	16:24 (WEA-4 E-160)	06:34	18:00 (WEA-4 E-160)	05:38	05:13
34	16:54	73 15:15 (WEA-3 E-160)	17:50	5 08:15 (WEA03)	18:39	61 17:27 (WEA-4 E-160)	20:32	21:21	21:54	21:54
35	08:31	09:20 (WEA-01)	07:43	14:49 (WEA04)	06:42	16:24 (WEA-4 E-160)	06:32	18:01 (WEA-4 E-160)	05:37	05:13
36	16:56	73 15:16 (WEA-3 E-160)	17:51	7 08:15 (WEA03)	18:41	62 17:28 (WEA-4 E-160)	20:34	21:23	21:54	21:54
37	08:30	09:20 (WEA-01)	07:41	14:50 (WEA04)	06:40	16:23 (WEA-4 E-160)	06:30	18:02 (WEA-4 E-160)	05:35	05:13
38	16:57	72 15:15 (WEA-3 E-160)	17:53	9 08:14 (WEA03)	18:43	63 17:29 (WEA-4 E-160)	20:35	21:24	21:55	21:55
39	08:29	09:21 (WEA-01)	07:39	14:51 (WEA04)	06:38	16:22 (WEA-4 E-160)	06:28	18:03 (WEA-4 E-160)	05:34	05:13
40	16:59	71 15:16 (WEA-3 E-160)	17:55	6 08:12 (WEA03)	18:45	64 17:26 (WEA-4 E-160)	20:37	21:26	21:55	21:55
41	08:28	08:56 (WEA05)	07:37	14:52 (WEA04)	06:35	16:22 (WEA-4 E-160)	06:26	18:04 (WEA-4 E-160)	05:33	05:14
42	17:00	70 15:16 (WEA-3 E-160)	17:57	18:46	64 17:26 (WEA-4 E-160)	20:39	21:27	21:55	21:55	21:55
43	08:27	08:55 (WEA05)	07:35	14:53 (WEA04)	06:33	16:22 (WEA-4 E-160)	06:24	18:05 (WEA-4 E-160)	05:31	05:14
44	17:02	71 15:17 (WEA-3 E-160)	17:59	18:48	64 17:26 (WEA-4 E-160)	20:41	21:28	21:56	21:56	21:56
45	08:26	08:53 (WEA05)	07:33	14:54 (WEA04)	06:31	16:21 (WEA-4 E-160)	06:22	18:06 (WEA-4 E-160)	05:30	05:14
46	17:04	68 15:16 (WEA-3 E-160)	18:00	18:50	64 17:25 (WEA-4 E-160)	20:42	21:30	21:56	21:56	21:56
47	08:25	08:52 (WEA05)	07:31	14:55 (WEA04)	06:29	16:21 (WEA-4 E-160)	06:20	18:07 (WEA-4 E-160)	05:29	05:14
48	17:06	66 15:17 (WEA-3 E-160)	18:02	18:51	64 17:25 (WEA-4 E-160)	20:44	21:31	21:56	21:56	21:56
49	08:23	08:51 (WEA05)	07:29	14:56 (WEA04)	06:26	16:22 (WEA-4 E-160)	06:18	18:08 (WEA-4 E-160)	05:28	05:15
50	17:07	61 15:17 (WEA-3 E-160)	18:04	18:53	63 17:25 (WEA-4 E-160)	20:46	21:33	21:56	21:56	21:56
51	08:22	14:27 (WEA-3 E-160)	07:27	14:57 (WEA04)	06:24	16:21 (WEA-4 E-160)	06:15	18:09 (WEA-4 E-160)	05:27	05:15
52	17:09	50 15:17 (WEA-3 E-160)	18:06	7 07:51 (WEA08)	18:55	63 17:24 (WEA-4 E-160)	20:47	21:34	21:56	21:56
53	08:21	14:28 (WEA-3 E-160)	07:25	14:58 (WEA04)	06:22	16:21 (WEA-4 E-160)	06:13	18:10 (WEA-4 E-160)	05:25	05:15
54	17:11	49 15:17 (WEA-3 E-160)	18:08	11 08:00 (WEA08)	18:57	63 17:24 (WEA-4 E-160)	20:49	21:35	21:56	21:56
55	08:19	14:28 (WEA-3 E-160)	07:23	14:59 (WEA04)	06:19	16:22 (WEA-4 E-160)	06:11	18:11 (WEA-4 E-160)	05:24	05:16
56	17:13	48 15:16 (WEA-3 E-160)	18:10	13 08:01 (WEA08)	18:58	61 17:23 (WEA-4 E-160)	20:51	21:36	21:56	21:56
57	08:18	14:30 (WEA-3 E-160)	18:04	14:59 (WEA04)	07:17	17:22 (WEA-4 E-160)	06:10	18:12 (WEA-4 E-160)	05:23	05:16
58	17:15	47 15:17 (WEA-3 E-160)	18:06	20:00	61 18:23 (WEA-4 E-160)	20:52	21:38	21:56	21:56	21:56
59	08:17	14:30 (WEA-3 E-160)	18:00	14:59 (WEA04)	07:15	17:22 (WEA-4 E-160)	06:08	18:13 (WEA-4 E-160)	05:22	05:17
60	17:16	46 15:16 (WEA-3 E-160)	18:02	20:02	59 18:21 (WEA-4 E-160)	20:54	21:39	21:55	21:55	21:55
61	08:15	14:31 (WEA-3 E-160)	18:00	14:59 (WEA04)	07:12	17:23 (WEA-4 E-160)	06:06	18:14 (WEA-4 E-160)	05:21	05:17
62	17:18	44 15:15 (WEA-3 E-160)	18:02	20:03	58 18:21 (WEA-4 E-160)	20:56	21:40	21:56	21:56	21:56
63	Sonnenscheinstunden	259	278	367	416	479	485	498		
64	astr.max.mögl.Beschattung	2025	371	1640	479					
65	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41					
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84					
67	Reduktion Windrichtung	0,66	0,67	0,70	0,71					
68	Gesamte Reduktion	0,11	0,17	0,17	0,24					
69	Met.wahrsch.Beschattung	217	63	286	115					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 46/1 - IP 46/1 Rhader Straße 16

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1	05:18 05:54		06:43 17:38 (WEA-4 E-160)	07:32 17:08 (WEA-4 E-160)	07:26 17:08 (WEA-4 E-160)	08:16 08:59 (WEA-01)	
2	21:55 21:24		20:22 18:00 (WEA-4 E-160)	19:13 17:35 (WEA-4 E-160)	17:07 17:09 (WEA-4 E-160)	16:27 14:54 (WEA-3 E-160)	72
3	05:19 05:57		06:47 17:31 (WEA-4 E-160)	07:35 17:08 (WEA-4 E-160)	07:29 17:05 (WEA-4 E-160)	08:19 09:00 (WEA-01)	72
4	21:54 21:20		20:17 18:05 (WEA-4 E-160)	19:08 17:29 (WEA-4 E-160)	17:03 17:10 (WEA-4 E-160)	16:25 14:54 (WEA-3 E-160)	71
5	05:20 05:59		06:48 17:29 (WEA-4 E-160)	07:37 17:08 (WEA-4 E-160)	07:31 17:12 (WEA-4 E-160)	08:21 09:01 (WEA-01)	70
6	21:54 21:18		20:15 18:07 (WEA-4 E-160)	19:06 17:27 (WEA-4 E-160)	17:01 17:12 (WEA-4 E-160)	16:25 14:55 (WEA-3 E-160)	69
7	05:21 06:00		06:50 17:27 (WEA-4 E-160)	07:39 17:08 (WEA-4 E-160)	07:33 17:00 (WEA-4 E-160)	08:22 09:02 (WEA-01)	69
8	21:54 21:17		20:13 18:08 (WEA-4 E-160)	19:03 17:24 (WEA-4 E-160)	17:00 17:00 (WEA-4 E-160)	16:24 14:55 (WEA-3 E-160)	69
9	05:21 06:02		06:51 17:24 (WEA-4 E-160)	07:40 17:09 (WEA-4 E-160)	07:35 17:00 (WEA-4 E-160)	08:23 09:02 (WEA-01)	69
10	21:53 21:15		20:10 18:09 (WEA-4 E-160)	19:01 17:23 (WEA-4 E-160)	16:58 17:05 (WEA-4 E-160)	16:24 14:56 (WEA-3 E-160)	69
11	05:22 06:03		06:53 17:23 (WEA-4 E-160)	07:42 17:08 (WEA-4 E-160)	07:36 17:05 (WEA-4 E-160)	08:24 09:03 (WEA-01)	69
12	21:52 21:13		20:08 18:10 (WEA-4 E-160)	18:59 17:10 (WEA-4 E-160)	16:56 17:05 (WEA-4 E-160)	16:23 14:56 (WEA-3 E-160)	68
13	05:23 06:05		06:55 17:20 (WEA-4 E-160)	07:44 17:09 (WEA-4 E-160)	07:38 17:05 (WEA-4 E-160)	08:26 09:03 (WEA-01)	68
14	21:52 21:11		20:06 18:11 (WEA-4 E-160)	18:57 17:19 (WEA-4 E-160)	16:54 17:05 (WEA-4 E-160)	16:23 14:56 (WEA-3 E-160)	68
15	05:24 06:06		06:56 17:19 (WEA-4 E-160)	07:45 17:08 (WEA-4 E-160)	07:40 17:05 (WEA-4 E-160)	08:27 09:04 (WEA-01)	68
16	21:51 21:10		20:04 18:12 (WEA-4 E-160)	18:54 17:17 (WEA-4 E-160)	16:53 17:05 (WEA-4 E-160)	16:23 14:56 (WEA-3 E-160)	65
17	05:25 06:08		06:58 17:17 (WEA-4 E-160)	07:47 17:08 (WEA-4 E-160)	07:42 17:05 (WEA-4 E-160)	08:28 09:04 (WEA-01)	65
18	21:50 21:08		20:01 18:12 (WEA-4 E-160)	18:52 17:17 (WEA-4 E-160)	16:51 17:05 (WEA-4 E-160)	16:23 14:56 (WEA-3 E-160)	65
19	05:26 06:10		07:00 17:16 (WEA-4 E-160)	07:49 17:08 (WEA-4 E-160)	07:43 17:05 (WEA-4 E-160)	08:29 09:06 (WEA-01)	65
20	21:50 21:06		19:59 18:12 (WEA-4 E-160)	18:50 17:15 (WEA-4 E-160)	16:50 17:05 (WEA-4 E-160)	16:22 14:57 (WEA-3 E-160)	63
21	05:27 06:11		07:01 17:15 (WEA-4 E-160)	07:51 17:08 (WEA-4 E-160)	07:45 17:05 (WEA-4 E-160)	08:30 09:07 (WEA-01)	63
22	21:49 21:04		19:57 18:13 (WEA-4 E-160)	18:48 17:14 (WEA-4 E-160)	16:48 17:05 (WEA-4 E-160)	16:22 14:57 (WEA-3 E-160)	63
23	05:28 06:13		07:03 17:14 (WEA-4 E-160)	07:52 17:08 (WEA-4 E-160)	07:47 17:05 (WEA-4 E-160)	08:31 09:07 (WEA-01)	62
24	21:48 21:02		19:54 18:13 (WEA-4 E-160)	18:46 17:13 (WEA-4 E-160)	16:47 17:05 (WEA-4 E-160)	16:22 14:57 (WEA-3 E-160)	62
25	05:30 06:14		07:04 17:13 (WEA-4 E-160)	07:54 17:08 (WEA-4 E-160)	07:49 17:05 (WEA-4 E-160)	08:32 09:08 (WEA-01)	62
26	21:47 21:00		19:52 18:13 (WEA-4 E-160)	18:43 17:11 (WEA-4 E-160)	16:45 17:05 (WEA-4 E-160)	16:22 14:58 (WEA-3 E-160)	62
27	05:31 06:16		07:06 17:11 (WEA-4 E-160)	07:56 17:08 (WEA-4 E-160)	07:50 17:05 (WEA-4 E-160)	08:33 09:09 (WEA-01)	62
28	21:46 20:58		19:50 18:13 (WEA-4 E-160)	18:41 17:11 (WEA-4 E-160)	16:44 17:05 (WEA-4 E-160)	16:22 14:58 (WEA-3 E-160)	60
29	05:32 06:18		07:08 17:11 (WEA-4 E-160)	07:57 17:08 (WEA-4 E-160)	07:52 17:05 (WEA-4 E-160)	08:34 09:09 (WEA-01)	60
30	21:45 20:56		19:47 18:13 (WEA-4 E-160)	18:39 17:11 (WEA-4 E-160)	16:42 17:05 (WEA-4 E-160)	16:22 14:58 (WEA-3 E-160)	60
31	05:33 06:19		07:09 17:09 (WEA-4 E-160)	07:59 17:08 (WEA-4 E-160)	07:54 17:05 (WEA-4 E-160)	08:35 09:10 (WEA-01)	60
32	21:44 20:54		19:45 18:12 (WEA-4 E-160)	18:37 17:11 (WEA-4 E-160)	16:41 17:05 (WEA-4 E-160)	16:23 14:58 (WEA-3 E-160)	58
33	05:34 06:21		07:11 17:09 (WEA-4 E-160)	08:01 17:08 (WEA-4 E-160)	07:56 17:05 (WEA-4 E-160)	08:35 09:10 (WEA-01)	58
34	21:43 20:52		19:43 18:12 (WEA-4 E-160)	18:35 17:11 (WEA-4 E-160)	16:40 17:05 (WEA-4 E-160)	16:23 14:59 (WEA-3 E-160)	60
35	05:36 06:22		07:12 17:09 (WEA-4 E-160)	08:03 17:08 (WEA-4 E-160)	07:57 17:05 (WEA-4 E-160)	08:36 09:11 (WEA-01)	60
36	21:42 20:50		19:40 18:13 (WEA-4 E-160)	18:33 17:11 (WEA-4 E-160)	16:38 17:05 (WEA-4 E-160)	16:23 15:00 (WEA-3 E-160)	59
37	05:37 06:24		07:14 17:08 (WEA-4 E-160)	08:04 17:08 (WEA-4 E-160)	07:59 17:05 (WEA-4 E-160)	08:37 09:11 (WEA-01)	59
38	21:41 20:48		19:38 18:12 (WEA-4 E-160)	18:30 17:11 (WEA-4 E-160)	16:37 17:05 (WEA-4 E-160)	16:24 14:59 (WEA-3 E-160)	58
39	05:38 06:26		07:16 17:08 (WEA-4 E-160)	08:06 17:08 (WEA-4 E-160)	08:01 17:05 (WEA-4 E-160)	08:37 09:12 (WEA-01)	58
40	21:39 20:46		19:36 18:12 (WEA-4 E-160)	18:28 17:11 (WEA-4 E-160)	16:36 17:05 (WEA-4 E-160)	16:24 15:00 (WEA-3 E-160)	58
41	05:40 06:27		07:17 17:07 (WEA-4 E-160)	08:08 17:08 (WEA-4 E-160)	08:02 17:05 (WEA-4 E-160)	08:38 09:12 (WEA-01)	58
42	21:38 20:44		19:33 18:11 (WEA-4 E-160)	18:26 17:11 (WEA-4 E-160)	16:35 17:05 (WEA-4 E-160)	16:24 15:00 (WEA-3 E-160)	58
43	05:41 06:29		07:19 17:07 (WEA-4 E-160)	08:10 17:08 (WEA-4 E-160)	08:04 17:05 (WEA-4 E-160)	08:38 09:13 (WEA-01)	58
44	21:37 20:41		19:31 18:10 (WEA-4 E-160)	18:24 17:11 (WEA-4 E-160)	16:34 17:05 (WEA-4 E-160)	16:25 15:01 (WEA-3 E-160)	58
45	05:42 06:30		07:21 17:07 (WEA-4 E-160)	08:11 17:08 (WEA-4 E-160)	08:06 17:05 (WEA-4 E-160)	08:39 09:13 (WEA-01)	59
46	21:36 20:39		19:29 18:10 (WEA-4 E-160)	18:22 17:11 (WEA-4 E-160)	16:33 17:05 (WEA-4 E-160)	16:26 15:02 (WEA-3 E-160)	59
47	05:44 06:32		07:22 17:06 (WEA-4 E-160)	08:13 17:08 (WEA-4 E-160)	08:07 17:05 (WEA-4 E-160)	08:39 09:13 (WEA-01)	59
48	21:34 20:37		19:26 18:09 (WEA-4 E-160)	18:20 17:11 (WEA-4 E-160)	16:32 17:05 (WEA-4 E-160)	16:26 15:02 (WEA-3 E-160)	59
49	05:45 06:34		07:24 17:07 (WEA-4 E-160)	08:15 17:08 (WEA-4 E-160)	08:09 17:05 (WEA-4 E-160)	08:39 09:14 (WEA-01)	59
50	21:33 20:35		19:24 18:08 (WEA-4 E-160)	18:18 17:11 (WEA-4 E-160)	16:31 17:05 (WEA-4 E-160)	16:27 15:02 (WEA-3 E-160)	58
51	05:47 06:35		07:26 17:07 (WEA-4 E-160)	08:17 17:08 (WEA-4 E-160)	08:10 17:05 (WEA-4 E-160)	08:40 09:15 (WEA-01)	58
52	21:31 20:33		19:22 18:08 (WEA-4 E-160)	18:16 17:11 (WEA-4 E-160)	16:30 17:05 (WEA-4 E-160)	16:28 15:03 (WEA-3 E-160)	58
53	05:48 06:37		07:27 17:07 (WEA-4 E-160)	08:18 17:08 (WEA-4 E-160)	08:12 17:05 (WEA-4 E-160)	08:40 09:15 (WEA-01)	60
54	21:30 20:31		19:19 18:06 (WEA-4 E-160)	18:14 17:11 (WEA-4 E-160)	16:29 17:05 (WEA-4 E-160)	16:28 15:04 (WEA-3 E-160)	60
55	05:49 06:39		07:29 17:07 (WEA-4 E-160)	08:20 17:08 (WEA-4 E-160)	08:13 17:05 (WEA-4 E-160)	08:40 09:15 (WEA-01)	61
56	21:28 20:28		19:17 18:05 (WEA-4 E-160)	18:12 17:11 (WEA-4 E-160)	16:28 17:05 (WEA-4 E-160)	16:29 15:04 (WEA-3 E-160)	61
57	05:51 06:40		07:30 17:07 (WEA-4 E-160)	08:22 17:08 (WEA-4 E-160)	08:15 17:05 (WEA-4 E-160)	08:40 09:15 (WEA-01)	61
58	21:27 20:26		19:15 18:04 (WEA-4 E-160)	18:10 17:11 (WEA-4 E-160)	16:27 17:05 (WEA-4 E-160)	16:30 15:05 (WEA-3 E-160)	61
59	05:52 06:42	17:44 (WEA-4 E-160)		07:24 17:08 (WEA-4 E-160)		08:40 09:15 (WEA-01)	61
60	21:25 20:24	12 17:56 (WEA-4 E-160)		17:09 17:08 (WEA-4 E-160)		16:31 15:06 (WEA-3 E-160)	63
61	Sonnenscheinstunden	501	453	381	332	267	244
62	astr.max.mögl.Beschattung		12	1638	566	1588	1947
63	Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	0,15
64	Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84
65	Reduktion Windrichtung		0,71	0,71	0,68	0,66	0,65
66	Gesamte Reduktion		0,25	0,21	0,18	0,13	0,08
67	Met.wahrsch.Beschattung		3	347	102	201	156

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 46/2 - IP 46/2 Rhader Straße 16b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni						
1	08:40	09:15 (WEA-01)	08:14	14:51 (WEA-3 E-160)	07:20	07:47 (WEA08)	07:10	17:50 (WEA-4 E-160)	06:06	05:21		
1	16:32	49 15:19 (WEA-3 E-160)	17:20	15:45 (WEA-3 E-160)	18:11	3	07:50 (WEA08)	20:05	61 18:51 (WEA-4 E-160)	20:56	21:41	
2	08:40	09:15 (WEA-01)	08:12	14:51 (WEA-3 E-160)	07:18		07:44 (WEA08)	07:08		17:49 (WEA-4 E-160)	06:04	05:20
2	16:33	48 15:21 (WEA-3 E-160)	17:22	15:45 (WEA-3 E-160)	18:13	9	07:53 (WEA08)	20:07	61 18:50 (WEA-4 E-160)	20:57	21:42	
3	08:40	09:15 (WEA-01)	08:10	14:51 (WEA-3 E-160)	07:16		07:41 (WEA08)	07:06		17:49 (WEA-4 E-160)	06:02	05:19
3	16:35	43 15:22 (WEA-3 E-160)	17:24	15:44 (WEA-3 E-160)	18:15	13	07:54 (WEA08)	20:08	61 18:50 (WEA-4 E-160)	20:59	21:43	
4	08:40	09:15 (WEA-01)	08:09	14:52 (WEA-3 E-160)	07:14		07:40 (WEA08)	07:03		17:49 (WEA-4 E-160)	06:00	05:18
4	16:36	44 15:23 (WEA-3 E-160)	17:25	15:45 (WEA-3 E-160)	18:17	15	07:55 (WEA08)	20:10	61 18:50 (WEA-4 E-160)	21:01	21:44	
5	08:40	09:15 (WEA-01)	08:07	14:53 (WEA-3 E-160)	07:12		07:40 (WEA08)	07:01		17:49 (WEA-4 E-160)	05:58	05:18
5	16:37	46 15:24 (WEA-3 E-160)	17:27	15:45 (WEA-3 E-160)	18:18	16	07:56 (WEA08)	20:12	61 18:50 (WEA-4 E-160)	21:02	21:45	
6	08:39	09:15 (WEA-01)	08:06	08:31 (WEA04)	07:10		07:39 (WEA08)	06:59		17:48 (WEA-4 E-160)	05:56	05:17
6	16:38	50 15:26 (WEA-3 E-160)	17:29	15:44 (WEA-3 E-160)	18:20	17	07:56 (WEA08)	20:13	61 18:49 (WEA-4 E-160)	21:04	21:46	
7	08:39	09:15 (WEA-01)	08:04	08:29 (WEA04)	07:07		07:39 (WEA08)	06:56		17:48 (WEA-4 E-160)	05:55	05:16
7	16:39	52 15:27 (WEA-3 E-160)	17:31	15:44 (WEA-3 E-160)	18:22	16	07:55 (WEA08)	20:15	61 18:49 (WEA-4 E-160)	21:06	21:47	
8	08:38	09:15 (WEA-01)	08:02	08:27 (WEA04)	07:05		07:39 (WEA08)	06:54		17:49 (WEA-4 E-160)	05:53	05:16
8	16:41	54 15:27 (WEA-3 E-160)	17:33	15:43 (WEA-3 E-160)	18:24	15	07:54 (WEA08)	20:17	60 18:49 (WEA-4 E-160)	21:07	21:48	
9	08:38	09:15 (WEA-01)	08:00	08:25 (WEA04)	07:03		07:40 (WEA08)	06:52		17:49 (WEA-4 E-160)	05:51	05:15
9	16:42	56 15:29 (WEA-3 E-160)	17:35	15:43 (WEA-3 E-160)	18:26	14	07:54 (WEA08)	20:19	59 18:48 (WEA-4 E-160)	21:09	21:49	
10	08:37	09:15 (WEA-01)	07:59	08:24 (WEA04)	07:01		07:40 (WEA08)	06:50		17:49 (WEA-4 E-160)	05:49	05:15
10	16:43	58 15:30 (WEA-3 E-160)	17:37	15:42 (WEA-3 E-160)	18:27	11	07:51 (WEA08)	20:20	58 18:47 (WEA-4 E-160)	21:10	21:50	
11	08:37	09:15 (WEA-01)	07:57	08:27 (WEA04)	06:58		07:43 (WEA08)	06:48		17:49 (WEA-4 E-160)	05:48	05:15
11	16:45	60 15:31 (WEA-3 E-160)	17:38	15:42 (WEA-3 E-160)	18:29	6	07:49 (WEA08)	20:22	57 18:46 (WEA-4 E-160)	21:12	21:51	
12	08:36	09:16 (WEA-01)	07:55	14:58 (WEA-3 E-160)	06:56			06:45		17:50 (WEA-4 E-160)	05:46	05:14
12	16:46	61 15:32 (WEA-3 E-160)	17:40	15:41 (WEA-3 E-160)	18:31			20:24	55 18:45 (WEA-4 E-160)	21:14	21:51	
13	08:35	09:16 (WEA-01)	07:53	15:00 (WEA-3 E-160)	06:54			06:43		17:51 (WEA-4 E-160)	05:44	05:14
13	16:48	63 15:33 (WEA-3 E-160)	17:42	15:40 (WEA-3 E-160)	18:32			20:25	54 18:45 (WEA-4 E-160)	21:15	21:52	
14	08:35	09:16 (WEA-01)	07:51	15:01 (WEA-3 E-160)	06:52			06:41		17:51 (WEA-4 E-160)	05:43	05:14
14	16:49	64 15:34 (WEA-3 E-160)	17:44	15:39 (WEA-3 E-160)	18:34			20:27	53 18:44 (WEA-4 E-160)	21:17	21:52	
15	08:34	09:16 (WEA-01)	07:49	15:03 (WEA-3 E-160)	06:49			06:39		17:52 (WEA-4 E-160)	05:41	05:14
15	16:51	67 15:35 (WEA-3 E-160)	17:46	15:37 (WEA-3 E-160)	18:36			20:29	51 18:43 (WEA-4 E-160)	21:18	21:53	
16	08:33	09:16 (WEA-01)	07:47	15:05 (WEA-3 E-160)	06:47		17:17 (WEA-4 E-160)	06:37		17:53 (WEA-4 E-160)	05:40	05:13
16	16:52	68 15:36 (WEA-3 E-160)	17:48	15:35 (WEA-3 E-160)	18:38	17	17:34 (WEA-4 E-160)	20:30	49 18:42 (WEA-4 E-160)	21:20	21:54	
17	08:32	09:17 (WEA-01)	07:45	15:07 (WEA-3 E-160)	06:45		17:11 (WEA-4 E-160)	06:34		17:54 (WEA-4 E-160)	05:38	05:13
17	16:54	69 15:37 (WEA-3 E-160)	17:50	15:33 (WEA-3 E-160)	18:39	26	17:37 (WEA-4 E-160)	20:32	46 18:40 (WEA-4 E-160)	21:21	21:54	
18	08:31	09:17 (WEA-01)	07:43	08:08 (WEA03)	06:42		17:08 (WEA-4 E-160)	06:32		17:55 (WEA-4 E-160)	05:37	05:13
18	16:56	70 15:38 (WEA-3 E-160)	17:51	15:30 (WEA-3 E-160)	18:41	32	17:40 (WEA-4 E-160)	20:34	43 18:38 (WEA-4 E-160)	21:23	21:54	
19	08:30	09:17 (WEA-01)	07:41	08:05 (WEA03)	06:40		17:06 (WEA-4 E-160)	06:30		17:56 (WEA-4 E-160)	05:35	05:13
19	16:57	70 15:38 (WEA-3 E-160)	17:53	15:24 (WEA-3 E-160)	18:43	37	17:43 (WEA-4 E-160)	20:35	41 18:37 (WEA-4 E-160)	21:24	21:55	
20	08:29	09:18 (WEA-01)	07:39	08:03 (WEA03)	06:38		17:03 (WEA-4 E-160)	06:28		17:58 (WEA-4 E-160)	05:34	05:13
20	16:59	71 15:39 (WEA-3 E-160)	17:55	08:09 (WEA03)	18:45	41	17:44 (WEA-4 E-160)	20:37	37 18:35 (WEA-4 E-160)	21:26	21:55	
21	08:28	09:18 (WEA-01)	07:37	08:01 (WEA03)	06:35		17:01 (WEA-4 E-160)	06:26		18:00 (WEA-4 E-160)	05:33	05:14
21	17:00	72 15:40 (WEA-3 E-160)	17:57	08:09 (WEA03)	18:46	44	17:45 (WEA-4 E-160)	20:39	33 18:33 (WEA-4 E-160)	21:27	21:55	
22	08:27	09:19 (WEA-01)	07:35	07:59 (WEA03)	06:33		17:00 (WEA-4 E-160)	06:24		18:02 (WEA-4 E-160)	05:31	05:14
22	17:02	72 15:41 (WEA-3 E-160)	17:59	08:09 (WEA03)	18:48	47	17:47 (WEA-4 E-160)	20:41	29 18:31 (WEA-4 E-160)	21:28	21:56	
23	08:26	08:53 (WEA05)	07:33	08:00 (WEA03)	06:31		16:58 (WEA-4 E-160)	06:22		18:05 (WEA-4 E-160)	05:30	05:14
23	17:04	71 15:41 (WEA-3 E-160)	18:00	08:08 (WEA03)	18:50	49	17:47 (WEA-4 E-160)	20:42	23 18:28 (WEA-4 E-160)	21:30	21:56	
24	08:25	08:52 (WEA05)	07:31	06:29			16:56 (WEA-4 E-160)	06:20		18:09 (WEA-4 E-160)	05:29	05:14
24	17:06	73 15:42 (WEA-3 E-160)	18:02	18:51	52	17:48 (WEA-4 E-160)	20:44	15 18:24 (WEA-4 E-160)		21:31	21:56	
25	08:23	08:51 (WEA05)	07:29	06:26			16:56 (WEA-4 E-160)	06:18		05:28	05:15	
25	17:07	75 15:43 (WEA-3 E-160)	18:04	18:53	53	17:49 (WEA-4 E-160)	20:46			21:33	21:56	
26	08:22	08:49 (WEA05)	07:27	06:24			16:54 (WEA-4 E-160)	06:15		05:27	05:15	
26	17:09	74 15:43 (WEA-3 E-160)	18:06	18:55	55	17:49 (WEA-4 E-160)	20:47			21:34	21:56	
27	08:21	08:48 (WEA05)	07:25	06:22			16:53 (WEA-4 E-160)	06:13		05:25	05:15	
27	17:11	72 15:43 (WEA-3 E-160)	18:08	18:57	57	17:50 (WEA-4 E-160)	20:49			21:35	21:56	
28	08:19	08:50 (WEA05)	07:23	06:19			16:52 (WEA-4 E-160)	06:11		05:24	05:16	
28	17:13	62 15:43 (WEA-3 E-160)	18:10	18:58	58	17:50 (WEA-4 E-160)	20:51			21:36	21:56	
29	08:18	14:51 (WEA-3 E-160)		07:17			17:52 (WEA-4 E-160)	06:10		05:23	05:16	
29	17:14	53 15:44 (WEA-3 E-160)		20:00	59	18:51 (WEA-4 E-160)	20:52			21:38	21:56	
30	08:17	14:51 (WEA-3 E-160)		07:15			17:51 (WEA-4 E-160)	06:08		05:22	05:17	
30	17:16	53 15:44 (WEA-3 E-160)		20:02	59	18:50 (WEA-4 E-160)	20:54			21:39	21:55	
31	08:15	14:50 (WEA-3 E-160)		07:12			17:50 (WEA-4 E-160)			05:21	05:17	
31	17:18	54 15:44 (WEA-3 E-160)		20:03	61	18:51 (WEA-4 E-160)				21:40	21:55	
	Sonnenscheinstunden	259	278	367	416					485	498	
	astr.max.mögl.Beschattung	1894	861	882	1190							
	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41							
	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84							
	Reduktion Windrichtung	0,65	0,69	0,68	0,70							
	Gesamte Reduktion	0,11	0,17	0,17	0,24							
	Met.wahrsch.Beschattung	200	150	149	280							

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 46/2 - IP 46/2 Rhader Straße 16b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember		
1	05:18	05:54	06:43	17:48 (WEA-4 E-160) 07:32	07:26	07:53 (WEA04)	08:16	08:57 (WEA-01)
	21:55	21:24	20:22	17:48 (WEA-4 E-160) 19:13	17:07	15:12 (WEA-3 E-160) 16:27	60	15:13 (WEA-3 E-160)
2	05:18	05:55	06:45	17:48 (WEA-4 E-160) 07:34	08:24 (WEA08) 07:27	07:55 (WEA04)	08:18	08:58 (WEA-01)
	21:55	21:22	20:20	18:46 (WEA-4 E-160) 19:10	08:25 (WEA08) 17:05	15:12 (WEA-3 E-160) 16:26	59	15:13 (WEA-3 E-160)
3	05:19	05:57	06:47	17:46 (WEA-4 E-160) 07:35	08:20 (WEA08) 07:29	07:57 (WEA04)	08:19	08:58 (WEA-01)
	21:54	21:20	20:17	18:45 (WEA-4 E-160) 19:08	08:30 (WEA08) 17:03	15:13 (WEA-3 E-160) 16:25	56	15:12 (WEA-3 E-160)
4	05:20	05:59	06:48	17:46 (WEA-4 E-160) 07:37	08:17 (WEA08) 07:31	07:59 (WEA04)	08:21	09:00 (WEA-01)
	21:54	21:18	20:15	18:46 (WEA-4 E-160) 19:06	08:30 (WEA08) 17:01	15:13 (WEA-3 E-160) 16:25	54	15:12 (WEA-3 E-160)
5	05:21	06:00	06:50	17:45 (WEA-4 E-160) 07:39	08:16 (WEA08) 07:33	08:01 (WEA04)	08:22	09:00 (WEA-01)
	21:54	21:17	20:13	18:46 (WEA-4 E-160) 19:03	08:31 (WEA08) 17:00	15:14 (WEA-3 E-160) 16:24	52	15:12 (WEA-3 E-160)
6	05:21	06:02	06:51	17:44 (WEA-4 E-160) 07:40	08:16 (WEA08) 07:35	14:22 (WEA-3 E-160) 08:23	49	09:02 (WEA-01)
	21:53	21:15	20:10	18:45 (WEA-4 E-160) 19:01	08:32 (WEA08) 16:58	15:14 (WEA-3 E-160) 16:24	49	15:12 (WEA-3 E-160)
7	05:22	06:03	06:53	17:44 (WEA-4 E-160) 07:42	08:14 (WEA08) 07:36	14:22 (WEA-3 E-160) 08:24	47	09:02 (WEA-01)
	21:52	21:13	20:08	18:45 (WEA-4 E-160) 18:59	08:31 (WEA08) 16:56	15:15 (WEA-3 E-160) 16:23	49	15:11 (WEA-3 E-160)
8	05:23	06:05	06:55	17:43 (WEA-4 E-160) 07:44	08:15 (WEA08) 07:38	14:22 (WEA-3 E-160) 08:26	49	09:03 (WEA-01)
	21:52	21:11	20:06	18:44 (WEA-4 E-160) 18:57	08:15 (WEA08) 16:54	15:15 (WEA-3 E-160) 16:23	44	15:11 (WEA-3 E-160)
9	05:24	06:06	06:56	17:43 (WEA-4 E-160) 07:45	08:15 (WEA08) 07:40	14:22 (WEA-3 E-160) 08:27	43	09:03 (WEA-01)
	21:51	21:10	20:04	18:44 (WEA-4 E-160) 18:54	08:30 (WEA08) 16:53	15:15 (WEA-3 E-160) 16:23	43	15:10 (WEA-3 E-160)
10	05:25	06:08	06:58	17:42 (WEA-4 E-160) 07:47	08:16 (WEA08) 07:42	14:22 (WEA-3 E-160) 08:28	48	09:04 (WEA-01)
	21:50	21:08	20:01	18:43 (WEA-4 E-160) 18:52	08:30 (WEA08) 16:51	15:16 (WEA-3 E-160) 16:23	48	15:10 (WEA-3 E-160)
11	05:26	06:10	07:00	17:42 (WEA-4 E-160) 07:49	08:16 (WEA08) 07:43	14:22 (WEA-3 E-160) 08:29	49	09:06 (WEA-01)
	21:50	21:06	19:59	18:43 (WEA-4 E-160) 18:50	08:28 (WEA08) 16:50	15:16 (WEA-3 E-160) 16:22	49	15:11 (WEA-3 E-160)
12	05:27	06:11	07:01	17:42 (WEA-4 E-160) 07:51	08:18 (WEA08) 07:45	14:22 (WEA-3 E-160) 08:30	51	09:06 (WEA-01)
	21:49	21:04	19:57	18:43 (WEA-4 E-160) 18:48	08:26 (WEA08) 16:48	15:16 (WEA-3 E-160) 16:22	51	15:10 (WEA-3 E-160)
13	05:28	06:13	07:03	17:42 (WEA-4 E-160) 07:52	08:26 (WEA08) 07:47	14:23 (WEA-3 E-160) 08:31	50	09:07 (WEA09)
	21:48	21:02	19:54	18:42 (WEA-4 E-160) 18:46	15:16 (WEA-3 E-160) 16:47	15:16 (WEA-3 E-160) 16:22	50	15:10 (WEA-3 E-160)
14	05:30	06:14	07:04	17:42 (WEA-4 E-160) 07:54	08:21 (WEA08) 07:49	14:23 (WEA-3 E-160) 08:32	50	09:07 (WEA09)
	21:47	21:00	19:52	18:41 (WEA-4 E-160) 18:43	15:15 (WEA-3 E-160) 16:45	15:15 (WEA-3 E-160) 16:22	50	15:10 (WEA-3 E-160)
15	05:31	06:16	07:06	17:42 (WEA-4 E-160) 07:56	08:20 (WEA08) 07:50	14:23 (WEA-3 E-160) 08:33	50	09:08 (WEA09)
	21:46	20:58	19:50	18:40 (WEA-4 E-160) 18:41	15:16 (WEA-3 E-160) 16:44	15:15 (WEA-3 E-160) 16:22	50	15:10 (WEA-3 E-160)
16	05:32	06:18	07:08	17:42 (WEA-4 E-160) 07:57	08:22 (WEA08) 07:52	14:23 (WEA-3 E-160) 08:34	51	09:08 (WEA09)
	21:45	20:56	19:47	18:39 (WEA-4 E-160) 18:39	15:16 (WEA-3 E-160) 16:42	15:16 (WEA-3 E-160) 16:22	51	15:09 (WEA-3 E-160)
17	05:33	06:19	07:09	17:42 (WEA-4 E-160) 07:59	08:24 (WEA08) 07:54	14:23 (WEA-3 E-160) 08:35	51	09:08 (WEA09)
	21:44	20:54	19:45	18:38 (WEA-4 E-160) 18:37	15:16 (WEA-3 E-160) 16:41	15:16 (WEA-3 E-160) 16:23	51	15:09 (WEA-3 E-160)
18	05:34	06:21	07:11	17:43 (WEA-4 E-160) 08:01	08:33 (WEA03) 07:56	14:23 (WEA-3 E-160) 08:35	51	09:09 (WEA09)
	21:43	20:52	19:43	18:37 (WEA-4 E-160) 18:35	15:16 (WEA-3 E-160) 16:40	15:16 (WEA-3 E-160) 16:23	51	15:10 (WEA-3 E-160)
19	05:36	06:22	18:14 (WEA-4 E-160) 07:12	17:44 (WEA-4 E-160) 08:03	08:31 (WEA03) 07:57	14:23 (WEA-3 E-160) 08:36	50	09:10 (WEA09)
	21:42	20:50	18:30 (WEA-4 E-160) 19:40	18:36 (WEA-4 E-160) 18:33	15:16 (WEA-3 E-160) 16:38	15:16 (WEA-3 E-160) 16:23	50	15:10 (WEA-3 E-160)
20	05:37	06:24	18:10 (WEA-4 E-160) 07:14	17:44 (WEA-4 E-160) 08:04	08:31 (WEA03) 07:59	14:23 (WEA-3 E-160) 08:37	51	09:10 (WEA09)
	21:41	20:48	18:34 (WEA-4 E-160) 19:38	18:34 (WEA-4 E-160) 18:30	15:16 (WEA-3 E-160) 16:37	15:16 (WEA-3 E-160) 16:24	51	15:10 (WEA-3 E-160)
21	05:38	06:26	18:06 (WEA-4 E-160) 07:16	17:45 (WEA-4 E-160) 08:06	08:32 (WEA03) 08:01	14:23 (WEA-3 E-160) 08:37	49	09:11 (WEA09)
	21:39	20:46	18:36 (WEA-4 E-160) 19:36	18:33 (WEA-4 E-160) 18:28	15:16 (WEA-3 E-160) 16:36	15:16 (WEA-3 E-160) 16:24	49	15:10 (WEA-3 E-160)
22	05:40	06:27	18:04 (WEA-4 E-160) 07:17	17:45 (WEA-4 E-160) 08:08	08:34 (WEA03) 08:02	14:23 (WEA-3 E-160) 08:38	48	09:11 (WEA09)
	21:38	20:44	18:38 (WEA-4 E-160) 19:33	18:30 (WEA-4 E-160) 18:26	15:17 (WEA-3 E-160) 16:35	15:15 (WEA-3 E-160) 16:24	48	15:10 (WEA-3 E-160)
23	05:41	06:29	18:03 (WEA-4 E-160) 07:19	17:47 (WEA-4 E-160) 08:10	08:36 (WEA03) 08:04	14:23 (WEA-3 E-160) 08:38	50	09:12 (WEA09)
	21:37	20:41	18:40 (WEA-4 E-160) 19:31	18:29 (WEA-4 E-160) 18:24	15:15 (WEA-3 E-160) 16:34	15:15 (WEA-3 E-160) 16:25	50	15:12 (WEA-3 E-160)
24	05:42	06:30	18:00 (WEA-4 E-160) 07:21	17:49 (WEA-4 E-160) 08:11	15:39 (WEA-3 E-160) 08:06	14:23 (WEA-3 E-160) 08:39	51	09:12 (WEA09)
	21:35	20:39	18:41 (WEA-4 E-160) 19:29	18:27 (WEA-4 E-160) 18:22	16:00 (WEA-3 E-160) 16:33	15:15 (WEA-3 E-160) 16:26	51	15:12 (WEA-3 E-160)
25	05:44	06:32	17:59 (WEA-4 E-160) 07:22	17:50 (WEA-4 E-160) 07:13	14:36 (WEA-3 E-160) 08:07	14:23 (WEA-3 E-160) 08:39	50	09:12 (WEA09)
	21:34	20:37	18:42 (WEA-4 E-160) 19:26	18:24 (WEA-4 E-160) 17:20	15:03 (WEA-3 E-160) 16:32	15:15 (WEA-3 E-160) 16:26	50	15:12 (WEA-3 E-160)
26	05:45	06:34	17:56 (WEA-4 E-160) 07:24	17:53 (WEA-4 E-160) 07:15	14:34 (WEA-3 E-160) 08:09	14:23 (WEA-3 E-160) 08:39	51	09:12 (WEA09)
	21:33	20:35	18:43 (WEA-4 E-160) 19:24	18:21 (WEA-4 E-160) 17:18	15:05 (WEA-3 E-160) 16:31	15:14 (WEA-3 E-160) 16:27	51	15:13 (WEA-3 E-160)
27	05:47	06:35	17:55 (WEA-4 E-160) 07:26	17:57 (WEA-4 E-160) 07:17	14:32 (WEA-3 E-160) 08:10	14:23 (WEA-3 E-160) 08:40	51	09:13 (WEA09)
	21:31	20:33	18:44 (WEA-4 E-160) 19:22	18:17 (WEA-4 E-160) 17:16	15:07 (WEA-3 E-160) 16:30	15:14 (WEA-3 E-160) 16:28	51	15:15 (WEA-3 E-160)
28	05:48	06:37	17:53 (WEA-4 E-160) 07:27	18:03 (WEA-4 E-160) 07:18	14:30 (WEA-3 E-160) 08:12	14:23 (WEA-3 E-160) 08:40	50	09:14 (WEA09)
	21:30	20:31	18:44 (WEA-4 E-160) 19:19	18:09 (WEA-4 E-160) 17:14	15:09 (WEA-3 E-160) 16:29	15:14 (WEA-3 E-160) 16:28	50	15:16 (WEA-3 E-160)
29	05:49	06:39	17:52 (WEA-4 E-160) 07:29	18:02 (WEA-4 E-160) 07:20	14:29 (WEA-3 E-160) 08:13	14:23 (WEA-3 E-160) 08:40	50	09:14 (WEA09)
	21:28	20:28	18:45 (WEA-4 E-160) 19:17	17:51 (WEA-4 E-160) 17:12	15:10 (WEA-3 E-160) 16:28	15:13 (WEA-3 E-160) 16:29	50	15:17 (WEA-3 E-160)
30	05:51	06:40	17:51 (WEA-4 E-160) 07:30	17:52 (WEA-4 E-160) 07:22	14:27 (WEA-3 E-160) 08:15	14:23 (WEA-3 E-160) 08:40	50	09:15 (WEA09)
	21:27	20:26	18:45 (WEA-4 E-160) 19:15	17:50 (WEA-4 E-160) 17:10	15:10 (WEA-3 E-160) 16:27	15:14 (WEA-3 E-160) 16:30	50	15:18 (WEA-3 E-160)
31	05:52	06:42	17:50 (WEA-4 E-160) 07:31	17:51 (WEA-4 E-160) 07:24	14:27 (WEA-3 E-160) 08:15	14:23 (WEA-3 E-160) 08:40	50	09:15 (WEA09)
	21:25	20:24	18:45 (WEA-4 E-160) 19:16	17:50 (WEA-4 E-160) 17:09	15:11 (WEA-3 E-160) 16:27	15:14 (WEA-3 E-160) 16:31	51	15:19 (WEA-3 E-160)
Sonnenscheinstunden	501	453	381	332	267	244	1567	
astr.max.mögl.Beschattung		534	1429	474	1872	1517	0,15	
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	0,16	0,15	
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84	0,84	
Reduktion Windrichtung		0,70	0,70	0,67	0,67	0,67	0,62	
Gesamte Reduktion		0,25	0,21	0,18	0,13	0,13	0,08	
Met.wahrsch.Beschattung		132	297	83	238	244	118	

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 46/3 - IP 46/3 Rhader Straße 16a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	10:44 (WEA-2 E-138)	08:14	09:14 (WEA-01)	07:20	07:10	17:09 (WEA-4 E-160)	06:06	17:31 (WEA-4 E-160)	05:21	
	16:32	81 14:45 (WEA-3 E-160)	17:20	14:55 (WEA-3 E-160)	18:11	20:05	79 18:28 (WEA-4 E-160)	20:56	31 18:02 (WEA-4 E-160)	21:41	
2	08:40	10:45 (WEA-2 E-138)	08:12	14:02 (WEA-3 E-160)	07:18	07:08	17:08 (WEA-4 E-160)	06:04	17:34 (WEA-4 E-160)	05:20	
	16:33	80 14:46 (WEA-3 E-160)	17:22	14:55 (WEA-3 E-160)	18:13	20:07	80 18:28 (WEA-4 E-160)	20:57	24 17:58 (WEA-4 E-160)	21:42	
3	08:40	10:46 (WEA-2 E-138)	08:10	14:03 (WEA-3 E-160)	07:16	07:06	17:07 (WEA-4 E-160)	06:02	17:39 (WEA-4 E-160)	05:19	
	16:35	79 14:46 (WEA-3 E-160)	17:24	14:54 (WEA-3 E-160)	18:15	20:08	81 18:28 (WEA-4 E-160)	20:59	15 17:54 (WEA-4 E-160)	21:43	
4	08:40	10:47 (WEA-2 E-138)	08:09	14:05 (WEA-3 E-160)	07:14	07:03	17:07 (WEA-4 E-160)	06:00		05:18	
	16:36	79 14:47 (WEA-3 E-160)	17:25	14:54 (WEA-3 E-160)	18:17	20:10	81 18:28 (WEA-4 E-160)	21:01		21:44	
5	08:40	10:48 (WEA-2 E-138)	08:07	14:06 (WEA-3 E-160)	07:12	07:01	17:08 (WEA-4 E-160)	05:58		05:18	
	16:37	77 14:47 (WEA-3 E-160)	17:27	14:53 (WEA-3 E-160)	18:18	20:12	80 18:28 (WEA-4 E-160)	21:02		21:45	
6	08:39	10:50 (WEA-2 E-138)	08:06	14:07 (WEA-3 E-160)	07:10	06:59	17:07 (WEA-4 E-160)	05:56		05:17	
	16:38	76 14:49 (WEA-3 E-160)	17:29	14:52 (WEA-3 E-160)	18:20	20:13	80 18:27 (WEA-4 E-160)	21:04		21:46	
7	08:39	10:50 (WEA-2 E-138)	08:04	14:08 (WEA-3 E-160)	07:07	06:56	17:07 (WEA-4 E-160)	05:55		05:16	
	16:39	76 14:49 (WEA-3 E-160)	17:31	14:50 (WEA-3 E-160)	18:22	20:15	80 18:27 (WEA-4 E-160)	21:06		21:47	
8	08:38	10:52 (WEA-2 E-138)	08:02	14:10 (WEA-3 E-160)	07:05	06:54	17:07 (WEA-4 E-160)	05:53		05:16	
	16:41	73 14:49 (WEA-3 E-160)	17:33	14:49 (WEA-3 E-160)	18:24	20:17	80 18:27 (WEA-4 E-160)	21:07		21:48	
9	08:38	10:54 (WEA-2 E-138)	08:00	14:12 (WEA-3 E-160)	07:03	06:52	17:07 (WEA-4 E-160)	05:51		05:15	
	16:42	71 14:50 (WEA-3 E-160)	17:35	14:47 (WEA-3 E-160)	18:26	20:19	80 18:27 (WEA-4 E-160)	21:09		21:49	
10	08:37	10:56 (WEA-2 E-138)	07:59	08:24 (WEA04)	07:01	06:50	17:07 (WEA-4 E-160)	05:49		05:15	
	16:43	66 14:50 (WEA-3 E-160)	17:37	14:46 (WEA-3 E-160)	18:27	20:20	78 18:25 (WEA-4 E-160)	21:10		21:50	
11	08:37	09:08 (WEA-01)	07:57	08:22 (WEA04)	06:58	06:48	17:07 (WEA-4 E-160)	05:48		05:15	
	16:45	64 14:51 (WEA-3 E-160)	17:38	14:43 (WEA-3 E-160)	18:29	20:22	78 18:25 (WEA-4 E-160)	21:12		21:51	
12	08:36	09:08 (WEA-01)	07:55	08:20 (WEA04)	06:56	06:45	17:08 (WEA-4 E-160)	05:46		05:14	
	16:46	67 14:52 (WEA-3 E-160)	17:40	14:40 (WEA-3 E-160)	18:31	20:24	77 18:25 (WEA-4 E-160)	21:14		21:51	
13	08:35	09:06 (WEA-01)	07:53	08:19 (WEA04)	06:54	06:43	17:08 (WEA-4 E-160)	05:44		05:14	
	16:48	71 14:52 (WEA-3 E-160)	17:42	08:24 (WEA04)	18:33	20:25	76 18:24 (WEA-4 E-160)	21:15		21:52	
14	08:35	09:06 (WEA-01)	07:51	08:17 (WEA04)	06:52	06:41	17:09 (WEA-4 E-160)	05:43		05:14	
	16:49	73 14:53 (WEA-3 E-160)	17:44	08:18 (WEA04)	18:34	20:27	75 18:24 (WEA-4 E-160)	21:17		21:52	
15	08:34	09:05 (WEA-01)	07:49	08:16 (WEA04)	06:49	06:39	17:10 (WEA-4 E-160)	05:41		05:14	
	16:51	74 14:53 (WEA-3 E-160)	17:46	08:16 (WEA04)	18:36	20:29	73 18:23 (WEA-4 E-160)	21:18		21:53	
16	08:33	09:05 (WEA-01)	07:47	08:15 (WEA04)	06:47	06:37	17:10 (WEA-4 E-160)	05:40		05:13	
	16:52	76 14:54 (WEA-3 E-160)	17:48	08:15 (WEA04)	18:38	20:30	72 18:22 (WEA-4 E-160)	21:20		21:54	
17	08:32	09:05 (WEA-01)	07:45	08:14 (WEA04)	06:45	06:34	17:10 (WEA-4 E-160)	05:38		05:13	
	16:54	77 14:54 (WEA-3 E-160)	17:50	08:14 (WEA04)	18:39	20:32	71 18:21 (WEA-4 E-160)	21:21		21:54	
18	08:31	09:05 (WEA-01)	07:43	08:13 (WEA04)	06:42	06:32	17:11 (WEA-4 E-160)	05:37		05:13	
	16:56	78 14:55 (WEA-3 E-160)	17:51	08:13 (WEA04)	18:41	20:34	69 18:20 (WEA-4 E-160)	21:23		21:54	
19	08:30	09:04 (WEA-01)	07:41	08:12 (WEA04)	06:40	06:30	17:12 (WEA-4 E-160)	05:35		05:13	
	16:57	79 14:54 (WEA-3 E-160)	17:53	08:12 (WEA04)	18:43	20:36	67 18:19 (WEA-4 E-160)	21:24		21:55	
20	08:29	09:04 (WEA-01)	07:39	08:11 (WEA04)	06:38	06:28	17:13 (WEA-4 E-160)	05:34		05:13	
	16:59	80 14:55 (WEA-3 E-160)	17:55	08:11 (WEA04)	18:45	20:37	65 18:18 (WEA-4 E-160)	21:26		21:55	
21	08:28	09:04 (WEA-01)	07:37	08:10 (WEA03)	06:35	06:26	17:14 (WEA-4 E-160)	05:33		05:14	
	17:00	81 14:55 (WEA-3 E-160)	17:57	08:03 (WEA03)	18:46	20:39	63 18:17 (WEA-4 E-160)	21:27		21:55	
22	08:27	09:05 (WEA-01)	07:35	08:03 (WEA03)	06:33	06:24	17:15 (WEA-4 E-160)	05:31		05:14	
	17:02	81 14:56 (WEA-3 E-160)	17:59	08:03 (WEA03)	18:48	20:41	61 18:16 (WEA-4 E-160)	21:28		21:56	
23	08:26	09:04 (WEA-01)	07:33	08:03 (WEA03)	06:31	06:22	17:16 (WEA-4 E-160)	05:30		05:14	
	17:04	80 14:55 (WEA-3 E-160)	18:00	08:03 (WEA03)	18:50	20:42	59 18:15 (WEA-4 E-160)	21:30		21:56	
24	08:25	09:05 (WEA-01)	07:31	08:03 (WEA03)	06:29	06:20	17:18 (WEA-4 E-160)	05:29		05:14	
	17:06	81 14:56 (WEA-3 E-160)	18:02	08:03 (WEA03)	18:51	20:44	56 18:14 (WEA-4 E-160)	21:31		21:56	
25	08:23	09:06 (WEA-01)	07:29	08:03 (WEA03)	06:26	06:18	17:19 (WEA-4 E-160)	05:28		05:15	
	17:07	80 14:57 (WEA-3 E-160)	18:04	08:01 (WEA03)	18:53	20:46	53 18:12 (WEA-4 E-160)	21:33		21:56	
26	08:22	09:06 (WEA-01)	07:27	08:01 (WEA03)	06:24	06:16	17:20 (WEA-4 E-160)	05:27		05:15	
	17:09	79 14:56 (WEA-3 E-160)	18:06	08:01 (WEA03)	18:55	20:47	51 18:11 (WEA-4 E-160)	21:34		21:56	
27	08:21	09:07 (WEA-01)	07:25	08:01 (WEA03)	06:22	06:13	17:22 (WEA-4 E-160)	05:25		05:15	
	17:11	77 14:56 (WEA-3 E-160)	18:08	08:01 (WEA03)	18:57	20:49	47 18:09 (WEA-4 E-160)	21:35		21:56	
28	08:19	08:46 (WEA05)	07:23	08:01 (WEA03)	06:19	06:11	17:24 (WEA-4 E-160)	05:24		05:16	
	17:13	77 14:56 (WEA-3 E-160)	18:10	08:01 (WEA03)	18:58	20:51	44 18:08 (WEA-4 E-160)	21:36		21:56	
29	08:18	08:45 (WEA05)	07:21	08:01 (WEA03)	06:17	06:10	17:27 (WEA-4 E-160)	05:23		05:16	
	17:15	76 14:56 (WEA-3 E-160)	18:12	08:01 (WEA03)	19:00	20:52	39 18:06 (WEA-4 E-160)	21:38		21:56	
30	08:17	08:43 (WEA05)	07:19	08:01 (WEA03)	06:15	06:08	17:29 (WEA-4 E-160)	05:22		05:17	
	17:16	74 14:56 (WEA-3 E-160)	18:14	08:01 (WEA03)	19:02	20:54	35 18:04 (WEA-4 E-160)	21:39		21:55	
31	08:15	08:41 (WEA05)	07:17	08:01 (WEA03)	06:12	06:05	17:30 (WEA-4 E-160)	05:21		05:17	
	17:18	71 14:55 (WEA-3 E-160)	18:16	08:01 (WEA03)	19:04	20:56	31 18:03 (WEA-4 E-160)	21:40		21:55	
Sonnenscheinstunden	259		278		367		416	485		498	
astr.max.mögl.Beschattung	2354		536		1340		2030		70		
Red.Sonnenscheinwahrsch.	0,20		0,30		0,30		0,41		0,46		
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84		
Reduktion Windrichtung	0,65		0,67		0,69		0,70		0,70		
Gesamte Reduktion	0,11		0,17		0,17		0,24		0,27		
Met.wahrsch.Beschattung	248		90		230		480		19		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 46/3 - IP 46/3 Rhader Straße 16a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	17:06 (WEA-4 E-160) 07:32	17:19 (WEA-4 E-160) 07:26	07:53 (WEA04) 08:16
	21:55	21:24	20:22	78 18:24 (WEA-4 E-160) 19:13	27 17:46 (WEA-4 E-160) 17:07	34 14:15 (WEA-3 E-160) 16:27
2	05:18	05:55	06:45	17:06 (WEA-4 E-160) 07:34	08:19 (WEA08) 07:27	13:41 (WEA-3 E-160) 08:18
	21:55	21:22	20:20	78 18:24 (WEA-4 E-160) 19:10	19 17:41 (WEA-4 E-160) 17:05	36 14:17 (WEA-3 E-160) 16:26
3	05:19	05:57	06:47	17:05 (WEA-4 E-160) 07:35	08:16 (WEA08) 07:29	13:39 (WEA-3 E-160) 08:19
	21:54	21:20	20:17	80 18:25 (WEA-4 E-160) 19:08	9 08:25 (WEA08) 17:03	40 14:19 (WEA-3 E-160) 16:25
4	05:20	05:59	06:48	17:04 (WEA-4 E-160) 07:37	08:13 (WEA08) 07:31	13:38 (WEA-3 E-160) 08:21
	21:54	21:18	20:15	80 18:24 (WEA-4 E-160) 19:06	13 08:26 (WEA08) 17:01	42 14:20 (WEA-3 E-160) 16:25
5	05:21	06:00	06:50	17:04 (WEA-4 E-160) 07:39	08:12 (WEA08) 07:33	13:36 (WEA-3 E-160) 08:22
	21:54	21:17	20:13	80 18:24 (WEA-4 E-160) 19:03	14 08:26 (WEA08) 17:00	46 14:22 (WEA-3 E-160) 16:24
6	05:21	06:02	06:51	17:03 (WEA-4 E-160) 07:40	08:12 (WEA08) 07:35	13:35 (WEA-3 E-160) 08:23
	21:53	21:15	20:10	80 18:23 (WEA-4 E-160) 19:01	15 08:27 (WEA08) 16:58	48 14:23 (WEA-3 E-160) 16:24
7	05:22	06:03	06:53	17:03 (WEA-4 E-160) 07:42	08:11 (WEA08) 07:36	13:34 (WEA-3 E-160) 08:24
	21:52	21:13	20:08	80 18:23 (WEA-4 E-160) 18:59	15 08:26 (WEA08) 16:56	50 14:24 (WEA-3 E-160) 16:23
8	05:23	06:05	06:55	17:02 (WEA-4 E-160) 07:44	08:11 (WEA08) 07:38	13:34 (WEA-3 E-160) 08:26
	21:52	21:11	20:06	80 18:22 (WEA-4 E-160) 18:57	15 08:26 (WEA08) 16:54	51 14:25 (WEA-3 E-160) 16:23
9	05:24	06:06	06:56	17:02 (WEA-4 E-160) 07:45	08:12 (WEA08) 07:40	13:33 (WEA-3 E-160) 08:27
	21:51	21:10	20:04	80 18:22 (WEA-4 E-160) 18:54	13 08:25 (WEA08) 16:53	52 14:25 (WEA-3 E-160) 16:23
10	05:25	06:08	17:47 (WEA-4 E-160) 06:58	17:01 (WEA-4 E-160) 07:47	08:13 (WEA08) 07:42	08:45 (WEA-01) 08:28
	21:50	21:08	18:05 (WEA-4 E-160) 20:01	80 18:21 (WEA-4 E-160) 18:52	11 08:24 (WEA08) 16:51	61 14:26 (WEA-3 E-160) 16:23
11	05:26	06:10	17:42 (WEA-4 E-160) 07:00	17:01 (WEA-4 E-160) 07:49	08:14 (WEA08) 07:43	08:13 (WEA05) 08:29
	21:50	21:06	26 18:08 (WEA-4 E-160) 19:59	80 18:21 (WEA-4 E-160) 18:50	7 08:21 (WEA08) 16:50	71 14:27 (WEA-3 E-160) 16:22
12	05:27	06:11	17:39 (WEA-4 E-160) 07:01	17:01 (WEA-4 E-160) 07:51	07:45	08:15 (WEA05) 08:30
	21:49	21:04	32 18:11 (WEA-4 E-160) 19:57	79 18:20 (WEA-4 E-160) 18:48	16:48	75 14:28 (WEA-3 E-160) 16:22
13	05:28	06:13	17:36 (WEA-4 E-160) 07:03	17:00 (WEA-4 E-160) 07:52	07:47	08:17 (WEA05) 08:31
	21:48	21:02	36 18:12 (WEA-4 E-160) 19:54	79 18:19 (WEA-4 E-160) 18:46	16:47	76 14:28 (WEA-3 E-160) 16:22
14	05:30	06:14	17:34 (WEA-4 E-160) 07:04	17:01 (WEA-4 E-160) 07:54	07:49	08:18 (WEA05) 08:32
	21:47	21:00	41 18:15 (WEA-4 E-160) 19:52	78 18:19 (WEA-4 E-160) 18:43	16:45	77 14:28 (WEA-3 E-160) 16:22
15	05:31	06:16	17:31 (WEA-4 E-160) 07:06	17:00 (WEA-4 E-160) 07:56	07:50	08:39 (WEA-01) 08:33
	21:46	20:58	44 18:15 (WEA-4 E-160) 19:50	77 18:17 (WEA-4 E-160) 18:41	16:44	77 14:28 (WEA-3 E-160) 16:22
16	05:32	06:18	17:29 (WEA-4 E-160) 07:08	17:01 (WEA-4 E-160) 07:57	07:52	08:39 (WEA-01) 08:34
	21:45	20:56	48 18:17 (WEA-4 E-160) 19:47	76 18:17 (WEA-4 E-160) 18:39	16:42	79 14:29 (WEA-3 E-160) 16:22
17	05:33	06:19	17:27 (WEA-4 E-160) 07:09	17:00 (WEA-4 E-160) 07:59	08:27 (WEA03) 07:54	08:39 (WEA-01) 08:35
	21:44	20:54	51 18:18 (WEA-4 E-160) 19:45	75 18:15 (WEA-4 E-160) 18:37	6 08:33 (WEA03) 16:41	79 14:29 (WEA-3 E-160) 16:23
18	05:34	06:21	17:25 (WEA-4 E-160) 07:11	17:01 (WEA-4 E-160) 08:01	08:27 (WEA03) 07:56	08:39 (WEA-01) 08:35
	21:43	20:52	54 18:19 (WEA-4 E-160) 19:43	73 18:14 (WEA-4 E-160) 18:35	7 08:34 (WEA03) 16:40	81 14:30 (WEA-3 E-160) 16:23
19	05:36	06:22	17:23 (WEA-4 E-160) 07:12	17:02 (WEA-4 E-160) 08:03	08:29 (WEA03) 07:57	08:39 (WEA-01) 08:36
	21:42	20:50	57 18:20 (WEA-4 E-160) 19:40	71 18:13 (WEA-4 E-160) 18:33	6 08:35 (WEA03) 16:38	80 14:30 (WEA-3 E-160) 16:23
20	05:37	06:24	17:22 (WEA-4 E-160) 07:14	17:02 (WEA-4 E-160) 08:04	08:31 (WEA03) 07:59	08:40 (WEA-01) 08:37
	21:41	20:48	59 18:21 (WEA-4 E-160) 19:38	70 18:12 (WEA-4 E-160) 18:30	4 08:35 (WEA03) 16:37	81 14:31 (WEA-3 E-160) 16:24
21	05:38	06:26	17:20 (WEA-4 E-160) 07:16	17:03 (WEA-4 E-160) 08:06	08:32 (WEA03) 08:01	08:39 (WEA-01) 08:37
	21:39	20:46	61 18:21 (WEA-4 E-160) 19:36	68 18:11 (WEA-4 E-160) 18:28	1 08:33 (WEA03) 16:36	81 14:30 (WEA-3 E-160) 16:24
22	05:40	06:27	17:18 (WEA-4 E-160) 07:17	17:03 (WEA-4 E-160) 08:08	08:02	08:40 (WEA-01) 08:38
	21:38	20:44	64 18:22 (WEA-4 E-160) 19:33	66 18:09 (WEA-4 E-160) 18:26	08:33	80 14:31 (WEA-3 E-160) 16:24
23	05:41	06:29	17:17 (WEA-4 E-160) 07:19	17:04 (WEA-4 E-160) 08:10	08:04	08:41 (WEA-01) 08:38
	21:37	20:41	66 18:23 (WEA-4 E-160) 19:31	63 18:07 (WEA-4 E-160) 18:24	16:34	79 14:31 (WEA-3 E-160) 16:25
24	05:42	06:30	17:16 (WEA-4 E-160) 07:21	17:05 (WEA-4 E-160) 08:11	08:06	08:42 (WEA-01) 08:39
	21:36	20:39	67 18:23 (WEA-4 E-160) 19:29	61 18:05 (WEA-4 E-160) 18:22	16:33	78 14:32 (WEA-3 E-160) 16:26
25	05:44	06:32	17:15 (WEA-4 E-160) 07:22	17:06 (WEA-4 E-160) 07:13	08:07	08:43 (WEA-01) 08:39
	21:34	20:37	69 18:24 (WEA-4 E-160) 19:26	57 18:03 (WEA-4 E-160) 17:20	16:32	77 14:32 (WEA-3 E-160) 16:26
26	05:45	06:34	17:13 (WEA-4 E-160) 07:24	17:08 (WEA-4 E-160) 07:15	08:09	08:43 (WEA-01) 08:39
	21:33	20:35	71 18:24 (WEA-4 E-160) 19:24	54 18:02 (WEA-4 E-160) 17:18	16:31	77 14:32 (WEA-3 E-160) 16:27
27	05:47	06:35	17:12 (WEA-4 E-160) 07:26	17:10 (WEA-4 E-160) 07:17	08:10	08:44 (WEA-01) 08:40
	21:31	20:33	72 18:24 (WEA-4 E-160) 19:22	50 18:00 (WEA-4 E-160) 17:16	16:30	74 14:32 (WEA-3 E-160) 16:28
28	05:48	06:37	17:10 (WEA-4 E-160) 07:27	17:11 (WEA-4 E-160) 07:18	08:12	08:46 (WEA-01) 08:40
	21:30	20:31	74 18:24 (WEA-4 E-160) 19:19	46 17:57 (WEA-4 E-160) 17:14	16:29	73 14:33 (WEA-3 E-160) 16:28
29	05:49	06:39	17:10 (WEA-4 E-160) 07:29	17:13 (WEA-4 E-160) 07:20	08:13	08:47 (WEA-01) 08:40
	21:28	20:28	18:25 (WEA-4 E-160) 19:17	41 17:54 (WEA-4 E-160) 17:12	13 14:04 (WEA-3 E-160) 16:28	71 14:33 (WEA-3 E-160) 16:29
30	05:51	06:40	17:08 (WEA-4 E-160) 07:30	17:15 (WEA-4 E-160) 07:22	07:49 (WEA04) 08:15	08:49 (WEA-01) 08:40
	21:27	20:26	76 18:24 (WEA-4 E-160) 19:15	35 17:50 (WEA-4 E-160) 17:10	25 14:09 (WEA-3 E-160) 16:27	68 14:33 (WEA-3 E-160) 16:30
31	05:52	06:42	17:08 (WEA-4 E-160) 07:31	07:24	07:51 (WEA04) 08:15	08:40
	21:25	20:24	77 18:25 (WEA-4 E-160) 19:13	17:09	31 14:13 (WEA-3 E-160) 16:27	68 14:33 (WEA-3 E-160) 16:30
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung		1238	2095	251	1994	2547
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	0,15
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84
Reduktion Windrichtung		0,70	0,70	0,64	0,65	0,64
Gesamte Reduktion		0,25	0,21	0,17	0,12	0,08
Met.wahrsch.Beschattung		307	438	42	246	198

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

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



Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 47 - IP 47 Rhader Straße 18

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	09:11 (WEA09) 08:14	08:40 (WEA05) 07:20	07:44 (WEA03) 07:10	06:06	18:40 (WEA-4 E-160) 05:21	
2	16:32 80	14:34 (WEA-1) 17:20 29	09:34 (WEA-01) 18:11	16:38 (WEA-3 E-160) 20:05	20:56 56	19:36 (WEA-4 E-160) 21:41	
3	08:40	09:11 (WEA09) 08:10	08:39 (WEA05) 07:18	07:43 (WEA03) 07:08	06:04	18:40 (WEA-4 E-160) 05:20	
4	16:33 80	14:34 (WEA-1) 17:22 27	09:33 (WEA-01) 18:13	16:37 (WEA-3 E-160) 20:07	20:57 56	19:36 (WEA-4 E-160) 21:42	
5	08:40	09:11 (WEA09) 08:09	08:40 (WEA05) 07:16	07:43 (WEA03) 07:06	06:02	18:40 (WEA-4 E-160) 05:19	
6	16:35 80	14:34 (WEA-1) 17:24 23	09:32 (WEA-01) 18:15	16:36 (WEA-3 E-160) 20:08	20:59 55	19:35 (WEA-4 E-160) 21:43	
7	08:40	09:11 (WEA09) 08:07	09:18 (WEA-01) 07:14	07:46 (WEA03) 07:03	06:00	18:41 (WEA-4 E-160) 05:18	
8	16:36 79	14:34 (WEA-1) 17:25 28	16:19 (WEA-3 E-160) 18:17	16:35 (WEA-3 E-160) 20:10	21:01 55	19:36 (WEA-4 E-160) 21:44	
9	08:39	09:11 (WEA09) 08:07	09:20 (WEA-01) 07:12	15:46 (WEA-3 E-160) 07:01	05:58	18:41 (WEA-4 E-160) 05:18	
10	16:37 77	14:34 (WEA-1) 17:27 30	16:22 (WEA-3 E-160) 18:18	16:34 (WEA-3 E-160) 20:12	21:02 54	19:35 (WEA-4 E-160) 21:45	
11	08:39	09:12 (WEA09) 08:06	15:57 (WEA-3 E-160) 07:09	15:48 (WEA-3 E-160) 06:59	05:56	18:41 (WEA-4 E-160) 05:17	
12	16:38 75	14:34 (WEA-1) 17:29 28	16:25 (WEA-3 E-160) 18:20	16:33 (WEA-3 E-160) 20:13	21:04 53	19:34 (WEA-4 E-160) 21:46	
13	08:39	09:12 (WEA09) 08:04	15:55 (WEA-3 E-160) 07:07	15:48 (WEA-3 E-160) 06:56	05:55	18:42 (WEA-4 E-160) 05:16	
14	16:39 73	14:33 (WEA-1) 17:31 32	16:27 (WEA-3 E-160) 18:22	16:31 (WEA-3 E-160) 20:15	21:06 53	19:35 (WEA-4 E-160) 21:47	
15	08:38	09:12 (WEA09) 08:02	15:53 (WEA-3 E-160) 07:05	15:50 (WEA-3 E-160) 06:54	05:53	18:43 (WEA-4 E-160) 05:16	
16	16:41 71	14:32 (WEA-1) 17:33 35	16:28 (WEA-3 E-160) 18:24	16:30 (WEA-3 E-160) 20:17	21:07 51	19:34 (WEA-4 E-160) 21:48	
17	08:38	09:13 (WEA09) 08:00	15:52 (WEA-3 E-160) 07:03	15:52 (WEA-3 E-160) 06:52	05:51	18:43 (WEA-4 E-160) 05:15	
18	16:42 67	14:32 (WEA-1) 17:35 38	16:30 (WEA-3 E-160) 18:26	16:28 (WEA-3 E-160) 20:19	19:19 (WEA-4 E-160) 21:09	50 19:33 (WEA-4 E-160) 21:49	
19	08:37	09:13 (WEA09) 07:59	15:50 (WEA-3 E-160) 07:01	07:27 (WEA08) 06:50	05:49	18:44 (WEA-4 E-160) 05:15	
20	16:43 63	14:30 (WEA-1) 17:37 41	16:31 (WEA-3 E-160) 18:27	16:26 (WEA-3 E-160) 20:20	19:23 (WEA-4 E-160) 21:10	49 19:33 (WEA-4 E-160) 21:50	
21	08:37	09:13 (WEA09) 07:57	15:50 (WEA-3 E-160) 06:58	07:24 (WEA08) 06:48	05:48	18:44 (WEA-4 E-160) 05:15	
22	16:45 53	12:16 (WEA-2 E-138) 17:38 43	16:33 (WEA-3 E-160) 18:29	16:23 (WEA-3 E-160) 20:22	19:26 (WEA-4 E-160) 21:12	48 19:32 (WEA-4 E-160) 21:51	
23	08:36	09:14 (WEA-01) 07:55	08:20 (WEA04) 06:56	07:23 (WEA08) 06:45	05:46	18:45 (WEA-4 E-160) 05:14	
24	16:46 51	12:16 (WEA-2 E-138) 17:40 46	16:34 (WEA-3 E-160) 18:31	16:20 (WEA-3 E-160) 20:24	19:28 (WEA-4 E-160) 21:14	46 19:31 (WEA-4 E-160) 21:51	
25	08:35	09:13 (WEA-01) 07:53	08:18 (WEA04) 06:54	07:22 (WEA08) 06:43	05:44	18:46 (WEA-4 E-160) 05:14	
26	16:48 51	12:16 (WEA-2 E-138) 17:42 51	16:35 (WEA-3 E-160) 18:32	16:15 (WEA-3 E-160) 20:25	19:30 (WEA-4 E-160) 21:15	44 19:30 (WEA-4 E-160) 21:52	
27	08:35	09:12 (WEA-01) 07:51	08:16 (WEA04) 06:51	07:20 (WEA08) 06:41	05:43	18:47 (WEA-4 E-160) 05:14	
28	16:49 50	12:15 (WEA-2 E-138) 17:44 55	16:36 (WEA-3 E-160) 18:34	16:17 (WEA-3 E-160) 20:27	19:31 (WEA-4 E-160) 21:17	43 19:30 (WEA-4 E-160) 21:52	
29	08:34	09:11 (WEA-01) 07:49	08:14 (WEA04) 06:49	07:20 (WEA08) 06:39	05:41	18:48 (WEA-4 E-160) 05:14	
30	16:51 50	12:15 (WEA-2 E-138) 17:46 59	16:37 (WEA-3 E-160) 18:36	16:18 (WEA-3 E-160) 20:29	19:33 (WEA-4 E-160) 21:18	40 19:28 (WEA-4 E-160) 21:53	
31	08:33	09:11 (WEA-01) 07:47	08:12 (WEA04) 06:47	07:20 (WEA08) 06:37	05:40	18:49 (WEA-4 E-160) 05:13	
32	16:52 47	12:14 (WEA-2 E-138) 17:48 62	16:38 (WEA-3 E-160) 18:38	16:19 (WEA-3 E-160) 20:30	19:34 (WEA-4 E-160) 21:20	39 19:28 (WEA-4 E-160) 21:54	
33	08:32	09:10 (WEA-01) 07:45	08:13 (WEA04) 06:45	07:19 (WEA08) 06:34	05:38	18:50 (WEA-4 E-160) 05:13	
34	16:54 47	12:13 (WEA-2 E-138) 17:50 61	16:38 (WEA-3 E-160) 18:39	16:20 (WEA08) 20:32	19:34 (WEA-4 E-160) 21:21	37 19:27 (WEA-4 E-160) 21:54	
35	08:31	09:10 (WEA-01) 07:43	08:15 (WEA04) 06:42	07:20 (WEA08) 06:32	05:37	18:51 (WEA-4 E-160) 05:13	
36	16:56 45	12:12 (WEA-2 E-138) 17:51 58	16:39 (WEA-3 E-160) 18:41	16:21 (WEA08) 20:34	19:34 (WEA-4 E-160) 21:23	35 19:26 (WEA-4 E-160) 21:54	
37	08:30	09:09 (WEA-01) 07:41	15:43 (WEA-3 E-160) 06:40	07:21 (WEA08) 06:30	05:35	18:53 (WEA-4 E-160) 05:13	
38	16:57 43	12:10 (WEA-2 E-138) 17:53 55	16:38 (WEA-3 E-160) 18:43	16:22 (WEA08) 20:35	19:35 (WEA-4 E-160) 21:24	32 19:25 (WEA-4 E-160) 21:55	
39	08:29	09:09 (WEA-01) 07:39	15:43 (WEA-3 E-160) 06:38	07:22 (WEA08) 06:28	05:34	18:54 (WEA-4 E-160) 05:13	
40	16:59 39	12:08 (WEA-2 E-138) 17:55 56	16:39 (WEA-3 E-160) 18:45	16:23 (WEA08) 20:37	19:36 (WEA-4 E-160) 21:26	30 19:24 (WEA-4 E-160) 21:55	
41	08:28	09:09 (WEA-01) 07:37	15:43 (WEA-3 E-160) 06:35	07:23 (WEA08) 06:26	05:33	18:56 (WEA-4 E-160) 05:14	
42	17:00 31	12:04 (WEA-2 E-138) 17:57 56	16:39 (WEA-3 E-160) 18:46	16:24 (WEA08) 20:39	19:36 (WEA-4 E-160) 21:27	27 19:23 (WEA-4 E-160) 21:55	
43	08:27	09:09 (WEA-01) 07:35	15:43 (WEA-3 E-160) 06:33	07:24 (WEA08) 06:24	05:31	18:57 (WEA-4 E-160) 05:14	
44	17:02 25	09:34 (WEA-01) 17:59 56	16:39 (WEA-3 E-160) 18:48	16:25 (WEA08) 20:41	19:36 (WEA-4 E-160) 21:28	23 19:20 (WEA-4 E-160) 21:56	
45	08:26	09:09 (WEA-01) 07:33	15:43 (WEA-3 E-160) 06:31	06:22	05:29	18:59 (WEA-4 E-160) 05:14	
46	17:04 25	09:34 (WEA-01) 18:00 56	16:39 (WEA-3 E-160) 18:50	16:26 (WEA08) 20:42	19:37 (WEA-4 E-160) 21:30	20 19:19 (WEA-4 E-160) 21:56	
47	08:25	09:09 (WEA-01) 07:31	15:43 (WEA-3 E-160) 06:29	06:20	05:29	19:02 (WEA-4 E-160) 05:14	
48	17:06 25	09:34 (WEA-01) 18:02 56	16:39 (WEA-3 E-160) 18:51	16:27 (WEA08) 20:44	19:37 (WEA-4 E-160) 21:31	14 19:16 (WEA-4 E-160) 21:56	
49	08:23	09:10 (WEA-01) 07:29	15:43 (WEA-3 E-160) 06:26	06:18	05:28	19:06 (WEA-4 E-160) 05:15	
50	17:07 25	09:35 (WEA-01) 18:04 56	16:39 (WEA-3 E-160) 18:53	16:28 (WEA08) 20:46	19:37 (WEA-4 E-160) 21:33	7 19:13 (WEA-4 E-160) 21:56	
51	08:22	09:09 (WEA-01) 07:27	07:50 (WEA03) 06:24	06:15	05:27	19:13 (WEA-4 E-160) 05:15	
52	17:09 26	09:35 (WEA-01) 18:06 59	16:38 (WEA-3 E-160) 18:55	16:29 (WEA08) 20:47	19:37 (WEA-4 E-160) 21:34	19:13 (WEA-4 E-160) 05:15	
53	08:21	09:10 (WEA-01) 07:25	07:48 (WEA03) 06:22	06:13	05:25	19:13 (WEA-4 E-160) 05:15	
54	17:11 26	09:36 (WEA-01) 18:08 61	16:38 (WEA-3 E-160) 18:57	16:30 (WEA08) 20:49	19:37 (WEA-4 E-160) 21:35	19:13 (WEA-4 E-160) 05:15	
55	08:19	09:10 (WEA-01) 07:23	07:46 (WEA03) 06:19	06:11	05:24	19:13 (WEA-4 E-160) 05:16	
56	17:13 25	09:35 (WEA-01) 18:10 63	16:38 (WEA-3 E-160) 18:58	16:31 (WEA08) 20:51	19:36 (WEA-4 E-160) 21:36	19:13 (WEA-4 E-160) 05:16	
57	08:18	08:45 (WEA05)	07:17	06:10	05:23	19:13 (WEA-4 E-160) 05:16	
58	17:15 27	09:36 (WEA-01)	20:00	20:52	21:38	19:13 (WEA-4 E-160) 05:16	
59	08:17	08:43 (WEA05)	07:15	06:08	05:22	18:40 (WEA-4 E-160) 05:17	
60	17:16 28	09:35 (WEA-01)	20:02	20:54	21:39	19:13 (WEA-4 E-160) 05:17	
61	08:15	08:41 (WEA05)	07:12	06:08	05:22	18:40 (WEA-4 E-160) 05:17	
62	17:18 28	09:34 (WEA-01)	20:03	20:54	21:40	19:13 (WEA-4 E-160) 05:17	
63	Sonnenscheinstunden	259	278	367	416	485	498
64	astr.max.mögl.Beschattung	1512	1320	701	1016	1017	
65	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41	0,46	
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	
67	Reduktion Windrichtung	0,58	0,70	0,69	0,66	0,66	
68	Gesamte Reduktion	0,09	0,18	0,17	0,22	0,25	
69	Met.wahrsch.Beschattung	142	233	120	226	254	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 47 - IP 47 Rhader Straße 18

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1 05:18	05:54	18:56 (WEA-4 E-160) 06:43	18:57 (WEA-4 E-160) 07:32	08:01 (WEA08) 07:26	15:20 (WEA-3 E-160) 08:16	08:55 (WEA09)	
2 21:55	21:23	46 19:42 (WEA-4 E-160) 20:22	28 19:25 (WEA-4 E-160) 19:13	32 16:57 (WEA-3 E-160) 17:07	41 16:01 (WEA-3 E-160) 16:27	53 11:58 (WEA-2 E-138)	
3 05:19	05:55	18:54 (WEA-4 E-160) 06:45	22 19:00 (WEA-4 E-160) 07:34	38 08:02 (WEA08) 07:27	38 15:21 (WEA-3 E-160) 08:18	61 08:56 (WEA09)	
4 21:54	21:22	48 19:42 (WEA-4 E-160) 20:20	22 19:22 (WEA-4 E-160) 19:10	38 17:01 (WEA-3 E-160) 17:05	38 15:59 (WEA-3 E-160) 16:26	67 14:13 (WEA-1)	
5 05:20	05:57	18:53 (WEA-4 E-160) 06:47	12 19:04 (WEA-4 E-160) 07:35	39 17:03 (WEA-3 E-160) 17:03	35 15:58 (WEA-3 E-160) 16:25	61 08:56 (WEA09)	
6 21:54	21:20	49 19:42 (WEA-4 E-160) 20:17	12 19:16 (WEA-4 E-160) 19:08	39 17:03 (WEA-3 E-160) 17:03	35 15:58 (WEA-3 E-160) 16:25	67 14:15 (WEA-1)	
7 05:21	05:59	18:53 (WEA-4 E-160) 06:48	07:37	35 16:29 (WEA-3 E-160) 17:31	31 15:25 (WEA-3 E-160) 08:20	71 08:57 (WEA09)	
8 21:54	21:18	50 19:43 (WEA-4 E-160) 20:15	07:39	35 17:04 (WEA-3 E-160) 17:01	31 15:56 (WEA-3 E-160) 16:25	71 14:17 (WEA-1)	
9 05:21	06:00	18:52 (WEA-4 E-160) 06:50	07:39	39 17:06 (WEA-3 E-160) 17:33	27 15:27 (WEA-3 E-160) 08:22	73 08:57 (WEA09)	
10 21:54	21:17	51 19:43 (WEA-4 E-160) 20:13	07:40	39 17:07 (WEA-3 E-160) 17:30	27 15:54 (WEA-3 E-160) 16:24	73 14:18 (WEA-1)	
11 05:21	06:02	18:52 (WEA-4 E-160) 06:51	07:40	40 16:26 (WEA-3 E-160) 17:35	27 08:50 (WEA-01) 08:23	73 08:58 (WEA09)	
12 21:53	21:15	52 19:44 (WEA-4 E-160) 20:10	19:01	42 17:08 (WEA-3 E-160) 16:58	30 15:52 (WEA-3 E-160) 16:24	76 14:20 (WEA-1)	
13 05:22	06:03	18:51 (WEA-4 E-160) 06:53	07:42	42 16:23 (WEA-3 E-160) 17:36	30 15:52 (WEA-3 E-160) 16:24	76 08:58 (WEA09)	
14 21:52	21:13	53 19:44 (WEA-4 E-160) 20:08	18:59	45 17:08 (WEA-3 E-160) 16:56	28 15:48 (WEA-3 E-160) 16:23	77 14:21 (WEA-1)	
15 05:23	06:05	18:51 (WEA-4 E-160) 06:55	07:44	45 16:22 (WEA-3 E-160) 17:38	28 08:10 (WEA-05) 08:26	77 08:59 (WEA09)	
16 21:52	21:11	54 19:45 (WEA-4 E-160) 20:06	18:57	47 17:09 (WEA-3 E-160) 16:54	24 09:03 (WEA-01) 16:23	77 14:22 (WEA-1)	
17 05:24	06:06	18:50 (WEA-4 E-160) 06:56	07:45	47 16:21 (WEA-3 E-160) 17:40	24 08:15 (WEA-05) 08:30	77 09:03 (WEA09)	
18 21:51	21:10	54 19:44 (WEA-4 E-160) 20:04	18:54	49 17:10 (WEA-3 E-160) 16:53	28 09:04 (WEA-01) 16:23	80 14:22 (WEA-1)	
19 05:25	06:08	18:50 (WEA-4 E-160) 06:58	07:47	49 17:10 (WEA-3 E-160) 16:53	28 08:11 (WEA-05) 08:28	80 09:00 (WEA09)	
20 21:50	21:08	55 19:45 (WEA-4 E-160) 20:01	18:52	49 17:10 (WEA-3 E-160) 16:51	29 09:05 (WEA-01) 16:23	79 14:23 (WEA-1)	
21 05:26	06:10	18:49 (WEA-4 E-160) 07:00	07:49	62 17:10 (WEA-3 E-160) 16:50	29 09:06 (WEA-01) 16:22	80 09:02 (WEA09)	
22 21:50	21:06	55 19:44 (WEA-4 E-160) 19:59	18:50	62 17:10 (WEA-3 E-160) 16:50	29 09:06 (WEA-01) 16:22	80 14:25 (WEA-1)	
23 05:27	06:11	18:49 (WEA-4 E-160) 07:01	07:51	62 17:10 (WEA-3 E-160) 16:50	29 09:06 (WEA-01) 16:22	80 09:03 (WEA09)	
24 21:49	21:04	56 19:45 (WEA-4 E-160) 19:57	18:48	64 17:10 (WEA-3 E-160) 16:48	28 09:07 (WEA-01) 16:22	79 14:25 (WEA-1)	
25 05:28	06:13	18:48 (WEA-4 E-160) 07:03	07:52	64 17:11 (WEA-3 E-160) 16:47	26 08:18 (WEA-05) 08:31	81 09:04 (WEA09)	
26 21:48	21:02	56 19:44 (WEA-4 E-160) 19:54	18:46	64 17:11 (WEA-3 E-160) 16:47	26 09:06 (WEA-01) 16:22	81 14:26 (WEA-1)	
27 05:30	06:14	18:48 (WEA-4 E-160) 07:04	07:54	62 17:11 (WEA-3 E-160) 16:45	25 08:42 (WEA-01) 08:32	81 09:05 (WEA09)	
28 21:47	21:00	57 19:45 (WEA-4 E-160) 19:52	18:43	62 17:11 (WEA-3 E-160) 16:45	25 09:07 (WEA-01) 16:22	81 14:27 (WEA-1)	
29 05:31	06:16	18:47 (WEA-4 E-160) 07:06	07:56	60 17:10 (WEA-3 E-160) 16:44	25 08:42 (WEA-01) 08:33	81 09:06 (WEA09)	
30 21:46	20:58	57 19:44 (WEA-4 E-160) 19:50	18:41	60 17:10 (WEA-3 E-160) 16:44	25 09:07 (WEA-01) 16:22	80 14:28 (WEA-1)	
31 05:32	06:18	18:48 (WEA-4 E-160) 07:08	07:57	59 17:11 (WEA-3 E-160) 16:42	26 08:42 (WEA-01) 08:34	82 09:06 (WEA09)	
32 21:45	20:56	56 19:44 (WEA-4 E-160) 19:47	18:39	59 17:11 (WEA-3 E-160) 16:42	26 09:08 (WEA-01) 16:22	82 14:27 (WEA-1)	
33 05:33	06:19	18:47 (WEA-4 E-160) 07:09	07:59	59 17:11 (WEA-3 E-160) 16:42	26 08:43 (WEA-01) 08:34	82 09:07 (WEA09)	
34 21:44	20:54	56 19:43 (WEA-4 E-160) 19:45	18:37	57 17:11 (WEA-3 E-160) 16:41	25 09:08 (WEA-01) 16:23	84 14:28 (WEA-1)	
35 05:34	06:21	18:47 (WEA-4 E-160) 07:11	08:01	57 17:11 (WEA-3 E-160) 16:40	25 08:43 (WEA-01) 08:35	84 09:08 (WEA09)	
36 21:43	20:52	56 19:43 (WEA-4 E-160) 19:43	18:41	57 17:11 (WEA-3 E-160) 16:40	25 09:08 (WEA-01) 16:23	83 14:29 (WEA-1)	
37 05:36	19:13 (WEA-4 E-160) 06:22	18:47 (WEA-4 E-160) 07:12	08:03	57 17:11 (WEA-3 E-160) 16:40	25 08:44 (WEA-01) 08:36	83 09:09 (WEA09)	
38 21:42	11 19:24 (WEA-4 E-160) 20:50	55 19:42 (WEA-4 E-160) 19:40	18:33	57 17:11 (WEA-3 E-160) 16:38	25 09:09 (WEA-01) 16:23	84 14:30 (WEA-1)	
39 05:37	19:11 (WEA-4 E-160) 06:24	18:47 (WEA-4 E-160) 07:14	08:04	57 17:11 (WEA-3 E-160) 16:38	25 08:44 (WEA-01) 08:37	84 09:10 (WEA09)	
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41 05:38	19:09 (WEA-4 E-160) 06:26	18:47 (WEA-4 E-160) 07:16	08:06	56 17:10 (WEA-3 E-160) 16:37	25 09:09 (WEA-01) 16:24	86 09:10 (WEA09)	
42 21:39	21 19:30 (WEA-4 E-160) 20:46	54 19:41 (WEA-4 E-160) 19:36	18:28	56 17:09 (WEA-3 E-160) 16:36	31 11:39 (WEA-2 E-138) 16:24	86 14:31 (WEA-1)	
43 05:40	19:07 (WEA-4 E-160) 06:27	18:48 (WEA-4 E-160) 07:17	08:08	56 17:09 (WEA-3 E-160) 16:36	31 11:39 (WEA-2 E-138) 16:24	86 09:10 (WEA09)	
44 21:38	25 19:32 (WEA-4 E-160) 20:44	53 19:41 (WEA-4 E-160) 19:33	18:26	55 17:09 (WEA-3 E-160) 16:35	31 11:44 (WEA-2 E-138) 16:24	86 09:11 (WEA09)	
45 05:41	19:05 (WEA-4 E-160) 06:29	18:49 (WEA-4 E-160) 07:19	08:07 (WEA08) 08:10	55 17:09 (WEA-3 E-160) 16:34	31 11:44 (WEA-2 E-138) 16:24	86 09:11 (WEA09)	
46 21:37	28 19:33 (WEA-4 E-160) 20:41	51 19:40 (WEA-4 E-160) 19:31	9 08:16 (WEA08) 08:14	55 17:09 (WEA-3 E-160) 16:34	31 11:44 (WEA-2 E-138) 16:24	86 14:32 (WEA-1)	
47 05:42	19:04 (WEA-4 E-160) 06:30	18:48 (WEA-4 E-160) 07:21	08:05 (WEA08) 08:11	60 17:08 (WEA-3 E-160) 16:33	31 11:44 (WEA-2 E-138) 16:24	86 09:11 (WEA09)	
48 21:35	31 19:35 (WEA-4 E-160) 20:39	51 19:39 (WEA-4 E-160) 19:29	13 08:18 (WEA08) 08:11	60 17:08 (WEA-3 E-160) 16:33	31 11:44 (WEA-2 E-138) 16:24	86 14:32 (WEA-1)	
49 05:44	19:02 (WEA-4 E-160) 06:32	18:49 (WEA-4 E-160) 07:22	08:03 (WEA08) 07:13	60 17:08 (WEA-3 E-160) 16:33	31 11:44 (WEA-2 E-138) 16:24	86 09:11 (WEA09)	
50 21:34	34 19:36 (WEA-4 E-160) 20:37	49 19:38 (WEA-4 E-160) 19:26	15 08:18 (WEA08) 17:20	62 16:08 (WEA-3 E-160) 16:32	47 11:51 (WEA-2 E-138) 16:26	83 14:32 (WEA-1)	
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53 05:47	19:00 (WEA-4 E-160) 06:35	18:51 (WEA-4 E-160) 07:26	08:02 (WEA08) 07:17	61 16:07 (WEA-3 E-160) 16:31	47 11:52 (WEA-2 E-138) 16:27	85 09:12 (WEA09)	
54 21:31	38 19:38 (WEA-4 E-160) 20:33	45 19:36 (WEA-4 E-160) 19:22	17 08:19 (WEA08) 17:16	58 16:06 (WEA-3 E-160) 16:30	50 11:54 (WEA-2 E-138) 16:28	83 14:33 (WEA-1)	
55 05:48	18:59 (WEA-4 E-160) 06:37	18:51 (WEA-4 E-160) 07:27	08:01 (WEA08) 07:18	58 16:06 (WEA-3 E-160) 16:30	50 11:54 (WEA-2 E-138) 16:28	83 09:12 (WEA09)	
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59 05:51	18:57 (WEA-4 E-160) 06:40	18:53 (WEA-4 E-160) 07:30	08:00 (WEA08) 07:22	45 16:03 (WEA-3 E-160) 16:27	51 11:57 (WEA-2 E-138) 16:30	80 09:12 (WEA09)	
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62 21:25	45 19:41 (WEA-4 E-160) 20:24	33 19:28 (WEA-4 E-160) 19:13	17:09	43 16:02 (WEA-3 E-160) 16:27	49 11:57 (WEA-2 E-138) 16:30	79 14:34 (WEA-1)	
Sonnenscheinstunden	501	453	381	332	267	244	
astr.max.mögl.Beschattung	411	1573	184	1621	1024	2449	
Red.Sonnenscheinwahrsch.	0,41	0,43	0,36	0,32	0,23	0,15	
Reduktion Betriebsdauer	0,64	0,64	0,64	0,64	0,64	0,64	
Reduktion Windrichtung	0,66	0,66	0,64	0,71	0,59	0,60	
Gesamte Reduktion	0,23	0,23	0,19	0,19	0,11	0,07	
Met.wahrsch.Beschattung	93	366	35	301	115	180	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 48 - IP 48 Große Heide 2

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1 08:40	09:11 (WEA04) 08:14	08:47 (WEA08) 07:20	07:10	06:06	07:34 (WEA-5 E-160) 05:21	07:50 (WEA-5 E-160)		
2 16:32	23 15:40 (WEA-4 E-160) 17:20	52 16:00 (WEA-4 E-160) 18:11	20:05	20:56	70 08:44 (WEA-5 E-160) 21:41	34 08:24 (WEA-5 E-160)		
3 08:40	15:22 (WEA-4 E-160) 08:07	08:48 (WEA08) 07:18	07:08	06:04	07:34 (WEA-5 E-160) 05:20	07:50 (WEA-5 E-160)		
4 08:40	15:41 (WEA-4 E-160) 17:22	48 15:59 (WEA-4 E-160) 18:13	20:07	20:57	70 08:44 (WEA-5 E-160) 21:42	33 08:23 (WEA-5 E-160)		
5 08:40	15:22 (WEA-4 E-160) 08:07	08:48 (WEA08) 07:16	07:06	06:02	07:34 (WEA-5 E-160) 05:19	07:52 (WEA-5 E-160)		
6 08:39	15:42 (WEA-4 E-160) 17:24	48 15:59 (WEA-4 E-160) 18:15	20:08	20:59	69 08:43 (WEA-5 E-160) 21:43	31 08:23 (WEA-5 E-160)		
7 08:39	15:23 (WEA-4 E-160) 08:09	08:49 (WEA08) 07:14	07:03	06:00	07:35 (WEA-5 E-160) 05:18	07:53 (WEA-5 E-160)		
8 08:39	15:44 (WEA-4 E-160) 17:25	45 15:59 (WEA-4 E-160) 18:17	20:10	21:01	69 08:44 (WEA-5 E-160) 21:44	28 08:21 (WEA-5 E-160)		
9 08:39	15:22 (WEA-4 E-160) 08:07	08:51 (WEA08) 07:12	07:01	05:58	69 07:34 (WEA-5 E-160) 05:18	07:55 (WEA-5 E-160)		
10 08:37	15:20 (WEA-4 E-160) 07:57	39 15:58 (WEA-4 E-160) 18:18	20:12	21:02	69 08:43 (WEA-5 E-160) 21:45	26 08:21 (WEA-5 E-160)		
11 08:37	15:22 (WEA-4 E-160) 08:06	08:53 (WEA08) 07:10	06:59	05:56	69 07:34 (WEA-5 E-160) 05:17	07:55 (WEA-5 E-160)		
12 08:36	15:46 (WEA-4 E-160) 17:29	32 15:56 (WEA-4 E-160) 18:20	20:13	21:04	68 08:42 (WEA-5 E-160) 21:46	24 08:19 (WEA-5 E-160)		
13 08:35	15:21 (WEA-4 E-160) 08:04	15:31 (WEA-4 E-160) 07:07	06:56	05:55	67 07:34 (WEA-5 E-160) 05:16	07:57 (WEA-5 E-160)		
14 08:35	15:47 (WEA-4 E-160) 17:31	24 15:55 (WEA-4 E-160) 18:22	20:15	21:06	67 08:43 (WEA-5 E-160) 21:47	22 08:19 (WEA-5 E-160)		
15 08:35	15:21 (WEA-4 E-160) 08:02	15:33 (WEA-4 E-160) 07:05	06:54	05:53	67 07:35 (WEA-5 E-160) 05:16	07:58 (WEA-5 E-160)		
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17 08:35	15:21 (WEA-4 E-160) 08:00	15:35 (WEA-4 E-160) 07:03	06:52	05:51	67 07:34 (WEA-5 E-160) 05:15	08:00 (WEA-5 E-160)		
18 08:35	15:49 (WEA-4 E-160) 17:35	15 15:50 (WEA-4 E-160) 18:25	20:19	21:09	67 08:41 (WEA-5 E-160) 21:49	16 08:16 (WEA-5 E-160)		
19 08:35	15:21 (WEA-4 E-160) 07:59	15:42 (WEA-4 E-160) 07:01	06:50	05:49	67 07:35 (WEA-5 E-160) 05:15	08:01 (WEA-5 E-160)		
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21 08:35	15:20 (WEA-4 E-160) 07:57	06:58	06:48	05:48	66 07:35 (WEA-5 E-160) 05:15	08:03 (WEA-5 E-160)		
22 08:36	09:06 (WEA03) 07:55	18:29	20:22	21:12	65 08:40 (WEA-5 E-160) 21:51	10 08:13 (WEA-5 E-160)		
23 08:36	15:52 (WEA-4 E-160) 17:40	06:56	06:45	05:46	65 07:36 (WEA-5 E-160) 05:14	08:06 (WEA-5 E-160)		
24 08:36	09:05 (WEA03) 07:53	18:31	20:24	21:14	64 08:40 (WEA-5 E-160) 21:51	5 08:11 (WEA-5 E-160)		
25 08:36	15:53 (WEA-4 E-160) 17:42	06:54	06:43	05:44	64 07:36 (WEA-5 E-160) 05:14	08:19 (WEA-5 E-160)		
26 08:36	09:04 (WEA03) 07:51	18:32	20:25	21:15	63 08:39 (WEA-5 E-160) 21:52	08:19 (WEA-5 E-160)		
27 08:36	15:54 (WEA-4 E-160) 17:44	06:49	06:39	05:43	63 07:37 (WEA-5 E-160) 05:14	08:19 (WEA-5 E-160)		
28 08:36	09:03 (WEA03) 07:49	18:34	20:27	21:17	61 08:38 (WEA-5 E-160) 21:53	08:19 (WEA-5 E-160)		
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30 08:36	09:02 (WEA03) 07:47	18:36	20:29	21:18	61 08:37 (WEA-5 E-160) 21:53	08:19 (WEA-5 E-160)		
31 08:36	15:55 (WEA-4 E-160) 17:48	06:47	06:37	05:40	61 07:37 (WEA-5 E-160) 05:13	08:19 (WEA-5 E-160)		
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34 08:36	09:00 (WEA03) 07:43	18:39	20:32	21:21	58 08:36 (WEA-5 E-160) 21:54	08:19 (WEA-5 E-160)		
35 08:36	15:57 (WEA-4 E-160) 17:51	06:42	06:32	05:37	57 07:38 (WEA-5 E-160) 05:13	08:19 (WEA-5 E-160)		
36 08:36	09:01 (WEA03) 07:41	18:41	20:34	21:23	57 08:35 (WEA-5 E-160) 21:54	08:19 (WEA-5 E-160)		
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38 08:36	15:20 (WEA-4 E-160) 07:39	18:43	20:36	21:24	56 08:35 (WEA-5 E-160) 21:55	08:19 (WEA-5 E-160)		
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47 08:36	15:59 (WEA-4 E-160) 18:02	06:29	06:20	05:29	49 07:42 (WEA-5 E-160) 05:14	08:19 (WEA-5 E-160)		
48 08:36	08:51 (WEA08) 07:29	18:51	20:44	21:31	49 08:31 (WEA-5 E-160) 21:56	08:19 (WEA-5 E-160)		
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56 08:36	17:13	15:22 (WEA-4 E-160) 18:10	18:58	20:51	69 08:44 (WEA-5 E-160) 21:36	42 08:27 (WEA-5 E-160) 21:56		
57 08:36	17:14	08:47 (WEA08) 07:23	07:17	06:09	70 07:35 (WEA-5 E-160) 05:23	42 07:46 (WEA-5 E-160) 05:16		
58 08:36	17:14	16:01 (WEA-4 E-160) 18:06	20:00	20:52	70 08:45 (WEA-5 E-160) 21:38	40 08:26 (WEA-5 E-160) 21:56		
59 08:36	17:16	08:47 (WEA08) 07:23	07:15	06:08	70 07:35 (WEA-5 E-160) 05:22	40 07:48 (WEA-5 E-160) 05:17		
60 08:36	17:16	16:00 (WEA-4 E-160) 18:10	20:02	20:54	70 08:45 (WEA-5 E-160) 21:39	38 08:26 (WEA-5 E-160) 21:55		
61 08:36	17:18	08:47 (WEA08) 07:23	07:12	06:05	70 07:35 (WEA-5 E-160) 05:22	38 07:49 (WEA-5 E-160) 05:17		
62 08:36	17:18	16:00 (WEA-4 E-160) 18:10	20:03	20:55	70 08:45 (WEA-5 E-160) 21:40	36 08:25 (WEA-5 E-160) 21:55		
Sonnenscheinstunden	259	278	367	416	485	498		
astr.max.mögl.Beschattung	1127	327		1374		1776		262
Red.Sonnenscheinwahrsch.	0,20	0,30		0,41		0,46		0,36
Reduktion Betriebsdauer	0,84	0,84		0,84		0,84		0,84
Reduktion Windrichtung	0,68	0,67		0,68		0,68		0,68
Gesamte Reduktion	0,11	0,17		0,23		0,26		0,21
Met.wahrsch.Beschattung	127	56		320		465		54

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 48 - IP 48 Große Heide 2

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember						
1	05:18			05:54		06:43		07:32		07:26		08:16					
	21:55	8	08:08 (WEA-5 E-160)	21:24	64	08:50 (WEA-5 E-160)	20:22	44	08:35 (WEA-5 E-160)	19:13	17:07	7	15:09 (WEA-4 E-160)	08:16	15:02 (WEA-4 E-160)		
2	05:18		08:07 (WEA-5 E-160)	05:55		06:45		07:34		07:27		08:18	31	15:33 (WEA-4 E-160)	15:33 (WEA-4 E-160)		
	21:55	12	08:19 (WEA-5 E-160)	21:22	65	08:50 (WEA-5 E-160)	20:20	40	08:33 (WEA-5 E-160)	19:10	17:05	15	15:20 (WEA-4 E-160)	16:26	29	15:33 (WEA-4 E-160)	
3	05:19		08:06 (WEA-5 E-160)	05:57		06:47		07:35		07:29		08:19	29	15:04 (WEA-4 E-160)	15:32 (WEA-4 E-160)		
	21:54	15	08:21 (WEA-5 E-160)	21:20	65	08:50 (WEA-5 E-160)	20:17	35	08:30 (WEA-5 E-160)	19:08	17:03	21	15:23 (WEA-4 E-160)	16:25	28	15:32 (WEA-4 E-160)	
4	05:20		08:04 (WEA-5 E-160)	05:59		06:48		07:37		07:31		08:21	26	15:06 (WEA-4 E-160)	15:32 (WEA-4 E-160)		
	21:54	18	08:22 (WEA-5 E-160)	21:18	66	08:51 (WEA-5 E-160)	20:15	29	08:27 (WEA-5 E-160)	19:06	17:01	25	15:25 (WEA-4 E-160)	16:25	26	15:32 (WEA-4 E-160)	
5	05:21		08:03 (WEA-5 E-160)	06:00		06:50		07:39		07:33		08:22	22	15:06 (WEA-4 E-160)	15:32 (WEA-4 E-160)		
	21:54	20	08:23 (WEA-5 E-160)	21:17	67	08:51 (WEA-5 E-160)	20:13	21	08:02 (WEA-5 E-160)	19:03	17:00	33	15:26 (WEA-4 E-160)	16:24	26	15:32 (WEA-4 E-160)	
6	05:21		08:02 (WEA-5 E-160)	06:02		06:51		07:40		07:35		08:23	24	15:08 (WEA-4 E-160)	15:32 (WEA-4 E-160)		
	21:53	23	08:25 (WEA-5 E-160)	21:15	68	08:52 (WEA-5 E-160)	20:10	7	08:08 (WEA-5 E-160)	19:01	16:58	39	15:27 (WEA-4 E-160)	16:24	24	15:32 (WEA-4 E-160)	
7	05:22		08:01 (WEA-5 E-160)	06:03		06:53		07:42		07:36		08:24	24	15:09 (WEA-4 E-160)	15:32 (WEA-4 E-160)		
	21:52	26	08:27 (WEA-5 E-160)	21:13	69	08:52 (WEA-5 E-160)	20:08		08:19 (WEA08)	16:56	16:52	44	15:28 (WEA-4 E-160)	16:23	23	15:32 (WEA-4 E-160)	
8	05:23		08:01 (WEA-5 E-160)	06:05		06:55		07:44		07:38		08:26	21	15:10 (WEA-4 E-160)	15:32 (WEA-4 E-160)		
	21:52	27	08:28 (WEA-5 E-160)	21:11	69	08:53 (WEA-5 E-160)	20:06		08:19 (WEA08)	16:54	16:54	47	15:29 (WEA-4 E-160)	16:23	21	15:31 (WEA-4 E-160)	
9	05:24		08:00 (WEA-5 E-160)	06:06		06:56		07:45		07:40		08:27	21	15:10 (WEA-4 E-160)	15:32 (WEA-4 E-160)		
	21:51	29	08:29 (WEA-5 E-160)	21:10	69	08:52 (WEA-5 E-160)	20:04		08:18 (WEA08)	16:53	16:53	49	15:30 (WEA-4 E-160)	16:23	21	15:31 (WEA-4 E-160)	
10	05:25		07:58 (WEA-5 E-160)	06:08		06:58		07:47		07:42		08:28	22	15:31 (WEA-4 E-160)	16:23	22	15:31 (WEA-4 E-160)
	21:50	32	08:30 (WEA-5 E-160)	21:08	70	08:53 (WEA-5 E-160)	20:01		08:18 (WEA08)	16:51	16:51	52	15:31 (WEA-4 E-160)	16:23	22	15:31 (WEA-4 E-160)	
11	05:26		07:57 (WEA-5 E-160)	06:10		07:00		07:49		07:43		08:29	23	15:31 (WEA-4 E-160)	16:22	23	15:31 (WEA-4 E-160)
	21:50	34	08:31 (WEA-5 E-160)	21:06	69	08:52 (WEA-5 E-160)	19:59		08:19 (WEA08)	16:50	16:50	53	15:32 (WEA-4 E-160)	16:22	23	15:31 (WEA-4 E-160)	
12	05:27		07:57 (WEA-5 E-160)	06:11		07:01		07:51		07:45		08:30	23	15:31 (WEA-4 E-160)	16:22	23	15:31 (WEA-4 E-160)
	21:49	35	08:32 (WEA-5 E-160)	21:04	70	08:53 (WEA-5 E-160)	19:57		08:19 (WEA08)	16:48	16:48	52	15:32 (WEA-4 E-160)	16:22	20	15:30 (WEA-4 E-160)	
13	05:28		07:57 (WEA-5 E-160)	06:13		07:03		07:52		07:47		08:31	19	15:30 (WEA-4 E-160)	16:22	19	15:30 (WEA-4 E-160)
	21:48	37	08:34 (WEA-5 E-160)	21:02	70	08:52 (WEA-5 E-160)	19:54		08:19 (WEA08)	16:47	16:47	53	15:33 (WEA-4 E-160)	16:22	19	15:30 (WEA-4 E-160)	
14	05:29		07:56 (WEA-5 E-160)	06:14		07:04		07:54		07:49		08:32	18	15:30 (WEA-4 E-160)	16:22	18	15:30 (WEA-4 E-160)
	21:47	39	08:35 (WEA-5 E-160)	21:00	70	08:53 (WEA-5 E-160)	19:52		08:19 (WEA08)	16:45	16:45	52	15:32 (WEA-4 E-160)	16:22	18	15:30 (WEA-4 E-160)	
15	05:31		07:55 (WEA-5 E-160)	06:16		07:06		07:56		07:50		08:33	16	15:30 (WEA-4 E-160)	16:22	16	15:30 (WEA-4 E-160)
	21:46	41	08:36 (WEA-5 E-160)	20:58	70	08:52 (WEA-5 E-160)	19:50		08:19 (WEA08)	16:44	16:44	50	15:32 (WEA-4 E-160)	16:22	16	15:30 (WEA-4 E-160)	
16	05:32		07:55 (WEA-5 E-160)	06:18		07:08		07:57		07:52		08:34	15	15:28 (WEA-4 E-160)	16:22	15	15:28 (WEA-4 E-160)
	21:45	42	08:37 (WEA-5 E-160)	20:56	69	08:52 (WEA-5 E-160)	19:47		08:19 (WEA08)	16:42	16:42	48	15:33 (WEA-4 E-160)	16:22	13	15:28 (WEA-4 E-160)	
17	05:33		07:54 (WEA-5 E-160)	06:19		07:09		07:59		07:54		08:35	12	15:28 (WEA-4 E-160)	16:22	12	15:28 (WEA-4 E-160)
	21:44	44	08:38 (WEA-5 E-160)	20:54	69	08:51 (WEA-5 E-160)	19:45		08:19 (WEA08)	16:41	16:41	45	15:33 (WEA-4 E-160)	16:23	12	15:28 (WEA-4 E-160)	
18	05:34		07:53 (WEA-5 E-160)	06:21		07:11		08:01		07:56		08:35	10	15:28 (WEA-4 E-160)	16:23	10	15:28 (WEA-4 E-160)
	21:43	46	08:39 (WEA-5 E-160)	20:52	68	08:51 (WEA-5 E-160)	19:43		08:19 (WEA08)	16:40	16:40	38	15:33 (WEA-4 E-160)	16:23	10	15:28 (WEA-4 E-160)	
19	05:36		07:52 (WEA-5 E-160)	06:22		07:12		08:03		07:57		08:36	9	15:29 (WEA-4 E-160)	16:23	9	15:29 (WEA-4 E-160)
	21:42	48	08:40 (WEA-5 E-160)	20:50	68	08:50 (WEA-5 E-160)	19:40		08:19 (WEA08)	16:38	16:38	39	15:34 (WEA-4 E-160)	16:23	10	15:29 (WEA-4 E-160)	
20	05:37		07:52 (WEA-5 E-160)	06:24		07:14		08:04		07:59		08:37	9	15:28 (WEA-4 E-160)	16:24	9	15:28 (WEA-4 E-160)
	21:41	49	08:41 (WEA-5 E-160)	20:48	67	08:50 (WEA-5 E-160)	19:38		08:19 (WEA08)	16:37	16:37	38	15:34 (WEA-4 E-160)	16:24	9	15:28 (WEA-4 E-160)	
21	05:38		07:51 (WEA-5 E-160)	06:26		07:16		08:06		08:01		08:37	7	15:28 (WEA-4 E-160)	16:24	7	15:28 (WEA-4 E-160)
	21:39	51	08:42 (WEA-5 E-160)	20:46	66	08:49 (WEA-5 E-160)	19:36		08:19 (WEA08)	16:36	16:36	38	15:33 (WEA-4 E-160)	16:24	7	15:28 (WEA-4 E-160)	
22	05:40		07:51 (WEA-5 E-160)	06:27		07:17		08:08		08:02		08:38	7	15:28 (WEA-4 E-160)	16:24	7	15:28 (WEA-4 E-160)
	21:38	52	08:43 (WEA-5 E-160)	20:44	65	08:49 (WEA-5 E-160)	19:33		08:19 (WEA08)	16:35	16:35	37	15:33 (WEA-4 E-160)	16:24	7	15:28 (WEA-4 E-160)	
23	05:41		07:50 (WEA-5 E-160)	06:29		07:19		08:10		08:04		08:38	8	15:30 (WEA-4 E-160)	16:24	8	15:30 (WEA-4 E-160)
	21:37	53	08:43 (WEA-5 E-160)	20:41	65	08:49 (WEA-5 E-160)	19:31		08:19 (WEA08)	16:34	16:34	42	15:34 (WEA-4 E-160)	16:25	8	15:30 (WEA-4 E-160)	
24	05:42		07:50 (WEA-5 E-160)	06:30		07:21		08:11		08:06		08:39	9	15:30 (WEA-4 E-160)	16:25	9	15:30 (WEA-4 E-160)
	21:36	55	08:45 (WEA-5 E-160)	20:39	63	08:47 (WEA-5 E-160)	19:29		08:19 (WEA08)	16:33	16:33	45	15:34 (WEA-4 E-160)	16:25	9	15:30 (WEA-4 E-160)	
25	05:44		07:49 (WEA-5 E-160)	06:32		07:22		08:13		08:07		08:39	10	15:31 (WEA-4 E-160)	16:25	10	15:31 (WEA-4 E-160)
	21:34	56	08:45 (WEA-5 E-160)	20:37	62	08:47 (WEA-5 E-160)	19:26		08:19 (WEA08)	16:32	16:32	43	15:34 (WEA-4 E-160)	16:26	10	15:31 (WEA-4 E-160)	
26	05:45		07:48 (WEA-5 E-160)	06:34		07:24		08:15		08:09		08:39	12	15:32 (WEA-4 E-160)	16:27	12	15:32 (WEA-4 E-160)
	21:33	58	08:46 (WEA-5 E-160)	20:35	60	08:45 (WEA-5 E-160)	19:24		08:19 (WEA08)	16:31	16:31	41	15:33 (WEA-4 E-160)	16:27	12	15:32 (WEA-4 E-160)	
27	05:47		07:48 (WEA-5 E-160)	06:35		07:26		08:18		08:12		08:40	13	15:34 (WEA-4 E-160)	16:28	13	15:34 (WEA-4 E-160)
	21:31	59	08:47 (WEA-5 E-160)	20:33	58	08:44 (WEA-5 E-160)	19:22		08:19 (WEA08)	16:30	16:30	40	15:34 (WEA-4 E-160)	16:28	13	15:34 (WEA-4 E-160)	
28	05:48		07:47 (WEA-5 E-160)	06:37		07:27		08:18		08:12		08:40	15	15:35 (WEA-4 E-160)	16:28	15	15:35 (WEA-4 E-160)
	21:30	61	08:48 (WEA-5 E-160)	20:31	55	08:42 (WEA-5 E-160)	19:19		08:19 (WEA08)	16:29	16:29	37	15:34 (WEA-4 E-160)	16:28	15	15:35 (WEA-4 E-160)	
29	05:49		07:47 (WEA-5 E-160)	06:39		07:29		08:20		08:13		08:40	17	15:36 (WEA-4 E-160)	16:29	17	15:36 (WEA-4 E-160)
	21:28	61	08:48 (WEA-5 E-160)	20:28	53	08:41 (WEA-5 E-160)	19:17		08:19 (WEA08)	16:28	16:28	34	15:33 (WEA-4 E-160)	16:29	17	15:36 (WEA-4 E-160)	
30	05:51		07:47 (WEA-5 E-160)	06:40		07:30		08:22		08:15		08:40	19	15:38 (WEA-4 E-160)	16:30	19	15:38 (WEA-4 E-160)
	21:27	62	08:49 (WEA-5 E-160)	20:26	50	08:39 (WEA-5 E-160)	19:15		08:19 (WEA08)	16:27	16:27	32	15:33 (WEA-4 E-160)	16:30	19	15:38 (WEA-4 E-160)	
31	05:52		07:46 (WEA-5 E-160)	06:42		07:30		08:24		08:17		08:40	20	15:39 (WEA-4 E-160)	16:31	20	15:39 (WEA-4 E-160)
	21:25	63	08:49 (WEA-5 E-160)	20:24	48	08:38 (WEA-5 E-160)	19:14		08:19 (WEA08)	16:27	16:27	24					
Sonnenscheinstunden	501			453		381		332		267		244					
astr.max.mögl.Beschattung	1256			2007		176											

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 49 - IP 49 Große Heide 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni		
1	08:40		09:13 (WEA03)	08:14	07:20		08:21 (WEA-5 E-160)	07:10		09:19 (WEA-5 E-160)	06:06	05:21
	16:32	37	15:15 (WEA-4 E-160)	17:20	18:11	43	09:04 (WEA-5 E-160)	20:05	25	09:44 (WEA-5 E-160)	20:56	21:41
2	08:40		14:43 (WEA-4 E-160)	08:12	07:18		08:20 (WEA-5 E-160)	07:08		09:22 (WEA-5 E-160)	06:04	05:20
	16:33	33	15:16 (WEA-4 E-160)	17:22	18:13	45	09:05 (WEA-5 E-160)	20:07	17	09:39 (WEA-5 E-160)	20:57	21:42
3	08:40		14:44 (WEA-4 E-160)	08:10	07:16		08:18 (WEA-5 E-160)	07:06			06:02	05:19
	16:34	32	15:16 (WEA-4 E-160)	17:24	18:15	48	09:06 (WEA-5 E-160)	20:08			20:59	21:43
4	08:40		14:45 (WEA-4 E-160)	08:09	07:14		08:17 (WEA-5 E-160)	07:03			06:00	05:18
	16:36	32	15:17 (WEA-4 E-160)	17:25	18:17	50	09:07 (WEA-5 E-160)	20:10			21:01	21:44
5	08:40		14:45 (WEA-4 E-160)	08:07	07:12		08:16 (WEA-5 E-160)	07:01			05:58	05:18
	16:37	32	15:17 (WEA-4 E-160)	17:27	18:18	52	09:08 (WEA-5 E-160)	20:12			21:02	21:45
6	08:39		14:46 (WEA-4 E-160)	08:06	07:10		08:15 (WEA-5 E-160)	06:59			05:56	05:17
	16:38	32	15:18 (WEA-4 E-160)	17:29	18:20	54	09:09 (WEA-5 E-160)	20:13			21:04	21:46
7	08:39		14:46 (WEA-4 E-160)	08:04	07:07		08:13 (WEA-5 E-160)	06:56			05:55	05:16
	16:39	31	15:17 (WEA-4 E-160)	17:31	18:22	56	09:09 (WEA-5 E-160)	20:15			21:06	21:47
8	08:38		09:09 (WEA08)	08:02	07:05		08:13 (WEA-5 E-160)	06:54			05:53	05:16
	16:41	31	15:18 (WEA-4 E-160)	17:33	18:24	56	09:09 (WEA-5 E-160)	20:17			21:07	21:48
9	08:38		09:08 (WEA08)	08:00	07:03		08:12 (WEA-5 E-160)	06:52			05:51	05:15
	16:42	34	15:18 (WEA-4 E-160)	17:35	18:25	58	09:10 (WEA-5 E-160)	20:19			21:09	21:49
10	08:37		09:07 (WEA08)	07:59	07:01		08:11 (WEA-5 E-160)	06:50			05:49	05:15
	16:43	34	15:17 (WEA-4 E-160)	17:37	18:27	58	09:09 (WEA-5 E-160)	20:20			21:10	21:50
11	08:37		09:06 (WEA08)	07:57	06:58		08:10 (WEA-5 E-160)	06:48			05:48	05:15
	16:45	36	15:17 (WEA-4 E-160)	17:38	18:29	60	09:10 (WEA-5 E-160)	20:22			21:12	21:51
12	08:36		09:06 (WEA08)	07:55	06:56		08:10 (WEA-5 E-160)	06:45			05:46	05:14
	16:46	37	15:18 (WEA-4 E-160)	17:40	18:31	60	09:10 (WEA-5 E-160)	20:24			21:14	21:51
13	08:36		09:05 (WEA08)	07:53	06:54		08:10 (WEA-5 E-160)	06:43			05:44	05:14
	16:48	37	15:18 (WEA-4 E-160)	17:42	18:32	60	09:10 (WEA-5 E-160)	20:25			21:15	21:52
14	08:35		09:04 (WEA08)	07:51	06:51		08:09 (WEA-5 E-160)	06:41			05:43	05:14
	16:49	37	15:17 (WEA-4 E-160)	17:44	18:34	60	09:09 (WEA-5 E-160)	20:27			21:17	21:53
15	08:34		09:04 (WEA08)	07:49	06:49		08:09 (WEA-5 E-160)	06:39			05:41	05:13
	16:51	37	15:17 (WEA-4 E-160)	17:46	18:36	60	09:09 (WEA-5 E-160)	20:29			21:18	21:53
16	08:33		09:04 (WEA08)	07:47	06:47		08:09 (WEA-5 E-160)	06:36			05:40	05:13
	16:52	35	15:16 (WEA-4 E-160)	17:48	18:38	60	09:09 (WEA-5 E-160)	20:30			21:20	21:54
17	08:32		09:04 (WEA08)	07:45	06:45		08:08 (WEA-5 E-160)	06:34			05:38	05:13
	16:54	34	15:16 (WEA-4 E-160)	17:49	18:39	60	09:08 (WEA-5 E-160)	20:32			21:21	21:54
18	08:31		09:05 (WEA08)	07:43	06:42		08:08 (WEA-5 E-160)	06:32			05:37	05:13
	16:55	30	15:15 (WEA-4 E-160)	17:51	18:41	60	09:08 (WEA-5 E-160)	20:34			21:23	21:54
19	08:30		09:04 (WEA08)	07:41	06:40		08:08 (WEA-5 E-160)	06:30			05:35	05:13
	16:57	26	15:12 (WEA-4 E-160)	17:53	18:43	59	09:07 (WEA-5 E-160)	20:36			21:24	21:55
20	08:29		09:05 (WEA08)	07:39	06:38		08:08 (WEA-5 E-160)	06:28			05:34	05:13
	16:59	19	15:09 (WEA-4 E-160)	17:55	18:45	58	09:06 (WEA-5 E-160)	20:37			21:26	21:55
21	08:28		09:06 (WEA08)	07:37	06:35		08:08 (WEA-5 E-160)	06:26			05:33	05:14
	17:00	13	09:19 (WEA08)	17:57	18:46	57	09:05 (WEA-5 E-160)	20:39			21:27	21:55
22	08:27		09:07 (WEA08)	07:35	06:33		08:09 (WEA-5 E-160)	06:24			05:31	05:14
	17:02	12	09:19 (WEA08)	17:59	18:48	55	09:04 (WEA-5 E-160)	20:41			21:29	21:56
23	08:26		09:08 (WEA08)	07:33	06:31		08:08 (WEA-5 E-160)	06:22			05:30	05:14
	17:04	10	09:18 (WEA08)	18:00	18:50	54	09:02 (WEA-5 E-160)	20:42			21:30	21:56
24	08:25		09:09 (WEA08)	07:31	06:29		08:09 (WEA-5 E-160)	06:20			05:29	05:14
	17:06	8	09:17 (WEA08)	18:02	18:51	52	09:01 (WEA-5 E-160)	20:44			21:31	21:56
25	08:23		09:13 (WEA08)	07:29	06:26		08:10 (WEA-5 E-160)	06:17			05:28	05:15
	17:07	1	09:14 (WEA08)	18:04	18:53	50	09:00 (WEA-5 E-160)	20:46			21:33	21:56
26	08:22			07:27	06:24		08:10 (WEA-5 E-160)	06:15			05:27	05:15
	17:09			18:06	18:55	48	08:58 (WEA-5 E-160)	20:47			21:34	21:56
27	08:21			07:25	06:22		08:11 (WEA-5 E-160)	06:13			05:25	05:15
	17:11			18:08	18:57	46	08:57 (WEA-5 E-160)	20:49			21:35	21:56
28	08:19			07:23	06:19		08:12 (WEA-5 E-160)	06:11			05:24	05:16
	17:13			18:10	18:58	43	08:55 (WEA-5 E-160)	20:51			21:36	21:56
29	08:18				07:17		09:14 (WEA-5 E-160)	06:09			05:23	05:16
	17:14				20:00	39	09:53 (WEA-5 E-160)	20:52			21:38	21:56
30	08:17				07:15		09:15 (WEA-5 E-160)	06:08			05:22	05:17
	17:16				20:02	35	09:50 (WEA-5 E-160)	20:54			21:39	21:55
31	08:15				07:12		09:17 (WEA-5 E-160)	06:07			05:21	05:16
	17:18				20:03	30	09:47 (WEA-5 E-160)	20:56			21:40	21:55
	Sonnenscheinstunden	259		278		367		416		485		498
	astr.max.mögl.Beschattung	700		142		1626		42				
	Red.Sonnenscheinwahrsch.	0,20		0,30		0,30		0,41				
	Reduktion Betriebsdauer	0,84		0,84		0,84		0,84				
	Reduktion Windrichtung	0,66		0,61		0,61		0,61				
	Gesamte Reduktion	0,11		0,16		0,16		0,21				
	Met.wahrsch.Beschattung	77		22		252		9				

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 49 - IP 49 Große Heide 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	08:49 (WEA-5 E-160)	07:26
	21:55	21:24	20:22	19:13	60 09:49 (WEA-5 E-160)	17:07
2	05:18	05:55	06:45	07:34	08:49 (WEA-5 E-160)	07:27
	21:55	21:22	20:20	19:10	60 09:49 (WEA-5 E-160)	17:05
3	05:19	05:57	06:47	07:35	08:49 (WEA-5 E-160)	07:29
	21:54	21:20	20:17	19:08	59 09:48 (WEA-5 E-160)	17:03
4	05:20	05:59	06:48	07:37	08:49 (WEA-5 E-160)	07:31
	21:54	21:18	20:15	19:06	58 09:47 (WEA-5 E-160)	17:01
5	05:21	06:00	06:50	07:39	08:49 (WEA-5 E-160)	07:33
	21:54	21:17	20:13	19:03	58 09:47 (WEA-5 E-160)	17:00
6	05:21	06:02	06:51	07:40	08:50 (WEA-5 E-160)	07:35
	21:53	21:15	20:10	19:01	56 09:46 (WEA-5 E-160)	16:58
7	05:22	06:03	06:53	07:42	08:50 (WEA-5 E-160)	07:36
	21:52	21:13	20:08	18:59	54 09:44 (WEA-5 E-160)	16:56
8	05:23	06:05	06:55	07:44	08:50 (WEA-5 E-160)	07:38
	21:52	21:11	20:06	18:57	54 09:44 (WEA-5 E-160)	16:54
9	05:24	06:06	06:56	07:45	08:51 (WEA-5 E-160)	07:40
	21:51	21:10	20:04	18:54	52 09:43 (WEA-5 E-160)	16:53
10	05:25	06:08	06:58	07:47	08:52 (WEA-5 E-160)	07:42
	21:50	21:08	20:01	18:52	50 09:42 (WEA-5 E-160)	16:51
11	05:26	06:10	07:00	07:49	08:52 (WEA-5 E-160)	07:43
	21:50	21:06	19:59	18:50	47 09:39 (WEA-5 E-160)	16:50
12	05:27	06:11	07:01	07:51	08:54 (WEA-5 E-160)	07:45
	21:49	21:04	19:57	18:48	44 09:38 (WEA-5 E-160)	16:48
13	05:28	06:13	07:03	07:52	08:55 (WEA-5 E-160)	07:47
	21:48	21:02	19:54	18:46	41 09:36 (WEA-5 E-160)	16:47
14	05:29	06:14	07:04	07:54	08:57 (WEA-5 E-160)	07:49
	21:47	21:00	19:52	18:43	37 09:34 (WEA-5 E-160)	16:45
15	05:31	06:16	07:06	07:56	08:58 (WEA-5 E-160)	07:50
	21:46	20:58	19:50	18:41	33 09:31 (WEA-5 E-160)	16:44
16	05:32	06:18	07:08	07:57	09:01 (WEA-5 E-160)	07:52
	21:45	20:56	19:47	18:39	28 09:29 (WEA-5 E-160)	16:42
17	05:33	06:19	07:09	07:59	09:04 (WEA-5 E-160)	07:54
	21:44	20:54	19:45	18:37	21 09:25 (WEA-5 E-160)	16:41
18	05:34	06:21	07:11	08:01	09:10 (WEA-5 E-160)	07:56
	21:43	20:52	19:43	18:35	9 09:19 (WEA-5 E-160)	16:40
19	05:36	06:22	07:12	08:03	08:03	07:57
	21:42	20:50	19:40	18:33	10 08:53 (WEA08)	16:23
20	05:37	06:24	07:14	08:04	08:04	07:59
	21:41	20:48	19:38	18:30	12 08:54 (WEA08)	16:23
21	05:38	06:26	07:16	08:06	08:01	08:01
	21:39	20:46	19:36	18:28	13 08:54 (WEA08)	16:24
22	05:40	06:27	07:17	08:08	08:02	08:02
	21:38	20:44	19:33	18:26	19 14:45 (WEA-4 E-160)	16:24
23	05:41	06:29	07:19	08:10	08:04	08:04
	21:37	20:41	19:31	18:24	26 14:49 (WEA-4 E-160)	16:25
24	05:42	06:30	07:21	08:11	08:06	08:06
	21:36	20:39	19:29	18:22	30 14:52 (WEA-4 E-160)	16:25
25	05:44	06:32	07:22	08:13	08:07	08:07
	21:34	20:37	19:26	18:20	34 14:54 (WEA-4 E-160)	16:26
26	05:45	06:34	07:24	08:15	08:09	08:09
	21:33	20:35	19:24	18:18	35 14:54 (WEA-4 E-160)	16:27
27	05:47	06:35	07:26	08:17	08:10	08:10
	21:31	20:33	19:22	18:16	37 14:56 (WEA-4 E-160)	16:28
28	05:48	06:37	07:27	08:18	08:12	08:12
	21:30	20:31	19:19	18:14	37 14:57 (WEA-4 E-160)	16:28
29	05:49	06:39	07:29	08:20	08:13	08:13
	21:28	20:28	19:17	18:12	37 14:58 (WEA-4 E-160)	16:29
30	05:51	06:40	07:30	08:22	08:15	08:15
	21:27	20:26	19:15	18:10	37 14:59 (WEA-4 E-160)	16:30
31	05:52	06:42		07:24		08:40
	21:25	20:24		17:09		16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung				821	337	1125
Red.Sonnenscheinwahrsch.			1026	0,36	0,23	0,15
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,61	0,61	0,63	0,68
Gesamte Reduktion			0,19	0,16	0,12	0,08
Met.wahrsch.Beschattung			192	135	41	96

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 50 - IP 50 Rhader Straße 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40		08:14		07:20		07:10		06:06		05:21
	16:32		17:20	33	09:45 (WEA-5 E-160)		18:11		20:05		21:41
2	08:40		08:12		09:12 (WEA-5 E-160)		07:18		07:08		06:04
	16:33		17:22	32	09:44 (WEA-5 E-160)		18:13		20:07		21:42
3	08:40		08:11		09:12 (WEA-5 E-160)		07:16		07:06		06:02
	16:34		17:24	32	09:44 (WEA-5 E-160)		18:15		20:08		21:43
4	08:40		08:09		09:13 (WEA-5 E-160)		07:14		07:03		06:00
	16:36		17:25	31	09:44 (WEA-5 E-160)		18:17		20:10		21:44
5	08:40		08:07		09:14 (WEA-5 E-160)		07:12		07:01		05:58
	16:37		17:27	30	09:44 (WEA-5 E-160)		18:18		20:12		21:45
6	08:39		08:06		09:14 (WEA-5 E-160)		07:10		06:59		05:57
	16:38		17:29	29	09:43 (WEA-5 E-160)		18:20		20:14		21:46
7	08:39		08:04		09:15 (WEA-5 E-160)		07:07		06:56		05:56
	16:39		17:31	27	09:42 (WEA-5 E-160)		18:22		20:15		21:47
8	08:38		08:02		09:16 (WEA-5 E-160)		07:05		06:54		05:53
	16:41		17:33	24	09:40 (WEA-5 E-160)		18:24		20:17		21:48
9	08:38		08:00		09:18 (WEA-5 E-160)		07:03		06:52		05:51
	16:42		17:35	21	09:39 (WEA-5 E-160)		18:26		20:19		21:49
10	08:37		07:59		09:20 (WEA-5 E-160)		07:01		06:50		05:49
	16:43		17:37	18	09:38 (WEA-5 E-160)		18:27		20:20		21:50
11	08:37		07:57		09:23 (WEA-5 E-160)		06:58		06:48		05:48
	16:45		17:38	12	09:35 (WEA-5 E-160)		18:29		20:22		21:51
12	08:36		07:55		07:55		06:56		06:45		05:46
	16:46	8	09:19 (WEA-5 E-160)		17:40		18:31		20:24		21:51
13	08:36		09:17 (WEA-5 E-160)		07:53		06:54		06:43		05:44
	16:48	12	09:29 (WEA-5 E-160)		17:42		18:33		20:25		21:52
14	08:35		09:15 (WEA-5 E-160)		07:51		06:52		06:41		05:43
	16:49	16	09:31 (WEA-5 E-160)		17:44		18:34		20:27		21:53
15	08:34		09:14 (WEA-5 E-160)		07:49		06:49		06:39		05:41
	16:51	19	09:33 (WEA-5 E-160)		17:46		18:36		20:29		21:53
16	08:33		09:14 (WEA-5 E-160)		07:47		06:47		06:37		05:40
	16:52	20	09:34 (WEA-5 E-160)		17:48		18:38		20:30		21:54
17	08:32		09:13 (WEA-5 E-160)		07:45		06:45		06:34		05:38
	16:54	23	09:36 (WEA-5 E-160)		17:49		18:39		20:32		21:54
18	08:31		09:13 (WEA-5 E-160)		07:43		06:42		06:32		05:37
	16:55	24	09:37 (WEA-5 E-160)		17:51		18:41		20:34		21:55
19	08:30		09:11 (WEA-5 E-160)		07:41		06:40		06:30		05:35
	16:57	26	09:37 (WEA-5 E-160)		17:53		18:43		20:36		21:55
20	08:29		09:11 (WEA-5 E-160)		07:39		06:38		06:28		05:34
	16:59	28	09:39 (WEA-5 E-160)		17:55		18:45		20:37		21:55
21	08:28		09:11 (WEA-5 E-160)		07:37		06:35		06:26		05:33
	17:00	29	09:40 (WEA-5 E-160)		17:57		18:46		20:39		21:55
22	08:27		09:11 (WEA-5 E-160)		07:35		06:33		06:24		05:31
	17:02	30	09:41 (WEA-5 E-160)		17:59		18:48		20:41		21:56
23	08:26		09:10 (WEA-5 E-160)		07:33		06:31		06:22		05:30
	17:04	31	09:41 (WEA-5 E-160)		18:00		18:50		20:42		21:56
24	08:25		09:10 (WEA-5 E-160)		07:31		06:29		06:20		05:29
	17:06	32	09:42 (WEA-5 E-160)		18:02		18:51		20:44		21:56
25	08:23		09:11 (WEA-5 E-160)		07:29		06:26		06:18		05:28
	17:07	32	09:43 (WEA-5 E-160)		18:04		18:53		20:46		21:56
26	08:22		09:10 (WEA-5 E-160)		07:27		06:24		06:15		05:27
	17:09	33	09:43 (WEA-5 E-160)		18:06		18:55		20:47		21:56
27	08:21		09:11 (WEA-5 E-160)		07:25		06:22		06:13		05:25
	17:11	33	09:44 (WEA-5 E-160)		18:08		18:57		20:49		21:56
28	08:19		09:10 (WEA-5 E-160)		07:23		06:19		06:11		05:24
	17:13	34	09:44 (WEA-5 E-160)		18:10		18:58		20:51		21:57
29	08:18		09:11 (WEA-5 E-160)		07:21		07:17		06:09		05:23
	17:14	34	09:45 (WEA-5 E-160)		18:09		18:59		20:52		21:56
30	08:17		09:11 (WEA-5 E-160)		07:19		07:15		06:08		05:22
	17:16	33	09:44 (WEA-5 E-160)		18:07		18:57		20:54		21:57
31	08:15		09:11 (WEA-5 E-160)		07:17		07:12		06:04		05:21
	17:18	33	09:44 (WEA-5 E-160)		18:06		18:56		20:54		21:56
Sonnenscheinstunden	259		278		367		416		485		498
astr.max.mögl.Beschattung	530		289								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,55		0,55								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	48		41								

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 50 - IP 50 Rhader Straße 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober		November	Dezember
1	05:18	05:54	06:43	07:32		07:26	08:49 (WEA-5 E-160) 08:16
	21:55	21:24	20:22	19:13		17:07	18 09:07 (WEA-5 E-160) 16:27
2	05:18	05:55	06:45	07:34		07:27	08:47 (WEA-5 E-160) 08:18
	21:55	21:22	20:20	19:10		17:05	22 09:09 (WEA-5 E-160) 16:26
3	05:19	05:57	06:47	07:35		07:29	08:46 (WEA-5 E-160) 08:19
	21:55	21:20	20:17	19:08		17:03	24 09:10 (WEA-5 E-160) 16:25
4	05:20	05:59	06:48	07:37		07:31	08:45 (WEA-5 E-160) 08:21
	21:54	21:19	20:15	19:06		17:01	26 09:11 (WEA-5 E-160) 16:25
5	05:21	06:00	06:50	07:39		07:33	08:44 (WEA-5 E-160) 08:22
	21:54	21:17	20:13	19:03		17:00	28 09:12 (WEA-5 E-160) 16:24
6	05:21	06:02	06:51	07:40		07:35	08:43 (WEA-5 E-160) 08:23
	21:53	21:15	20:10	19:01		16:58	30 09:13 (WEA-5 E-160) 16:24
7	05:22	06:03	06:53	07:42		07:36	08:43 (WEA-5 E-160) 08:24
	21:53	21:13	20:08	18:59		16:56	31 09:14 (WEA-5 E-160) 16:23
8	05:23	06:05	06:55	07:44		07:38	08:43 (WEA-5 E-160) 08:26
	21:52	21:11	20:06	18:57		16:54	32 09:15 (WEA-5 E-160) 16:23
9	05:24	06:06	06:56	07:46		07:40	08:42 (WEA-5 E-160) 08:27
	21:51	21:10	20:04	18:54		16:53	33 09:15 (WEA-5 E-160) 16:23
10	05:25	06:08	06:58	07:47		07:42	08:42 (WEA-5 E-160) 08:28
	21:51	21:08	20:01	18:52		16:51	34 09:16 (WEA-5 E-160) 16:23
11	05:26	06:10	07:00	07:49		07:43	08:42 (WEA-5 E-160) 08:29
	21:50	21:06	19:59	18:50		16:50	34 09:16 (WEA-5 E-160) 16:22
12	05:27	06:11	07:01	07:51		07:45	08:43 (WEA-5 E-160) 08:30
	21:49	21:04	19:57	18:48		16:48	33 09:16 (WEA-5 E-160) 16:22
13	05:28	06:13	07:03	07:52		07:47	08:43 (WEA-5 E-160) 08:31
	21:48	21:02	19:54	18:46		16:47	34 09:17 (WEA-5 E-160) 16:22
14	05:29	06:14	07:04	07:54		07:49	08:42 (WEA-5 E-160) 08:32
	21:47	21:00	19:52	18:43		16:45	34 09:16 (WEA-5 E-160) 16:22
15	05:31	06:16	07:06	07:56		07:51	08:43 (WEA-5 E-160) 08:33
	21:46	20:58	19:50	18:41		16:44	33 09:16 (WEA-5 E-160) 16:22
16	05:32	06:18	07:08	07:57		07:52	08:43 (WEA-5 E-160) 08:34
	21:45	20:56	19:47	18:39		16:42	33 09:16 (WEA-5 E-160) 16:22
17	05:33	06:19	07:09	07:59		07:54	08:44 (WEA-5 E-160) 08:35
	21:44	20:54	19:45	18:37		16:41	32 09:16 (WEA-5 E-160) 16:23
18	05:34	06:21	07:11	08:01		07:56	08:44 (WEA-5 E-160) 08:35
	21:43	20:52	19:43	18:35		16:40	32 09:16 (WEA-5 E-160) 16:23
19	05:36	06:22	07:12	08:03		07:57	08:45 (WEA-5 E-160) 08:36
	21:42	20:50	19:40	18:33		16:38	31 09:16 (WEA-5 E-160) 16:23
20	05:37	06:24	07:14	08:04		07:59	08:46 (WEA-5 E-160) 08:37
	21:41	20:48	19:38	18:30		16:37	30 09:16 (WEA-5 E-160) 16:23
21	05:38	06:26	07:16	08:06		08:01	08:47 (WEA-5 E-160) 08:37
	21:39	20:46	19:36	18:28		16:36	29 09:16 (WEA-5 E-160) 16:24
22	05:39	06:27	07:17	08:08		08:02	08:47 (WEA-5 E-160) 08:38
	21:38	20:44	19:33	18:26		16:35	28 09:15 (WEA-5 E-160) 16:24
23	05:41	06:29	07:19	08:10		08:04	08:48 (WEA-5 E-160) 08:38
	21:37	20:41	19:31	18:24		16:34	26 09:14 (WEA-5 E-160) 16:25
24	05:42	06:30	07:21	08:11		08:06	08:50 (WEA-5 E-160) 08:39
	21:36	20:39	19:29	18:22		16:33	24 09:14 (WEA-5 E-160) 16:25
25	05:44	06:32	07:22	07:13		08:07	08:51 (WEA-5 E-160) 08:39
	21:34	20:37	19:26	17:20		16:32	23 09:14 (WEA-5 E-160) 16:26
26	05:45	06:34	07:24	07:15		08:09	08:52 (WEA-5 E-160) 08:39
	21:33	20:35	19:24	17:18		16:31	20 09:12 (WEA-5 E-160) 16:27
27	05:47	06:35	07:26	07:17		08:10	08:53 (WEA-5 E-160) 08:40
	21:31	20:33	19:22	17:16		16:30	19 09:12 (WEA-5 E-160) 16:28
28	05:48	06:37	07:27	07:18		08:12	08:55 (WEA-5 E-160) 08:40
	21:30	20:31	19:19	17:14		16:29	16 09:11 (WEA-5 E-160) 16:28
29	05:49	06:39	07:29	07:20		08:13	08:57 (WEA-5 E-160) 08:40
	21:28	20:28	19:17	17:12		16:28	12 09:09 (WEA-5 E-160) 16:29
30	05:51	06:40	07:30	07:22		08:15	08:59 (WEA-5 E-160) 08:40
	21:27	20:26	19:15	17:10		16:27	9 09:08 (WEA-5 E-160) 16:30
31	05:52	06:42		07:24		08:51 (WEA-5 E-160)	08:40
	21:25	20:24		17:09	13	09:04 (WEA-5 E-160)	16:31
Sonnenscheinstunden	501	453	381	332		267	244
astr.max.mögl.Beschattung					13	810	
Red.Sonnenscheinwahrsch.					0,32	0,23	
Reduktion Betriebsdauer					0,84	0,84	
Reduktion Windrichtung					0,55	0,55	
Gesamte Reduktion					0,15	0,11	
Met.wahrsch.Beschattung					2	86	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 51 - IP 51 Engelradingstr. 53

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1 08:40		09:23 (WEA-5 E-160)	08:14	09:31 (WEA-5 E-160)	07:20	07:10	06:06	05:21			
16:32	19	09:42 (WEA-5 E-160)	17:20	09:56 (WEA-5 E-160)	18:11	20:05	20:56	21:41			
2 08:40		09:23 (WEA-5 E-160)	08:12	09:32 (WEA-5 E-160)	07:18	07:08	06:04	05:20			
16:33	21	09:44 (WEA-5 E-160)	17:22	09:55 (WEA-5 E-160)	18:13	20:07	20:57	21:42			
3 08:40		09:24 (WEA-5 E-160)	08:11	09:33 (WEA-5 E-160)	07:16	07:06	06:02	05:19			
16:34	21	09:45 (WEA-5 E-160)	17:24	09:54 (WEA-5 E-160)	18:15	20:08	20:59	21:43			
4 08:40		09:24 (WEA-5 E-160)	08:09	09:36 (WEA-5 E-160)	07:14	07:03	06:00	05:18			
16:36	22	09:46 (WEA-5 E-160)	17:25	09:52 (WEA-5 E-160)	18:17	20:10	21:01	21:44			
5 08:40		09:23 (WEA-5 E-160)	08:07	09:38 (WEA-5 E-160)	07:12	07:01	05:58	05:18			
16:37	23	09:46 (WEA-5 E-160)	17:27	09:50 (WEA-5 E-160)	18:18	20:12	21:02	21:45			
6 08:39		09:24 (WEA-5 E-160)	08:06		07:10	06:59	05:56	05:17			
16:38	24	09:48 (WEA-5 E-160)	17:29		18:20	20:14	21:04	21:46			
7 08:39		09:23 (WEA-5 E-160)	08:04		07:07	06:56	05:55	05:16			
16:39	25	09:48 (WEA-5 E-160)	17:31		18:22	20:15	21:06	21:47			
8 08:38		09:24 (WEA-5 E-160)	08:02		07:05	06:54	05:53	05:16			
16:41	26	09:50 (WEA-5 E-160)	17:33		18:24	20:17	21:07	21:48			
9 08:38		09:23 (WEA-5 E-160)	08:00		07:03	06:52	05:51	05:15			
16:42	27	09:50 (WEA-5 E-160)	17:35		18:26	20:19	21:09	21:49			
10 08:37		09:23 (WEA-5 E-160)	07:59		07:01	06:50	05:49	05:15			
16:43	28	09:51 (WEA-5 E-160)	17:37		18:27	20:20	21:10	21:50			
11 08:37		09:22 (WEA-5 E-160)	07:57		06:58	06:48	05:48	05:14			
16:45	30	09:52 (WEA-5 E-160)	17:38		18:29	20:22	21:12	21:51			
12 08:36		09:23 (WEA-5 E-160)	07:55		06:56	06:45	05:46	05:14			
16:46	30	09:53 (WEA-5 E-160)	17:40		18:31	20:24	21:14	21:51			
13 08:36		09:23 (WEA-5 E-160)	07:53		06:54	06:43	05:44	05:14			
16:48	31	09:54 (WEA-5 E-160)	17:42		18:33	20:25	21:15	21:52			
14 08:35		09:23 (WEA-5 E-160)	07:51		06:52	06:41	05:43	05:14			
16:49	31	09:54 (WEA-5 E-160)	17:44		18:34	20:27	21:17	21:53			
15 08:34		09:23 (WEA-5 E-160)	07:49		06:49	06:39	05:41	05:13			
16:51	32	09:55 (WEA-5 E-160)	17:46		18:36	20:29	21:18	21:53			
16 08:33		09:23 (WEA-5 E-160)	07:47		06:47	06:37	05:40	05:13			
16:52	33	09:56 (WEA-5 E-160)	17:48		18:38	20:30	21:20	21:54			
17 08:32		09:23 (WEA-5 E-160)	07:45		06:45	06:34	05:38	05:13			
16:54	33	09:56 (WEA-5 E-160)	17:49		18:39	20:32	21:21	21:54			
18 08:31		09:24 (WEA-5 E-160)	07:43		06:42	06:32	05:37	05:13			
16:55	33	09:57 (WEA-5 E-160)	17:51		18:41	20:34	21:23	21:55			
19 08:30		09:23 (WEA-5 E-160)	07:41		06:40	06:30	05:35	05:13			
16:57	34	09:57 (WEA-5 E-160)	17:53		18:43	20:36	21:24	21:55			
20 08:29		09:23 (WEA-5 E-160)	07:39		06:38	06:28	05:34	05:13			
16:59	34	09:57 (WEA-5 E-160)	17:55		18:45	20:37	21:26	21:55			
21 08:28		09:24 (WEA-5 E-160)	07:37		06:35	06:26	05:33	05:14			
17:00	34	09:58 (WEA-5 E-160)	17:57		18:46	20:39	21:27	21:55			
22 08:27		09:24 (WEA-5 E-160)	07:35		06:33	06:24	05:31	05:14			
17:02	35	09:59 (WEA-5 E-160)	17:59		18:48	20:41	21:29	21:56			
23 08:26		09:24 (WEA-5 E-160)	07:33		06:31	06:22	05:30	05:14			
17:04	34	09:58 (WEA-5 E-160)	18:00		18:50	20:42	21:30	21:56			
24 08:25		09:25 (WEA-5 E-160)	07:31		06:29	06:20	05:29	05:14			
17:06	34	09:59 (WEA-5 E-160)	18:02		18:51	20:44	21:31	21:56			
25 08:23		09:26 (WEA-5 E-160)	07:29		06:26	06:17	05:28	05:15			
17:07	33	09:59 (WEA-5 E-160)	18:04		18:53	20:46	21:33	21:56			
26 08:22		09:25 (WEA-5 E-160)	07:27		06:24	06:15	05:26	05:15			
17:09	34	09:59 (WEA-5 E-160)	18:06		18:55	20:47	21:34	21:56			
27 08:21		09:26 (WEA-5 E-160)	07:25		06:22	06:13	05:25	05:15			
17:11	33	09:59 (WEA-5 E-160)	18:08		18:57	20:49	21:35	21:56			
28 08:19		09:27 (WEA-5 E-160)	07:23		06:19	06:11	05:24	05:16			
17:13	31	09:58 (WEA-5 E-160)	18:10		18:58	20:51	21:37	21:56			
29 08:18		09:28 (WEA-5 E-160)			07:17	06:09	05:23	05:16			
17:14	30	09:58 (WEA-5 E-160)			20:00	20:52	21:38	21:56			
30 08:17		09:28 (WEA-5 E-160)			07:15	06:08	05:22	05:17			
17:16	30	09:58 (WEA-5 E-160)			20:02	20:54	21:39	21:55			
31 08:15		09:29 (WEA-5 E-160)			07:12		05:21				
17:18	28	09:57 (WEA-5 E-160)			20:03		21:40				
Sonnenscheinstunden	259		278		367	416	485	498			
astr.max.mögl.Beschattung	913		97								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,56		0,56								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	84		14								

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 51 - IP 51 Engelradingstr. 53

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	09:05 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34	07:27	16:27 29 09:34 (WEA-5 E-160)
	21:55	21:22	20:20	19:10	17:05	08:18 09:06 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35	07:29	16:26 28 09:34 (WEA-5 E-160)
	21:55	21:20	20:17	19:08	17:03	08:19 09:06 (WEA-5 E-160)
4	05:20	05:59	06:48	07:37	07:31	16:25 28 09:34 (WEA-5 E-160)
	21:54	21:19	20:15	19:06	17:01	08:21 09:08 (WEA-5 E-160)
5	05:21	06:00	06:50	07:39	07:33	16:25 26 09:34 (WEA-5 E-160)
	21:54	21:17	20:13	19:03	17:00	08:22 09:08 (WEA-5 E-160)
6	05:21	06:02	06:51	07:40	07:35	16:24 26 09:34 (WEA-5 E-160)
	21:53	21:15	20:10	19:01	16:58	08:23 09:10 (WEA-5 E-160)
7	05:22	06:03	06:53	07:42	07:36	13 09:07 (WEA-5 E-160) 16:24 24 09:34 (WEA-5 E-160)
	21:53	21:13	20:08	18:59	16:56	09:05 (WEA-5 E-160) 08:24 09:10 (WEA-5 E-160)
8	05:23	06:05	06:55	07:44	07:38	18 09:23 (WEA-5 E-160) 16:23 24 09:34 (WEA-5 E-160)
	21:52	21:11	20:06	18:57	16:54	09:03 (WEA-5 E-160) 08:26 09:11 (WEA-5 E-160)
9	05:24	06:06	06:56	07:46	07:40	22 09:25 (WEA-5 E-160) 16:23 22 09:33 (WEA-5 E-160)
	21:51	21:10	20:04	18:54	16:53	09:02 (WEA-5 E-160) 08:27 09:12 (WEA-5 E-160)
10	05:25	06:08	06:58	07:47	07:42	24 09:26 (WEA-5 E-160) 16:23 21 09:33 (WEA-5 E-160)
	21:51	21:08	20:01	18:52	16:51	09:01 (WEA-5 E-160) 08:28 09:13 (WEA-5 E-160)
11	05:26	06:10	07:00	07:49	07:43	26 09:27 (WEA-5 E-160) 16:23 21 09:34 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	16:50	09:01 (WEA-5 E-160) 08:29 09:14 (WEA-5 E-160)
12	05:27	06:11	07:01	07:51	07:45	28 09:29 (WEA-5 E-160) 16:22 19 09:33 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	16:48	09:00 (WEA-5 E-160) 08:30 09:15 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52	07:47	30 09:30 (WEA-5 E-160) 16:22 18 09:33 (WEA-5 E-160)
	21:48	21:02	19:54	18:46	16:47	09:00 (WEA-5 E-160) 08:31 09:16 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	30 09:30 (WEA-5 E-160) 16:22 17 09:33 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	08:59 (WEA-5 E-160) 08:32 09:17 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56	07:51	31 09:30 (WEA-5 E-160) 16:22 16 09:33 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	08:58 (WEA-5 E-160) 08:33 09:18 (WEA-5 E-160)
16	05:32	06:18	07:08	07:57	07:52	33 09:31 (WEA-5 E-160) 16:22 15 09:33 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	08:58 (WEA-5 E-160) 08:34 09:18 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59	07:54	33 09:31 (WEA-5 E-160) 16:22 14 09:32 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	08:59 (WEA-5 E-160) 08:35 09:19 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01	07:56	33 09:32 (WEA-5 E-160) 16:23 14 09:33 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	08:59 (WEA-5 E-160) 08:35 09:20 (WEA-5 E-160)
19	05:36	06:22	07:12	08:03	07:57	34 09:33 (WEA-5 E-160) 16:23 13 09:33 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	08:59 (WEA-5 E-160) 08:36 09:21 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04	07:59	34 09:33 (WEA-5 E-160) 16:23 13 09:34 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	08:59 (WEA-5 E-160) 08:37 09:21 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06	08:01	35 09:34 (WEA-5 E-160) 16:23 12 09:33 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	09:00 (WEA-5 E-160) 08:37 09:22 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08	08:02	34 09:34 (WEA-5 E-160) 16:24 12 09:34 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	08:59 (WEA-5 E-160) 08:38 09:22 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10	08:04	34 09:33 (WEA-5 E-160) 16:24 12 09:34 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	09:00 (WEA-5 E-160) 08:38 09:23 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11	08:06	34 09:34 (WEA-5 E-160) 16:25 12 09:35 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	09:01 (WEA-5 E-160) 08:39 09:23 (WEA-5 E-160)
25	05:44	06:32	07:22	08:13	08:07	33 09:34 (WEA-5 E-160) 16:25 12 09:35 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	09:01 (WEA-5 E-160) 08:39 09:23 (WEA-5 E-160)
26	05:45	06:34	07:24	08:15	08:09	33 09:34 (WEA-5 E-160) 16:26 13 09:36 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	09:01 (WEA-5 E-160) 08:39 09:24 (WEA-5 E-160)
27	05:46	06:35	07:26	08:17	08:10	33 09:34 (WEA-5 E-160) 16:27 13 09:37 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	09:02 (WEA-5 E-160) 08:40 09:24 (WEA-5 E-160)
28	05:48	06:37	07:27	08:18	08:12	32 09:34 (WEA-5 E-160) 16:28 14 09:38 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	09:03 (WEA-5 E-160) 08:40 09:24 (WEA-5 E-160)
29	05:49	06:39	07:29	08:20	08:13	32 09:35 (WEA-5 E-160) 16:28 15 09:39 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	09:03 (WEA-5 E-160) 08:40 09:24 (WEA-5 E-160)
30	05:51	06:40	07:30	08:22	08:15	31 09:34 (WEA-5 E-160) 16:29 16 09:40 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	09:04 (WEA-5 E-160) 08:40 09:24 (WEA-5 E-160)
31	05:52	06:42	07:32	08:24	08:17	30 09:34 (WEA-5 E-160) 16:30 17 09:41 (WEA-5 E-160)
	21:25	20:24	19:09	17:09	16:27	08:40 09:24 (WEA-5 E-160)
						16:31 18 09:42 (WEA-5 E-160)
	Sonnenscheinstunden	501	453	381	332	267
	astr.max.mögl.Beschattung				750	554
	Red.Sonnenscheinwahrsch.				0,23	0,15
	Reduktion Betriebsdauer				0,84	0,84
	Reduktion Windrichtung				0,56	0,56
	Gesamte Reduktion				0,11	0,07
	Met.wahrsch.Beschattung				80	38

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 52 - IP 52 Bahnhofstr. 123

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
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1	08:40	09:52 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21	
	16:32	38	10:30 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2	08:40	09:53 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20	
	16:33	38	10:31 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	09:54 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19	
	16:34	38	10:32 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	09:55 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18	
	16:36	38	10:33 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	09:55 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18	
	16:37	37	10:32 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	09:56 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17	
	16:38	37	10:33 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7	08:39	09:56 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16	
	16:39	37	10:33 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	09:57 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16	
	16:41	37	10:34 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	09:57 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15	
	16:42	37	10:34 (WEA-5 E-160)	17:35	18:25	20:19	21:09	21:49
10	08:37	09:57 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15	
	16:43	37	10:34 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	09:57 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14	
	16:45	37	10:34 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	09:59 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14	
	16:46	36	10:35 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	09:59 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14	
	16:48	36	10:35 (WEA-5 E-160)	17:42	18:32	20:25	21:15	21:52
14	08:35	10:00 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14	
	16:49	35	10:35 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34	10:00 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13	
	16:51	35	10:35 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16	08:33	10:01 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13	
	16:52	34	10:35 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17	08:32	10:02 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13	
	16:54	33	10:35 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18	08:31	10:03 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13	
	16:55	32	10:35 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19	08:30	10:03 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13	
	16:57	30	10:33 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20	08:29	10:04 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13	
	16:59	29	10:33 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21	08:28	10:06 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:13	
	17:00	27	10:33 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22	08:27	10:07 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14	
	17:02	25	10:32 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23	08:26	10:08 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14	
	17:04	23	10:31 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24	08:25	10:10 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14	
	17:06	20	10:30 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25	08:23	10:13 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15	
	17:07	15	10:28 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26	08:22	10:16 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15	
	17:09	9	10:25 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27	08:21		07:25	06:22	06:13	05:25	05:15	
	17:11		18:08	18:57	20:49	21:35	21:56	
28	08:19		07:23	06:19	06:11	05:24	05:16	
	17:13		18:09	18:58	20:51	21:37	21:56	
29	08:18			07:17	06:09	05:23	05:16	
	17:14			20:00	20:52	21:38	21:56	
30	08:17			07:15	06:08	05:22	05:17	
	17:16			20:02	20:54	21:39	21:55	
31	08:15			07:12		05:21		
	17:18			20:03		21:40		
Sonnenscheinstunden	259	278	367	416	485	498		
astr.max.mögl.Beschattung	830							
Red.Sonnenscheinwahrsch.	0,20							
Reduktion Betriebsdauer	0,84							
Reduktion Windrichtung	0,57							
Gesamte Reduktion	0,09							
Met.wahrsch.Beschattung	78							

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 52 - IP 52 Bahnhofstr. 123

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					418	1169
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					46	82

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 53 - IP 53 Bahnhofstr. 111b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1	08:40	10:21 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	35 10:56 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2	08:40	10:22 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	34 10:56 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	10:23 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
	16:34	34 10:57 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	10:24 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	33 10:57 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	10:24 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	33 10:57 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	10:25 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	32 10:57 (WEA-5 E-160)	17:29	18:20	20:13	21:04	21:46
7	08:39	10:26 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
	16:39	31 10:57 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	10:27 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	30 10:57 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	10:28 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	29 10:57 (WEA-5 E-160)	17:35	18:25	20:19	21:09	21:49
10	08:37	10:28 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	28 10:56 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	10:29 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
	16:45	27 10:56 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	10:31 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	25 10:56 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	10:32 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	24 10:56 (WEA-5 E-160)	17:42	18:32	20:25	21:15	21:52
14	08:35	10:34 (WEA-5 E-160)	07:51	06:51	06:41	05:43	05:14
	16:49	21 10:55 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34	10:35 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	19 10:54 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16	08:33	10:37 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
	16:52	15 10:52 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17	08:32	10:40 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
	16:54	10 10:50 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18	08:31		07:43	06:42	06:32	05:37	05:13
	16:55		17:51	18:41	20:34	21:23	21:55
19	08:30		07:41	06:40	06:30	05:35	05:13
	16:57		17:53	18:43	20:36	21:24	21:55
20	08:29		07:39	06:38	06:28	05:34	05:13
	16:59		17:55	18:45	20:37	21:26	21:55
21	08:28		07:37	06:35	06:26	05:33	05:13
	17:00		17:57	18:46	20:39	21:27	21:55
22	08:27		07:35	06:33	06:24	05:31	05:14
	17:02		17:59	18:48	20:41	21:29	21:56
23	08:26		07:33	06:31	06:22	05:30	05:14
	17:04		18:00	18:50	20:42	21:30	21:56
24	08:25		07:31	06:29	06:20	05:29	05:14
	17:06		18:02	18:51	20:44	21:31	21:56
25	08:23		07:29	06:26	06:17	05:28	05:15
	17:07		18:04	18:53	20:46	21:33	21:56
26	08:22		07:27	06:24	06:15	05:26	05:15
	17:09		18:06	18:55	20:47	21:34	21:56
27	08:21		07:25	06:22	06:13	05:25	05:15
	17:11		18:08	18:57	20:49	21:35	21:56
28	08:19		07:23	06:19	06:11	05:24	05:16
	17:13		18:09	18:58	20:51	21:37	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	460						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,57						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	43						

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 53 - IP 53 Bahnhofstr. 111b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	07:32 19:13	07:26 17:07	08:16 16:27
2	05:18 21:55	05:55 21:22	06:45 20:20	07:34 19:10	07:27 17:05	08:18 16:26
3	05:19 21:55	05:57 21:20	06:47 20:17	07:35 19:08	07:29 17:03	08:19 16:25
4	05:20 21:54	05:58 21:19	06:48 20:15	07:37 19:06	07:31 17:01	08:21 16:25
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	07:33 16:59	08:22 16:24
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	07:35 16:58	08:23 16:24
7	05:22 21:53	06:03 21:13	06:53 20:08	07:42 18:59	07:36 16:56	08:24 16:23
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57	07:38 16:54	08:26 16:23
9	05:24 21:51	06:06 21:10	06:56 20:04	07:45 18:54	07:40 16:53	08:27 16:23
10	05:25 21:50	06:08 21:08	06:58 20:01	07:47 18:52	07:42 16:51	08:28 16:23
11	05:26 21:50	06:09 21:06	07:00 19:59	07:49 18:50	07:43 16:50	08:29 16:22
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48	07:45 16:48	08:30 16:22
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:45	07:47 16:47	08:31 16:22
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43	07:49 16:45	08:32 16:22
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41	07:50 16:44	08:33 16:22
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39	07:52 16:42	08:34 16:22
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37	07:54 16:41	08:35 16:23
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35	07:56 16:40	08:35 16:23
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33	07:57 16:38	08:36 16:23
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30	07:59 16:37	08:37 16:23
21	05:38 21:39	06:26 20:46	07:16 19:36	08:06 18:28	08:01 16:36	08:37 16:24
22	05:39 21:38	06:27 20:44	07:17 19:33	08:08 18:26	08:02 16:35	08:38 16:24
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24	08:04 16:34	08:38 16:25
24	05:42 21:36	06:30 20:39	07:21 19:29	08:11 18:22	08:06 16:33	08:39 16:25
25	05:44 21:34	06:32 20:37	07:22 19:26	07:13 17:20	08:07 16:32	08:39 16:26
26	05:45 21:33	06:34 20:35	07:24 19:24	07:15 17:18	08:09 16:31	10 10:18 (WEA-5 E-160) 10:28 (WEA-5 E-160) 08:39 16:27
27	05:46 21:31	06:35 20:33	07:26 19:22	07:17 17:16	08:10 16:30	15 10:30 (WEA-5 E-160) 10:14 (WEA-5 E-160) 10:33 (WEA-5 E-160) 08:40 16:28
28	05:48 21:30	06:37 20:31	07:27 19:19	07:18 17:14	08:12 16:29	19 10:14 (WEA-5 E-160) 10:14 (WEA-5 E-160) 10:35 (WEA-5 E-160) 08:40 16:28
29	05:49 21:28	06:39 20:28	07:29 19:17	07:20 17:12	08:13 16:28	21 10:12 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:36 (WEA-5 E-160) 08:40 16:29
30	05:51 21:27	06:40 20:26	07:30 19:15	07:22 17:10	08:15 16:27	24 10:12 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:37 (WEA-5 E-160) 08:40 16:30
31	05:52 21:25	06:42 20:24	07:31 17:09	07:24 17:09	08:16 16:27	25 10:11 (WEA-5 E-160) 10:11 (WEA-5 E-160) 10:40 (WEA-5 E-160) 08:40 16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					114	1066
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					12	75

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 53/1 - IP 53/1 Bahnhofstr. 111a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	10:19 (WEA-5 E-160)	08:14	07:20	07:10	06:06
	16:32	35 10:54 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	10:20 (WEA-5 E-160)	08:12	07:18	07:08	06:04
	16:33	35 10:55 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	10:21 (WEA-5 E-160)	08:10	07:16	07:06	06:02
	16:34	34 10:55 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	10:22 (WEA-5 E-160)	08:09	07:14	07:03	06:00
	16:36	34 10:56 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	10:22 (WEA-5 E-160)	08:07	07:12	07:01	05:58
	16:37	33 10:55 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	10:23 (WEA-5 E-160)	08:06	07:10	06:59	05:56
	16:38	33 10:56 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7	08:39	10:23 (WEA-5 E-160)	08:04	07:07	06:56	05:54
	16:39	32 10:55 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	10:25 (WEA-5 E-160)	08:02	07:05	06:54	05:53
	16:41	31 10:56 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	10:25 (WEA-5 E-160)	08:00	07:03	06:52	05:51
	16:42	31 10:56 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10	08:37	10:26 (WEA-5 E-160)	07:59	07:01	06:50	05:49
	16:43	29 10:55 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11	08:37	10:27 (WEA-5 E-160)	07:57	06:58	06:47	05:48
	16:45	28 10:55 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	10:29 (WEA-5 E-160)	07:55	06:56	06:45	05:46
	16:46	26 10:55 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:36	10:30 (WEA-5 E-160)	07:53	06:54	06:43	05:44
	16:48	25 10:55 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14	08:35	10:31 (WEA-5 E-160)	07:51	06:51	06:41	05:43
	16:49	23 10:54 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	10:32 (WEA-5 E-160)	07:49	06:49	06:39	05:41
	16:51	21 10:53 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	10:34 (WEA-5 E-160)	07:47	06:47	06:36	05:40
	16:52	18 10:52 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32	10:37 (WEA-5 E-160)	07:45	06:45	06:34	05:38
	16:54	13 10:50 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18	08:31	10:40 (WEA-5 E-160)	07:43	06:42	06:32	05:37
	16:55	7 10:47 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19	08:30		07:41	06:40	06:30	05:35
	16:57		17:53	18:43	20:36	21:24
20	08:29		07:39	06:38	06:28	05:34
	16:59		17:55	18:45	20:37	21:26
21	08:28		07:37	06:35	06:26	05:33
	17:00		17:57	18:46	20:39	21:27
22	08:27		07:35	06:33	06:24	05:31
	17:02		17:59	18:48	20:41	21:29
23	08:26		07:33	06:31	06:22	05:30
	17:04		18:00	18:50	20:42	21:30
24	08:25		07:31	06:29	06:20	05:29
	17:06		18:02	18:51	20:44	21:31
25	08:23		07:29	06:26	06:17	05:28
	17:07		18:04	18:53	20:46	21:33
26	08:22		07:27	06:24	06:15	05:26
	17:09		18:06	18:55	20:47	21:34
27	08:21		07:25	06:22	06:13	05:25
	17:11		18:08	18:57	20:49	21:35
28	08:19		07:23	06:19	06:11	05:24
	17:13		18:09	18:58	20:51	21:37
29	08:18			07:17	06:09	05:23
	17:14			20:00	20:52	21:38
30	08:17			07:15	06:08	05:22
	17:16			20:02	20:54	21:39
31	08:15			07:12		05:21
	17:18			20:03		21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	488					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,57					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	46					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 53/1 - IP 53/1 Bahnhofstr. 111a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	07:32 19:13	07:26 17:07	08:16 16:27
2	05:18 21:55	05:55 21:22	06:45 20:20	07:34 19:10	07:27 17:05	28 16:26
3	05:19 21:55	05:57 21:20	06:47 20:17	07:35 19:08	07:29 17:03	29 16:25
4	05:20 21:54	05:58 21:19	06:48 20:15	07:37 19:06	07:31 17:01	31 16:25
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	07:33 16:59	32 16:24
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	07:35 16:58	33 16:24
7	05:22 21:53	06:03 21:13	06:53 20:08	07:42 18:59	07:36 16:56	33 16:23
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57	07:38 16:54	34 16:23
9	05:24 21:51	06:06 21:10	06:56 20:04	07:45 18:54	07:40 16:53	34 16:23
10	05:25 21:50	06:08 21:08	06:58 20:01	07:47 18:52	07:42 16:51	35 16:23
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50	07:43 16:50	35 16:22
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48	07:45 16:48	36 16:22
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:45	07:47 16:47	36 16:22
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43	07:49 16:45	36 16:22
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41	07:50 16:44	37 16:22
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39	07:52 16:42	37 16:22
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37	07:54 16:41	37 16:23
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35	07:56 16:40	37 16:23
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33	07:57 16:38	37 16:23
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30	07:59 16:37	37 16:23
21	05:38 21:39	06:26 20:46	07:16 19:36	08:06 18:28	08:01 16:36	37 16:24
22	05:39 21:38	06:27 20:44	07:17 19:33	08:08 18:26	08:02 16:35	37 16:24
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24	08:04 16:34	37 16:25
24	05:42 21:36	06:30 20:39	07:21 19:29	08:11 18:22	08:06 16:33	37 16:25
25	05:44 21:34	06:32 20:37	07:22 19:26	07:13 17:20	08:07 16:32	6 13
26	05:45 21:33	06:34 20:35	07:24 19:24	07:15 17:18	08:09 16:31	10:18 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:24 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:28 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:30 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:32 (WEA-5 E-160) 10:11 (WEA-5 E-160)
27	05:46 21:31	06:35 20:33	07:26 19:22	07:17 17:16	08:10 16:30	10:14 (WEA-5 E-160) 10:13 (WEA-5 E-160) 10:50 (WEA-5 E-160) 10:14 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:16 (WEA-5 E-160) 10:33 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:32 (WEA-5 E-160) 10:11 (WEA-5 E-160)
28	05:48 21:30	06:37 20:31	07:27 19:19	07:18 17:14	08:12 16:29	10:17 (WEA-5 E-160) 10:17 (WEA-5 E-160) 10:51 (WEA-5 E-160) 10:14 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:16 (WEA-5 E-160) 10:53 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:32 (WEA-5 E-160) 10:11 (WEA-5 E-160)
29	05:49 21:28	06:39 20:28	07:29 19:17	07:20 17:12	08:13 16:28	10:18 (WEA-5 E-160) 10:18 (WEA-5 E-160) 10:54 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:16 (WEA-5 E-160) 10:53 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:32 (WEA-5 E-160) 10:11 (WEA-5 E-160)
30	05:51 21:27	06:40 20:26	07:30 19:15	07:22 17:10	08:15 16:27	10:18 (WEA-5 E-160) 10:18 (WEA-5 E-160) 10:54 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:16 (WEA-5 E-160) 10:53 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:32 (WEA-5 E-160) 10:11 (WEA-5 E-160)
31	05:52 21:25	06:42 20:24	07:24 17:09	07:24 17:09	08:16 16:27	10:19 (WEA-5 E-160) 10:19 (WEA-5 E-160) 10:54 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:15 (WEA-5 E-160) 10:16 (WEA-5 E-160) 10:53 (WEA-5 E-160) 10:12 (WEA-5 E-160) 10:32 (WEA-5 E-160) 10:11 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					131	1086
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					14	76

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 62 - IP 62 Leblicher Straße 6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	14:12 (WEA-5 E-160)	08:14	07:20	07:10	06:06
	16:32	34 14:46 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	14:13 (WEA-5 E-160)	08:12	07:18	07:08	06:04
	16:33	33 14:46 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	14:14 (WEA-5 E-160)	08:10	07:16	07:05	06:02
	16:34	33 14:47 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	14:16 (WEA-5 E-160)	08:09	07:14	07:03	06:00
	16:36	31 14:47 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	14:16 (WEA-5 E-160)	08:07	07:12	07:01	05:58
	16:37	31 14:47 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	14:17 (WEA-5 E-160)	08:06	07:09	06:59	05:56
	16:38	30 14:47 (WEA-5 E-160)	17:29	18:20	20:13	21:04
7	08:39	14:18 (WEA-5 E-160)	08:04	07:07	06:56	05:54
	16:39	29 14:47 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	14:18 (WEA-5 E-160)	08:02	07:05	06:54	05:53
	16:41	28 14:46 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	14:20 (WEA-5 E-160)	08:00	07:03	06:52	05:51
	16:42	27 14:47 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10	08:37	14:21 (WEA-5 E-160)	07:59	07:01	06:50	05:49
	16:43	25 14:46 (WEA-5 E-160)	17:36	18:27	20:20	21:10
11	08:37	14:22 (WEA-5 E-160)	07:57	06:58	06:47	05:48
	16:45	24 14:46 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	14:24 (WEA-5 E-160)	07:55	06:56	06:45	05:46
	16:46	22 14:46 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:35	14:25 (WEA-5 E-160)	07:53	06:54	06:43	05:44
	16:48	20 14:45 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14	08:35	14:27 (WEA-5 E-160)	07:51	06:51	06:41	05:43
	16:49	17 14:44 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	14:29 (WEA-5 E-160)	07:49	06:49	06:39	05:41
	16:51	13 14:42 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	14:33 (WEA-5 E-160)	07:47	06:47	06:36	05:40
	16:52	6 14:39 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32		07:45	06:45	06:34	05:38
	16:54		17:49	18:39	20:32	21:21
18	08:31		07:43	06:42	06:32	05:37
	16:55		17:51	18:41	20:34	21:23
19	08:30		07:41	06:40	06:30	05:35
	16:57		17:53	18:43	20:35	21:24
20	08:29		07:39	06:38	06:28	05:34
	16:59		17:55	18:45	20:37	21:26
21	08:28		07:37	06:35	06:26	05:33
	17:00		17:57	18:46	20:39	21:27
22	08:27		07:35	06:33	06:24	05:31
	17:02		17:59	18:48	20:41	21:28
23	08:26		07:33	06:31	06:22	05:30
	17:04		18:00	18:50	20:42	21:30
24	08:25		07:31	06:28	06:19	05:29
	17:06		18:02	18:51	20:44	21:31
25	08:23		07:29	06:26	06:17	05:28
	17:07		18:04	18:53	20:46	21:33
26	08:22		07:27	06:24	06:15	05:26
	17:09		18:06	18:55	20:47	21:34
27	08:21		07:25	06:22	06:13	05:25
	17:11		18:08	18:56	20:49	21:35
28	08:19		07:23	06:19	06:11	05:24
	17:13		18:09	18:58	20:51	21:36
29	08:18			07:17	06:09	05:23
	17:14			20:00	20:52	21:38
30	08:17			07:15	06:07	05:22
	17:16			20:02	20:54	21:39
31	08:15			07:12		05:21
	17:18			20:03		21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	403				11	
Red.Sonnenscheinwahrsch.	0,20				0,41	
Reduktion Betriebsdauer	0,84				0,84	
Reduktion Windrichtung	0,68				0,70	
Gesamte Reduktion	0,11				0,24	
Met.wahrsch.Beschattung	45				3	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 62 - IP 62 Leblicher Straße 6

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember		
1	05:18	05:54	06:43	07:32	07:26	08:16	14:04 (WEA-5 E-160)	
	21:55	21:23	20:22	19:12	17:07	16:26	24 14:28 (WEA-5 E-160)	
2	05:18	05:55	06:45	07:34	07:27	08:18	14:04 (WEA-5 E-160)	
	21:55	21:22	20:19	19:10	17:05	16:26	25 14:29 (WEA-5 E-160)	
3	05:19	05:57	06:47	07:35	07:29	08:19	14:03 (WEA-5 E-160)	
	21:54	21:20	20:17	19:08	17:03	16:25	27 14:30 (WEA-5 E-160)	
4	05:20	05:58	06:48	07:37	07:31	08:21	14:03 (WEA-5 E-160)	
	21:54	21:18	20:15	19:06	17:01	16:25	28 14:31 (WEA-5 E-160)	
5	05:20	06:00	06:50	07:39	07:33	08:22	14:03 (WEA-5 E-160)	
	21:54	21:17	20:13	19:03	16:59	16:24	29 14:32 (WEA-5 E-160)	
6	05:21	06:02	06:51	07:40	07:35	08:23	14:03 (WEA-5 E-160)	
	21:53	21:15	20:10	19:01	16:58	16:24	30 14:33 (WEA-5 E-160)	
7	05:22	06:03	06:53	07:42	07:36	08:24	14:03 (WEA-5 E-160)	
	21:52	21:13	20:08	18:59	16:56	16:23	31 14:34 (WEA-5 E-160)	
8	05:23	06:05	06:55	07:44	07:38	08:26	14:03 (WEA-5 E-160)	
	21:52	21:11	20:06	18:57	16:54	16:23	31 14:34 (WEA-5 E-160)	
9	05:24	06:06	06:56	07:45	07:40	08:27	14:03 (WEA-5 E-160)	
	21:51	21:09	20:04	18:54	16:53	16:23	32 14:35 (WEA-5 E-160)	
10	05:25	06:08	06:58	07:47	07:42	08:28	14:04 (WEA-5 E-160)	
	21:50	21:08	20:01	18:52	16:51	16:22	32 14:36 (WEA-5 E-160)	
11	05:26	06:09	06:59	07:49	07:43	08:29	14:04 (WEA-5 E-160)	
	21:50	21:06	19:59	18:50	16:50	16:22	33 14:37 (WEA-5 E-160)	
12	05:27	06:11	07:01	07:51	07:45	08:30	14:04 (WEA-5 E-160)	
	21:49	21:04	19:57	18:48	16:48	16:22	34 14:38 (WEA-5 E-160)	
13	05:28	06:13	07:03	07:52	07:47	08:31	14:04 (WEA-5 E-160)	
	21:48	21:02	19:54	18:45	16:46	16:22	34 14:38 (WEA-5 E-160)	
14	05:29	06:14	07:04	07:54	07:49	08:32	14:04 (WEA-5 E-160)	
	21:47	21:00	19:52	18:43	16:45	16:22	35 14:39 (WEA-5 E-160)	
15	05:31	06:16	07:06	07:56	07:50	08:33	14:05 (WEA-5 E-160)	
	21:46	20:58	19:50	18:41	16:44	16:22	34 14:39 (WEA-5 E-160)	
16	05:32	06:17	07:08	07:57	07:52	08:34	14:04 (WEA-5 E-160)	
	21:45	20:56	19:47	18:39	16:42	16:22	35 14:39 (WEA-5 E-160)	
17	05:33	06:19	07:09	07:59	07:54	08:35	14:05 (WEA-5 E-160)	
	21:44	20:54	19:45	18:37	16:41	16:23	35 14:40 (WEA-5 E-160)	
18	05:34	06:21	07:11	08:01	07:56	08:35	14:05 (WEA-5 E-160)	
	21:43	20:52	19:43	18:35	16:40	16:23	36 14:41 (WEA-5 E-160)	
19	05:35	06:22	07:12	08:03	07:57	08:36	14:06 (WEA-5 E-160)	
	21:42	20:50	19:40	18:33	16:38	16:23	36 14:42 (WEA-5 E-160)	
20	05:37	06:24	07:14	08:04	07:59	08:37	14:06 (WEA-5 E-160)	
	21:41	20:48	19:38	18:30	16:37	16:23	35 14:41 (WEA-5 E-160)	
21	05:38	06:26	07:16	08:06	08:01	08:37	14:07 (WEA-5 E-160)	
	21:39	20:46	19:36	18:28	16:36	16:24	35 14:42 (WEA-5 E-160)	
22	05:39	06:27	07:17	08:08	08:02	08:38	14:07 (WEA-5 E-160)	
	21:38	20:44	19:33	18:26	16:35	16:24	35 14:42 (WEA-5 E-160)	
23	05:41	06:29	07:19	08:10	08:04	08:38	14:08 (WEA-5 E-160)	
	21:37	20:41	19:31	18:24	16:34	16:25	35 14:43 (WEA-5 E-160)	
24	05:42	06:30	06:59 (WEA_Heid2)	07:21	08:11	08:06	08:39	14:08 (WEA-5 E-160)
	21:35	20:39	2 07:01 (WEA_Heid2)	19:29	18:22	16:33	16:25	36 14:44 (WEA-5 E-160)
25	05:44	06:32	06:59 (WEA_Heid2)	07:22	07:13	08:07	08:39	14:08 (WEA-5 E-160)
	21:34	20:37	5 07:04 (WEA_Heid2)	19:26	17:20	16:32	16:26	36 14:44 (WEA-5 E-160)
26	05:45	06:34	07:00 (WEA_Heid2)	07:24	07:15	08:09	08:39	14:09 (WEA-5 E-160)
	21:33	20:35	3 07:03 (WEA_Heid2)	19:24	17:18	16:31	6 14:17 (WEA-5 E-160)	
27	05:46	06:35	07:02 (WEA_Heid2)	07:25	07:17	08:10	14:09 (WEA-5 E-160)	
	21:31	20:33	2 07:04 (WEA_Heid2)	19:22	17:16	16:30	12 14:21 (WEA-5 E-160)	
28	05:48	06:37	07:27	07:18	08:12	14:07 (WEA-5 E-160)	08:40	14:11 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	17 14:24 (WEA-5 E-160)	16:28	34 14:45 (WEA-5 E-160)
29	05:49	06:38	07:29	07:20	08:13	14:05 (WEA-5 E-160)	08:40	14:11 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	20 14:25 (WEA-5 E-160)	16:29	35 14:46 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	14:05 (WEA-5 E-160)	08:40	14:12 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	22 14:27 (WEA-5 E-160)	16:30	34 14:46 (WEA-5 E-160)
31	05:52	06:42	07:31	07:24	08:16	14:06 (WEA-5 E-160)	08:40	14:12 (WEA-5 E-160)
	21:25	20:24	19:13	17:08	16:25	16:31	34 14:46 (WEA-5 E-160)	
Sonnenscheinstunden	501	453	381	332	267	244	1020	
astr. max. mögl. Beschattung		12			77			
Red. Sonnenscheinwahrsch.		0,43			0,23		0,15	
Reduktion Betriebsdauer		0,84			0,84		0,84	
Reduktion Windrichtung		0,70			0,68		0,68	
Gesamte Reduktion		0,25			0,13		0,08	
Met. wahrsch. Beschattung		3			10		85	

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 63/1 - IP 63/1 Leblicher Straße 8

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	14:44 (WEA-5 E-160)	08:14	07:20		07:10		06:06	05:20		
	16:32	39 15:23 (WEA-5 E-160)	17:20	18:11		20:05		20:56	21:41		
2	08:40	14:45 (WEA-5 E-160)	08:12	07:18		07:08	07:42 (WEA-HS4)	06:04	05:20		
	16:33	38 15:23 (WEA-5 E-160)	17:22	18:13	4	20:07	07:46 (WEA-HS4)	20:57	21:42		
3	08:40	14:45 (WEA-5 E-160)	08:10	07:16		07:05	07:39 (WEA-HS4)	06:02	05:19		
	16:34	39 15:24 (WEA-5 E-160)	17:24	18:15	8	20:08	07:47 (WEA-HS4)	20:59	21:43		
4	08:40	14:46 (WEA-5 E-160)	08:09	07:14		07:03	07:37 (WEA-HS4)	06:00	05:18		
	16:36	39 15:25 (WEA-5 E-160)	17:25	18:17	11	20:10	07:48 (WEA-HS4)	21:01	21:44		
5	08:40	14:46 (WEA-5 E-160)	08:07	07:12		07:01	07:35 (WEA-HS4)	05:58	05:17		
	16:37	39 15:25 (WEA-5 E-160)	17:27	18:18	14	20:12	07:49 (WEA-HS4)	21:02	21:45		
6	08:39	14:47 (WEA-5 E-160)	08:05	07:09		06:59	07:33 (WEA-HS4)	05:56	05:17		
	16:38	39 15:26 (WEA-5 E-160)	17:29	18:20	16	20:13	07:49 (WEA-HS4)	21:04	21:46		
7	08:39	14:47 (WEA-5 E-160)	08:04	07:07		06:56	07:30 (WEA-HS4)	05:54	05:16		
	16:39	39 15:26 (WEA-5 E-160)	17:31	18:22	19	20:15	07:49 (WEA-HS4)	21:06	21:47		
8	08:38	14:47 (WEA-5 E-160)	08:02	07:05		06:54	07:28 (WEA-HS4)	05:53	05:16		
	16:41	39 15:26 (WEA-5 E-160)	17:33	18:24	21	20:17	07:49 (WEA-HS4)	21:07	21:48		
9	08:38	14:48 (WEA-5 E-160)	08:00	07:03		06:52	07:29 (WEA-HS4)	05:51	05:15		
	16:42	39 15:27 (WEA-5 E-160)	17:35	18:25	19	20:19	07:48 (WEA-HS4)	21:09	21:49		
10	08:37	14:48 (WEA-5 E-160)	07:59	07:01		06:50	07:28 (WEA-HS4)	05:49	05:15		
	16:43	39 15:27 (WEA-5 E-160)	17:36	18:27	19	20:20	07:47 (WEA-HS4)	21:10	21:50		
11	08:37	14:48 (WEA-5 E-160)	07:57	06:58		06:47	07:21 (WEA_Heid7)	05:48	05:14		
	16:45	39 15:27 (WEA-5 E-160)	17:38	18:29	20	20:22	07:46 (WEA-HS4)	21:12	21:51		
12	08:36	14:50 (WEA-5 E-160)	07:55	06:56		06:45	07:19 (WEA_Heid7)	05:46	05:14		
	16:46	38 15:28 (WEA-5 E-160)	17:40	18:31	20	20:24	07:45 (WEA-HS4)	21:14	21:51		
13	08:35	14:50 (WEA-5 E-160)	07:53	06:54		06:43	07:17 (WEA_Heid7)	05:44	05:14		
	16:48	38 15:28 (WEA-5 E-160)	17:42	18:32	18	20:25	07:42 (WEA-HS4)	21:15	21:52		
14	08:35	14:51 (WEA-5 E-160)	07:51	06:51		06:41	07:14 (WEA_Heid7)	05:43	05:14		
	16:49	37 15:28 (WEA-5 E-160)	17:44	18:34	11	20:27	07:25 (WEA_Heid7)	21:17	21:52		
15	08:34	14:51 (WEA-5 E-160)	07:49	06:49		06:39	07:14 (WEA_Heid7)	05:41	05:13		
	16:51	38 15:29 (WEA-5 E-160)	17:46	18:36	10	20:29	07:24 (WEA_Heid7)	21:18	21:53		
16	08:33	14:52 (WEA-5 E-160)	07:47	06:47		06:36	07:15 (WEA_Heid7)	05:40	05:13		
	16:52	37 15:29 (WEA-5 E-160)	17:48	18:38	8	20:30	07:23 (WEA_Heid7)	21:20	21:54		
17	08:32	14:52 (WEA-5 E-160)	07:45	06:45		06:34	07:17 (WEA_Heid7)	05:38	05:13		
	16:54	37 15:29 (WEA-5 E-160)	17:49	18:39	3	20:32	07:20 (WEA_Heid7)	21:21	21:54		
18	08:31	14:53 (WEA-5 E-160)	07:43	06:42		06:32		05:37	05:13		
	16:55	36 15:29 (WEA-5 E-160)	17:51	18:41		20:34		21:23	21:54		
19	08:30	14:53 (WEA-5 E-160)	07:41	06:40		06:30		05:35	05:13		
	16:57	35 15:28 (WEA-5 E-160)	17:53	18:43		20:35		21:24	21:55		
20	08:29	14:54 (WEA-5 E-160)	07:39	06:38		06:28		05:34	05:13		
	16:59	34 15:28 (WEA-5 E-160)	17:55	18:45		20:37		21:26	21:55		
21	08:28	14:55 (WEA-5 E-160)	07:37	06:35		06:26	06:49 (WEA_Heid2)	05:33	05:13		
	17:00	33 15:28 (WEA-5 E-160)	17:57	18:46		20:39	06:51 (WEA_Heid2)	21:27	21:55		
22	08:27	14:57 (WEA-5 E-160)	07:35	06:33		06:24	06:47 (WEA_Heid2)	05:31	05:14		
	17:02	31 15:28 (WEA-5 E-160)	17:59	18:48		20:41	06:51 (WEA_Heid2)	21:28	21:56		
23	08:26	14:57 (WEA-5 E-160)	07:33	06:31		06:22	06:45 (WEA_Heid2)	05:30	05:14		
	17:04	30 15:27 (WEA-5 E-160)	18:00	18:50		20:42	06:50 (WEA_Heid2)	21:30	21:56		
24	08:25	14:59 (WEA-5 E-160)	07:31	06:28		06:19	06:43 (WEA_Heid2)	05:29	05:14		
	17:06	28 15:27 (WEA-5 E-160)	18:02	18:51	2	20:44	06:53 (WEA_Heid3)	21:31	21:56		
25	08:23	15:00 (WEA-5 E-160)	07:29	06:26		06:17	06:49 (WEA_Heid3)	05:28	05:14		
	17:07	26 15:26 (WEA-5 E-160)	18:04	18:53	3	20:46	06:52 (WEA_Heid3)	21:33	21:56		
26	08:22	15:01 (WEA-5 E-160)	07:27	06:24		06:15		05:26	05:15		
	17:09	24 15:25 (WEA-5 E-160)	18:06	18:55		20:47		21:34	21:56		
27	08:21	15:04 (WEA-5 E-160)	07:25	06:22		06:13		05:25	05:15		
	17:11	20 15:24 (WEA-5 E-160)	18:08	18:56		20:49		21:35	21:56		
28	08:19	15:06 (WEA-5 E-160)	07:23	06:19		06:11		05:24	05:16		
	17:13	15 15:21 (WEA-5 E-160)	18:09	18:58		20:51		21:36	21:56		
29	08:18	15:10 (WEA-5 E-160)		07:17		06:09		05:23	05:16		
	17:14	9 15:19 (WEA-5 E-160)		20:00		20:52		21:38	21:56		
30	08:17			07:15		06:07		05:22	05:17		
	17:16			20:02		20:54		21:39	21:55		
31	08:15			07:12				05:21			
	17:18			20:03				21:40			
Sonnenscheinstunden	259		278	367		416		485	498		
astr.max.mögl.Beschattung	974			226		17					
Red.Sonnenscheinwahrsch.	0,20			0,30		0,41					
Reduktion Betriebsdauer	0,84			0,84		0,84					
Reduktion Windrichtung	0,69			0,63		0,70					
Gesamte Reduktion	0,12			0,16		0,24					
Met.wahrsch.Beschattung	112			36		4					

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 63/1 - IP 63/1 Leblicher Straße 8

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
2	21:55	21:23	20:22	19:12	17:07	16:26
3	05:19	05:57	06:47	07:35	08:00	08:19
4	21:54	21:20	20:17	19:08	18:04	16:25
5	05:20	05:58	06:48	07:37	08:06	08:20
6	21:54	21:18	20:15	19:06	18:25	16:25
7	05:21	06:02	06:51	07:40	08:05	08:22
8	21:53	21:15	20:10	19:01	18:26	16:24
9	05:22	06:03	06:53	07:42	08:07	08:24
10	21:52	21:13	20:08	18:59	18:25	16:23
11	05:23	06:05	06:55	07:44	08:09	08:26
12	21:52	21:11	20:06	18:57	18:24	16:23
13	05:24	06:06	06:56	07:45	08:11	08:27
14	21:51	21:09	20:04	18:54	18:24	16:23
15	05:25	06:08	06:58	07:47	08:13	08:28
16	21:50	21:08	20:01	18:52	18:23	16:22
17	05:26	06:09	06:59	07:49	08:14	08:29
18	21:50	21:06	19:59	18:50	18:21	16:22
19	05:27	06:11	07:01	07:51	08:16	08:30
20	21:49	21:04	19:57	18:48	18:19	16:22
21	05:28	06:13	07:03	07:52	07:47	08:31
22	21:48	21:02	19:54	18:45	18:45	16:22
23	05:29	06:14	07:04	07:54	07:49	08:32
24	21:47	21:00	19:52	18:43	16:45	16:22
25	05:31	06:16	07:06	07:56	07:50	08:33
26	21:46	20:58	19:50	18:41	16:44	16:22
27	05:32	06:17	07:08	07:57	07:52	08:34
28	21:45	20:56	19:47	18:39	16:42	16:22
29	05:33	06:19	07:09	07:59	07:54	08:35
30	21:44	20:54	19:45	18:37	16:41	16:23
31	05:34	06:21	07:11	08:01	07:56	08:35
32	21:43	20:52	19:43	18:35	16:40	16:23
33	05:35	06:22	07:12	08:03	07:57	08:36
34	21:42	20:50	19:40	18:32	16:38	16:23
35	05:37	06:24	07:14	08:04	07:59	08:37
36	21:41	20:48	19:38	18:30	16:37	16:23
37	05:38	06:26	07:16	08:06	08:01	08:37
38	21:39	20:46	19:36	18:28	16:36	16:24
39	05:39	06:27	07:17	08:08	08:02	08:38
40	21:38	20:44	19:33	18:26	16:35	16:24
41	05:41	06:29	07:19	08:10	08:04	08:38
42	21:37	20:41	19:31	18:24	16:34	16:25
43	05:42	06:30	07:21	08:11	08:06	08:39
44	21:35	20:39	19:29	18:22	16:33	16:25
45	05:44	06:32	07:22	07:13	08:07	08:39
46	21:34	20:37	19:26	17:20	16:32	16:26
47	05:45	06:34	07:24	07:15	08:09	08:39
48	21:33	20:35	19:24	17:18	16:31	16:27
49	05:46	06:35	07:25	07:17	08:10	08:40
50	21:31	20:33	19:22	17:16	16:30	16:27
51	05:48	06:37	07:27	07:18	08:12	08:40
52	21:30	20:31	19:19	17:14	16:29	16:28
53	05:49	06:38	07:29	07:20	08:13	08:40
54	21:28	20:28	19:17	17:12	16:28	16:29
55	05:51	06:40	07:30	07:22	08:15	08:40
56	21:27	20:26	19:15	17:10	16:27	16:30
57	05:52	06:42		07:24	15:09	08:40
58	21:25	20:24		17:08		16:31
59	Sonnenscheinstunden	501	453	381	267	244
60	astr.max.mögl.Beschattung		16		182	1188
61	Red.Sonnenscheinwahrsch.		0,43		0,32	0,15
62	Reduktion Betriebsdauer		0,84		0,84	0,84
63	Reduktion Windrichtung		0,70		0,62	0,69
64	Gesamte Reduktion		0,25		0,17	0,09
65	Met.wahrsch.Beschattung		4		30	103

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 64 - IP 64 Leblicher Straße 17

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	15:38 (WEA-5 E-160)	07:20	07:10	06:06
2	08:40	08:12	15:38 (WEA-5 E-160)	07:18	06:04	06:35 (WEA_Heid2)
3	08:40	08:10	15:38 (WEA-5 E-160)	07:16	06:02	06:28 (WEA_Heid2)
4	08:40	08:09	15:38 (WEA-5 E-160)	07:14	06:00	06:34 (WEA_Heid2)
5	08:39	08:07	15:40 (WEA-5 E-160)	07:12	05:58	06:26 (WEA_Heid2)
6	08:39	08:05	15:40 (WEA-5 E-160)	07:09	05:56	06:31 (WEA_Heid2)
7	08:39	08:04	15:41 (WEA-5 E-160)	07:07	05:54	06:30 (WEA_Heid2)
8	08:38	08:02	15:42 (WEA-5 E-160)	07:05	05:53	06:30 (WEA_Heid2)
9	08:38	08:00	15:43 (WEA-5 E-160)	07:03	05:51	06:30 (WEA_Heid2)
10	08:37	07:58	15:44 (WEA-5 E-160)	07:00	05:49	06:30 (WEA_Heid2)
11	08:37	07:57	15:46 (WEA-5 E-160)	06:58	05:48	06:30 (WEA_Heid2)
12	08:36	07:55	15:48 (WEA-5 E-160)	06:56	05:46	06:30 (WEA_Heid2)
13	08:35	07:53	15:51 (WEA-5 E-160)	06:54	05:44	06:30 (WEA_Heid2)
14	08:35	07:51	15:57 (WEA-5 E-160)	06:51	05:43	06:30 (WEA_Heid2)
15	08:34	07:49	16:00 (WEA-5 E-160)	06:49	05:41	06:30 (WEA_Heid2)
16	08:33	07:47	16:09 (WEA-5 E-160)	06:47	05:40	06:30 (WEA_Heid2)
17	08:32	07:45	16:11 (WEA-5 E-160)	06:45	05:38	06:30 (WEA_Heid2)
18	08:31	07:43	16:13 (WEA-5 E-160)	06:43	05:37	06:30 (WEA_Heid2)
19	08:30	07:41	16:14 (WEA-5 E-160)	06:42	05:35	06:30 (WEA_Heid2)
20	08:29	07:39	16:15 (WEA-5 E-160)	06:41	05:34	06:30 (WEA_Heid2)
21	08:28	07:37	16:16 (WEA-5 E-160)	06:40	05:33	06:30 (WEA_Heid2)
22	08:27	07:35	16:17 (WEA-5 E-160)	06:39	05:31	06:30 (WEA_Heid2)
23	08:26	07:33	16:18 (WEA-5 E-160)	06:38	05:30	06:30 (WEA_Heid2)
24	08:25	07:31	16:19 (WEA-5 E-160)	06:37	05:29	06:30 (WEA_Heid2)
25	08:23	07:29	16:20 (WEA-5 E-160)	06:36	05:28	06:30 (WEA_Heid2)
26	08:22	07:27	16:21 (WEA-5 E-160)	06:35	05:27	06:30 (WEA_Heid2)
27	08:21	07:25	16:22 (WEA-5 E-160)	06:34	05:26	06:30 (WEA_Heid2)
28	08:19	07:23	16:23 (WEA-5 E-160)	06:33	05:25	06:30 (WEA_Heid2)
29	08:18	07:21	16:24 (WEA-5 E-160)	06:32	05:24	06:30 (WEA_Heid2)
30	08:17	07:19	16:25 (WEA-5 E-160)	06:31	05:23	06:30 (WEA_Heid2)
31	08:15	07:17	16:26 (WEA-5 E-160)	06:30	05:22	06:30 (WEA_Heid2)
31	08:15	07:15	16:27 (WEA-5 E-160)	06:29	05:21	06:30 (WEA_Heid2)
31	08:15	07:13	16:28 (WEA-5 E-160)	06:28	05:20	06:30 (WEA_Heid2)
31	08:15	07:11	16:29 (WEA-5 E-160)	06:27	05:19	06:30 (WEA_Heid2)
31	08:15	07:09	16:30 (WEA-5 E-160)	06:26	05:18	06:30 (WEA_Heid2)
31	08:15	07:07	16:31 (WEA-5 E-160)	06:25	05:17	06:30 (WEA_Heid2)
31	08:15	07:05	16:32 (WEA-5 E-160)	06:24	05:16	06:30 (WEA_Heid2)
31	08:15	07:03	16:33 (WEA-5 E-160)	06:23	05:15	06:30 (WEA_Heid2)
31	08:15	07:01	16:34 (WEA-5 E-160)	06:22	05:14	06:30 (WEA_Heid2)
31	08:15	06:59	16:35 (WEA-5 E-160)	06:21	05:13	06:30 (WEA_Heid2)
31	08:15	06:57	16:36 (WEA-5 E-160)	06:20	05:12	06:30 (WEA_Heid2)
31	08:15	06:55	16:37 (WEA-5 E-160)	06:19	05:11	06:30 (WEA_Heid2)
31	08:15	06:53	16:38 (WEA-5 E-160)	06:18	05:10	06:30 (WEA_Heid2)
31	08:15	06:51	16:39 (WEA-5 E-160)	06:17	05:09	06:30 (WEA_Heid2)
31	08:15	06:49	16:40 (WEA-5 E-160)	06:16	05:08	06:30 (WEA_Heid2)
31	08:15	06:47	16:41 (WEA-5 E-160)	06:15	05:07	06:30 (WEA_Heid2)
31	08:15	06:45	16:42 (WEA-5 E-160)	06:14	05:06	06:30 (WEA_Heid2)
31	08:15	06:43	16:43 (WEA-5 E-160)	06:13	05:05	06:30 (WEA_Heid2)
31	08:15	06:41	16:44 (WEA-5 E-160)	06:12	05:04	06:30 (WEA_Heid2)
31	08:15	06:39	16:45 (WEA-5 E-160)	06:11	05:03	06:30 (WEA_Heid2)
31	08:15	06:37	16:46 (WEA-5 E-160)	06:10	05:02	06:30 (WEA_Heid2)
31	08:15	06:35	16:47 (WEA-5 E-160)	06:09	05:01	06:30 (WEA_Heid2)
31	08:15	06:33	16:48 (WEA-5 E-160)	06:08	05:00	06:30 (WEA_Heid2)
31	08:15	06:31	16:49 (WEA-5 E-160)	06:07	04:59	06:30 (WEA_Heid2)
31	08:15	06:29	16:50 (WEA-5 E-160)	06:06	04:58	06:30 (WEA_Heid2)
31	08:15	06:27	16:51 (WEA-5 E-160)	06:05	04:57	06:30 (WEA_Heid2)
31	08:15	06:25	16:52 (WEA-5 E-160)	06:04	04:56	06:30 (WEA_Heid2)
31	08:15	06:23	16:53 (WEA-5 E-160)	06:03	04:55	06:30 (WEA_Heid2)
31	08:15	06:21	16:54 (WEA-5 E-160)	06:02	04:54	06:30 (WEA_Heid2)
31	08:15	06:19	16:55 (WEA-5 E-160)	06:01	04:53	06:30 (WEA_Heid2)
31	08:15	06:17	16:56 (WEA-5 E-160)	06:00	04:52	06:30 (WEA_Heid2)
31	08:15	06:15	16:57 (WEA-5 E-160)	05:59	04:51	06:30 (WEA_Heid2)
31	08:15	06:13	16:58 (WEA-5 E-160)	05:58	04:50	06:30 (WEA_Heid2)
31	08:15	06:11	16:59 (WEA-5 E-160)	05:57	04:49	06:30 (WEA_Heid2)
31	08:15	06:09	17:00 (WEA-5 E-160)	05:56	04:48	06:30 (WEA_Heid2)
31	08:15	06:07	17:01 (WEA-5 E-160)	05:55	04:47	06:30 (WEA_Heid2)
31	08:15	06:05	17:02 (WEA-5 E-160)	05:54	04:46	06:30 (WEA_Heid2)
31	08:15	06:03	17:03 (WEA-5 E-160)	05:53	04:45	06:30 (WEA_Heid2)
31	08:15	06:01	17:04 (WEA-5 E-160)	05:52	04:44	06:30 (WEA_Heid2)
31	08:15	05:59	17:05 (WEA-5 E-160)	05:51	04:43	06:30 (WEA_Heid2)
31	08:15	05:57	17:06 (WEA-5 E-160)	05:50	04:42	06:30 (WEA_Heid2)
31	08:15	05:55	17:07 (WEA-5 E-160)	05:49	04:41	06:30 (WEA_Heid2)
31	08:15	05:53	17:08 (WEA-5 E-160)	05:48	04:40	06:30 (WEA_Heid2)
31	08:15	05:51	17:09 (WEA-5 E-160)	05:47	04:39	06:30 (WEA_Heid2)
31	08:15	05:49	17:10 (WEA-5 E-160)	05:46	04:38	06:30 (WEA_Heid2)
31	08:15	05:47	17:11 (WEA-5 E-160)	05:45	04:37	06:30 (WEA_Heid2)
31	08:15	05:45	17:12 (WEA-5 E-160)	05:44	04:36	06:30 (WEA_Heid2)
31	08:15	05:43	17:13 (WEA-5 E-160)	05:43	04:35	06:30 (WEA_Heid2)
31	08:15	05:41	17:14 (WEA-5 E-160)	05:42	04:34	06:30 (WEA_Heid2)
31	08:15	05:39	17:15 (WEA-5 E-160)	05:41	04:33	06:30 (WEA_Heid2)
31	08:15	05:37	17:16 (WEA-5 E-160)	05:40	04:32	06:30 (WEA_Heid2)
31	08:15	05:35	17:17 (WEA-5 E-160)	05:39	04:31	06:30 (WEA_Heid2)
31	08:15	05:33	17:18 (WEA-5 E-160)	05:38	04:30	06:30 (WEA_Heid2)
31	08:15	05:31	17:19 (WEA-5 E-160)	05:37	04:29	06:30 (WEA_Heid2)
31	08:15	05:29	17:20 (WEA-5 E-160)	05:36	04:28	06:30 (WEA_Heid2)
31	08:15	05:27	17:21 (WEA-5 E-160)	05:35	04:27	06:30 (WEA_Heid2)
31	08:15	05:25	17:22 (WEA-5 E-160)	05:34	04:26	06:30 (WEA_Heid2)
31	08:15	05:23	17:23 (WEA-5 E-160)	05:33	04:25	06:30 (WEA_Heid2)
31	08:15	05:21	17:24 (WEA-5 E-160)	05:32	04:24	06:30 (WEA_Heid2)
31	08:15	05:19	17:25 (WEA-5 E-160)	05:31	04:23	06:30 (WEA_Heid2)
31	08:15	05:17	17:26 (WEA-5 E-160)	05:30	04:22	06:30 (WEA_Heid2)
31	08:15	05:15	17:27 (WEA-5 E-160)	05:29	04:21	06:30 (WEA_Heid2)
31	08:15	05:13	17:28 (WEA-5 E-160)	05:28	04:20	06:30 (WEA_Heid2)
31	08:15	05:11	17:29 (WEA-5 E-160)	05:27	04:19	06:30 (WEA_Heid2)
31	08:15	05:09	17:30 (WEA-5 E-160)	05:26	04:18	06:30 (WEA_Heid2)
31	08:15	05:07	17:31 (WEA-5 E-160)	05:25	04:17	06:30 (WEA_Heid2)
31	08:15	05:05	17:32 (WEA-5 E-160)	05:24	04:16	06:30 (WEA_Heid2)
31	08:15	05:03	17:33 (WEA-5 E-160)	05:23	04:15	06:30 (WEA_Heid2)
31	08:15	05:01	17:34 (WEA-5 E-160)	05:22	04:14	06:30 (WEA_Heid2)
31	08:15	04:59	17:35 (WEA-5 E-160)	05:21	04:13	06:30 (WEA_Heid2)
31	08:15	04:57	17:36 (WEA-5 E-160)	05:20	04:12	06:30 (WEA_Heid2)
31	08:15	04:55	17:37 (WEA-5 E-160)	05:19	04:11	06:30 (WEA_Heid2)
31	08:15	04:53	17:38 (WEA-5 E-160)	05:18	04:10	06:30 (WEA_Heid2)
31	08:15	04:51	17:39 (WEA-5 E-160)	05:17	04:09	06:30 (WEA_Heid2)
31	08:15	04:49	17:40 (WEA-5 E-160)	05:16	04:08	06:30 (WEA_Heid2)
31	08:15	04:47	17:41 (WEA-5 E-160)	05:15	04:07	06:30 (WEA_Heid2)
31	08:15	04:45	17:42 (WEA-5 E-160)	05:14	04:06	06:30 (WEA_Heid2)
31	08:15	04:43	17:43 (WEA-5 E-160)	05:13	04:05	06:30 (WEA_Heid2)
31	08:15	04:41	17:44 (WEA-5 E-160)	05:12	04:04	06:30 (WEA_Heid2)
31	08:15	04:39	17:45 (WEA-5 E-160)	05:11	04:03	06:30 (WEA_Heid2)
31	08:15	04:37	17:46 (WEA-5 E-160)	05:10	04:02	06:30 (WEA_Heid2)
31	08:15	04:35	17:47 (WEA-5 E-160)	05:09	04:01	06:30 (WEA_Heid2)
31	08:15	04:33	17:48 (WEA-5 E-160)	05:08	04:00	06:30 (WEA_Heid2)
31	08:15	04:31	17:49 (WEA-5 E-160)	05:07	03:59	06:30 (WEA_Heid2)
31	08:15	04:29	17:50 (WEA-5 E-160)	05:06	03:58	06:30 (WEA_Heid2)
31	08:15	04:27	17:51 (WEA-5 E-160)	05:05	03:57	06:30 (WEA_Heid2)
31	08:15	04:25	17:52 (WEA-5 E-160)	05:04	03:56	06:30 (WEA_Heid2)
31	08:15	04:23	17:53 (WEA-5 E-160)	05:03	03:55	06:30 (WEA_Heid2)
31	08:15	04:21	17:54 (WEA-5 E-160)	05:02	03:54	06:30 (WEA_Heid2)
31	08:15	04:19	17:55 (WEA-5 E-160)	05:01	03:53	06:30 (WEA_Heid2)
31	08:15	04:17	17:56 (WEA-5 E-160)	05:00	03:52	06:30 (WEA_Heid2)
31	08:15	04:15	17:57 (WEA-5 E-160)	04:59	03:51	06:30 (WEA_Heid2)
31	08:15	04:13	17:58 (WEA-5 E-160)	04:58	03:50	06:30 (WEA_Heid2)
31	08:15	04:11	17:59 (WEA-5 E-160)	04:57	03:49	06:30 (WEA_Heid2)
31	08:15	04:09	18:00 (WEA-5 E-160)	04:56	03:48	06:30 (WEA_Heid2)
31	08:15	04:07	18:01 (WEA-5 E-160)	04:55	03:47	06:30 (WEA_Heid2)
31	08:15	04:05	18:02 (WEA-5 E-160)	04:54	03:46	06:30 (WEA_Heid2)
31	08:15	04:03	18:03 (WEA-5 E-160)	04:53	03:45	06:30 (WEA_Heid2)
31	08:15	04:01	18:04 (WEA-			

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 64 - IP 64 Leblicher Straße 17

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember					
1	05:18	05:54	06:43	07:32	07:57 (WEA-Heid2)	07:26	15:13 (WEA-5 E-160)	08:16	15:26 (WEA-5 E-160)		
	21:55	21:23	20:22	19:12	19:12	17:07	28	15:41 (WEA-5 E-160)	16:26	13	15:39 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34	07:59 (WEA-Heid2)	07:27	15:12 (WEA-5 E-160)	08:18	15:29 (WEA-5 E-160)		
	21:55	21:22	20:19	19:10	19:10	17:05	30	15:42 (WEA-5 E-160)	16:26	8	15:37 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35	08:00 (WEA-Heid2)	07:29	15:11 (WEA-5 E-160)	08:19	15:25 (WEA-5 E-160)		
	21:54	21:20	20:17	19:08	19:08	17:03	32	15:43 (WEA-5 E-160)	16:25		
4	05:20	05:58	06:48	07:37	08:02 (WEA-Heid2)	07:31	15:11 (WEA-5 E-160)	08:20	15:24 (WEA-5 E-160)		
	21:54	21:18	20:15	19:06	19:06	17:01	33	15:44 (WEA-5 E-160)	16:25		
5	05:20	06:00	06:50	07:39	08:04 (WEA-Heid2)	07:33	15:10 (WEA-5 E-160)	08:22	15:23 (WEA-5 E-160)		
	21:54	21:17	20:13	19:03	19:03	16:59	35	15:45 (WEA-5 E-160)	16:24		
6	05:21	06:02	06:51	07:40	08:06 (WEA-Heid2)	07:34	15:09 (WEA-5 E-160)	08:23	15:22 (WEA-5 E-160)		
	21:53	21:15	20:10	19:01	19:01	16:58	36	15:45 (WEA-5 E-160)	16:24		
7	05:22	06:03	06:53	07:42	08:08 (WEA-Heid2)	07:36	15:09 (WEA-5 E-160)	08:24	15:21 (WEA-5 E-160)		
	21:52	21:13	20:08	18:59	18:59	16:56	37	15:46 (WEA-5 E-160)	16:23		
8	05:23	06:05	06:55	07:44	08:10 (WEA-Heid2)	07:38	15:09 (WEA-5 E-160)	08:26	15:20 (WEA-5 E-160)		
	21:52	21:11	20:06	18:57	18:57	16:54	37	15:46 (WEA-5 E-160)	16:23		
9	05:24	06:06	06:56	07:45	08:16 (WEA-Heid2)	07:40	15:09 (WEA-5 E-160)	08:27	15:19 (WEA-5 E-160)		
	21:51	21:09	5 06:41 (WEA_Heid2)	18:54	18:54	16:53	38	15:47 (WEA-5 E-160)	16:23		
10	05:25	06:08	06:58	07:47	08:17 (WEA-Heid2)	07:42	15:09 (WEA-5 E-160)	08:28	15:18 (WEA-5 E-160)		
	21:50	21:08	7 06:43 (WEA_Heid2)	18:52	18:52	16:51	38	15:47 (WEA-5 E-160)	16:22		
11	05:26	06:09	06:59	07:49	08:18 (WEA-Heid2)	07:43	15:09 (WEA-5 E-160)	08:29	15:17 (WEA-5 E-160)		
	21:50	21:06	6 06:43 (WEA_Heid2)	18:50	18:50	16:50	38	15:47 (WEA-5 E-160)	16:22		
12	05:27	06:11	07:01	07:51	08:19 (WEA-Heid2)	07:45	15:09 (WEA-5 E-160)	08:30	15:16 (WEA-5 E-160)		
	21:49	21:04	4 06:43 (WEA_Heid2)	18:48	18:48	16:48	38	15:47 (WEA-5 E-160)	16:22		
13	05:28	06:13	07:03	07:52	08:20 (WEA-Heid2)	07:47	15:08 (WEA-5 E-160)	08:31	15:15 (WEA-5 E-160)		
	21:48	21:02	2 06:42 (WEA_Heid2)	18:45	18:45	16:46	38	15:46 (WEA-5 E-160)	16:22		
14	05:29	06:14	07:04	07:54	08:21 (WEA-Heid2)	07:49	15:09 (WEA-5 E-160)	08:32	15:14 (WEA-5 E-160)		
	21:47	21:00	19:52	3 07:33 (WEA_Heid3)	18:43	16:45	38	15:47 (WEA-5 E-160)	16:22		
15	05:31	06:16	07:06	07:56	08:22 (WEA-Heid2)	07:50	15:09 (WEA-5 E-160)	08:33	15:13 (WEA-5 E-160)		
	21:46	20:58	19:50	1 07:32 (WEA_Heid3)	18:41	16:44	38	15:47 (WEA-5 E-160)	16:22		
16	05:32	06:17	07:08	07:57	08:23 (WEA-Heid2)	07:52	15:10 (WEA-5 E-160)	08:34	15:12 (WEA-5 E-160)		
	21:45	20:56	19:47	18:39	18:39	16:42	37	15:47 (WEA-5 E-160)	16:22		
17	05:33	06:19	07:09	07:59	08:24 (WEA-Heid2)	07:54	15:10 (WEA-5 E-160)	08:34	15:11 (WEA-5 E-160)		
	21:44	20:54	19:45	18:37	18:37	16:41	37	15:47 (WEA-5 E-160)	16:23		
18	05:34	06:21	07:11	8 07:45 (WEA_Heid7)	08:01	07:56	15:11 (WEA-5 E-160)	08:35	15:10 (WEA-5 E-160)		
	21:43	20:52	19:43	8 07:53 (WEA_Heid7)	18:35	16:40	36	15:47 (WEA-5 E-160)	16:23		
19	05:35	06:22	07:12	08:03	08:25 (WEA-Heid2)	07:57	15:12 (WEA-5 E-160)	08:36	15:09 (WEA-5 E-160)		
	21:42	20:50	19:40	11 07:54 (WEA_Heid7)	18:32	16:38	35	15:47 (WEA-5 E-160)	16:23		
20	05:37	06:24	07:14	08:04	08:26 (WEA-Heid2)	07:59	15:13 (WEA-5 E-160)	08:37	15:08 (WEA-5 E-160)		
	21:41	20:48	19:38	12 07:54 (WEA_Heid7)	18:30	16:37	34	15:47 (WEA-5 E-160)	16:23		
21	05:38	06:26	07:16	08:06	08:27 (WEA-Heid2)	08:01	15:13 (WEA-5 E-160)	08:37	15:07 (WEA-5 E-160)		
	21:39	20:46	19:36	13 07:55 (WEA_Heid7)	18:28	16:36	32	15:45 (WEA-5 E-160)	16:24		
22	05:39	06:27	07:17	08:08	08:28 (WEA-Heid2)	08:02	15:14 (WEA-5 E-160)	08:38	15:06 (WEA-5 E-160)		
	21:38	20:44	19:33	17 08:11 (WEA-Heid7)	18:26	16:35	31	15:45 (WEA-5 E-160)	16:24		
23	05:41	06:29	07:19	08:10	08:29 (WEA-Heid2)	08:04	15:15 (WEA-5 E-160)	08:38	15:05 (WEA-5 E-160)		
	21:37	20:41	19:31	22 08:14 (WEA-Heid7)	18:24	16:34	30	15:45 (WEA-5 E-160)	16:25		
24	05:42	06:30	07:21	08:11	08:30 (WEA-Heid2)	08:06	15:16 (WEA-5 E-160)	08:39	15:04 (WEA-5 E-160)		
	21:35	20:39	19:29	22 08:16 (WEA-Heid7)	18:22	16:33	29	15:45 (WEA-5 E-160)	16:25		
25	05:44	06:32	07:22	08:12	08:31 (WEA-Heid2)	08:07	15:18 (WEA-5 E-160)	08:39	15:03 (WEA-5 E-160)		
	21:34	20:37	19:26	21 08:17 (WEA-Heid7)	17:20	16:32	27	15:45 (WEA-5 E-160)	16:26		
26	05:45	06:34	07:24	08:13	08:32 (WEA-Heid2)	08:09	15:18 (WEA-5 E-160)	08:39	15:02 (WEA-5 E-160)		
	21:33	20:35	19:24	20 08:17 (WEA-Heid7)	17:18	16:31	25	15:43 (WEA-5 E-160)	16:27		
27	05:46	06:35	07:25	08:14	08:33 (WEA-Heid2)	08:10	15:20 (WEA-5 E-160)	08:40	15:01 (WEA-5 E-160)		
	21:31	20:33	19:22	22 08:17 (WEA-Heid7)	17:16	16:30	23	15:43 (WEA-5 E-160)	16:27		
28	05:48	06:37	07:27	08:15	08:34 (WEA-Heid2)	08:12	15:21 (WEA-5 E-160)	08:40	15:00 (WEA-5 E-160)		
	21:30	20:31	19:19	22 08:17 (WEA-Heid7)	17:14	8 15:32 (WEA-5 E-160)	22	15:43 (WEA-5 E-160)	16:28		
29	05:49	06:38	07:29	08:16	08:35 (WEA-Heid2)	08:13	15:19 (WEA-5 E-160)	08:40	15:00 (WEA-5 E-160)		
	21:28	20:28	19:17	22 08:17 (WEA-Heid7)	17:12	16 15:35 (WEA-5 E-160)	19	15:41 (WEA-5 E-160)	16:29		
30	05:51	06:40	07:30	08:18	08:36 (WEA-Heid2)	08:15	15:17 (WEA-5 E-160)	08:40	15:00 (WEA-5 E-160)		
	21:27	20:26	19:15	21 08:16 (WEA-Heid7)	17:10	21 15:38 (WEA-5 E-160)	15	15:40 (WEA-5 E-160)	16:30		
31	05:52	06:42	07:31	08:19	08:37 (WEA-Heid2)	08:16	15:15 (WEA-5 E-160)	08:40	15:00 (WEA-5 E-160)		
	21:25	20:24	19:14	20 08:17 (WEA-Heid7)	17:08	24 15:39 (WEA-5 E-160)	16	16:31	16:31		
Sonnenscheinstunden	501	453	381	332	267			244			
astr.max.mögl.Beschattung		24	241	137	966			21			
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23			0,15			
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84			0,84			
Reduktion Windrichtung		0,71	0,65	0,67	0,70			0,70			
Gesamte Reduktion		0,25	0,20	0,18	0,14			0,09			
Met.wahrsch.Beschattung		6	47	25	131			2			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 65 - IP 65 Leblicher Straße 10

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1	08:40	08:14	16:01 (WEA-5 E-160)	07:20	07:10	07:39 (WEA_Heid7)	06:06	05:20
2	16:32	17:20	32 16:33 (WEA-5 E-160)	18:11	20:05	12 07:51 (WEA_Heid7)	20:56	21:41
3	08:40	08:12	16:00 (WEA-5 E-160)	07:18	07:08	07:30 (WEA_Heid3)	06:04	05:20
4	16:33	17:22	33 16:33 (WEA-5 E-160)	18:13	20:07	11 07:48 (WEA_Heid7)	20:57	21:42
5	08:40	08:10	16:00 (WEA-5 E-160)	07:16	07:05	07:28 (WEA_Heid3)	06:02	05:19
6	16:34	17:24	35 16:34 (WEA-5 E-160)	18:15	20:08	9 07:46 (WEA_Heid7)	20:59	21:43
7	08:39	08:09	16:00 (WEA-5 E-160)	07:14	07:03	07:26 (WEA_Heid3)	06:00	05:18
8	16:36	17:25	36 16:34 (WEA-5 E-160)	18:17	20:10	4 07:30 (WEA_Heid3)	21:01	21:44
9	08:39	08:07	16:00 (WEA-5 E-160)	07:12	07:01		05:58	05:17
10	16:37	17:27	37 16:36 (WEA-5 E-160)	18:18	20:12		1 06:23 (WEA_Heid2)	21:45
11	08:39	08:05	16:00 (WEA-5 E-160)	07:09	06:59		06:21 (WEA_Heid2)	05:17
12	16:38	17:29	38 16:36 (WEA-5 E-160)	18:20	20:13		3 06:24 (WEA_Heid2)	21:46
13	08:39	08:04	16:00 (WEA-5 E-160)	07:07	06:56		06:19 (WEA_Heid2)	05:16
14	16:39	17:31	38 16:36 (WEA-5 E-160)	18:22	20:15		5 06:24 (WEA_Heid2)	21:47
15	08:38	08:02	16:00 (WEA-5 E-160)	07:05	06:54		06:18 (WEA_Heid2)	05:16
16	16:41	17:33	39 16:37 (WEA-5 E-160)	18:24	20:17		6 06:24 (WEA_Heid2)	21:48
17	08:38	08:00	16:00 (WEA-5 E-160)	07:03	06:52		06:16 (WEA_Heid2)	05:15
18	16:42	17:35	40 16:37 (WEA-5 E-160)	18:25	20:19		7 06:23 (WEA_Heid2)	21:49
19	08:37	07:58	16:00 (WEA-5 E-160)	07:00	06:50		06:17 (WEA_Heid2)	05:15
20	16:43	17:36	40 16:37 (WEA-5 E-160)	18:27	20:20		5 06:22 (WEA_Heid2)	21:50
21	08:37	07:57	16:00 (WEA-5 E-160)	06:58	06:47			05:14
22	16:45	17:38	40 16:38 (WEA-5 E-160)	18:29	20:22			21:51
23	08:36	07:55	16:00 (WEA-5 E-160)	06:56	06:45			05:14
24	16:46	17:40	40 16:38 (WEA-5 E-160)	18:31	20:24			21:51
25	08:35	07:53	16:00 (WEA-5 E-160)	06:54	06:43			05:14
26	16:48	17:42	38 16:37 (WEA-5 E-160)	18:32	20:25			21:52
27	08:35	07:51	16:00 (WEA-5 E-160)	06:51	06:41			05:14
28	16:49	17:44	38 16:37 (WEA-5 E-160)	18:34	20:27			21:52
29	08:34	07:49	16:00 (WEA-5 E-160)	06:49	06:39			05:13
30	16:51	17:46	37 16:37 (WEA-5 E-160)	18:36	6 07:12 (WEA-HS4)			21:53
31	08:33	07:47	16:00 (WEA-5 E-160)	06:47	07:10 (WEA-HS4)			05:13
32	16:52	17:48	36 16:36 (WEA-5 E-160)	18:38	11 07:21 (WEA-HS4)			21:54
33	08:32	07:45	16:00 (WEA-5 E-160)	06:45	07:07 (WEA-HS4)			05:13
34	16:54	17:49	34 16:35 (WEA-5 E-160)	18:39	14 07:21 (WEA-HS4)			21:54
35	08:31	07:43	16:00 (WEA-5 E-160)	06:42	07:05 (WEA-HS4)			05:13
36	16:55	17:51	33 16:34 (WEA-5 E-160)	18:41	17 07:22 (WEA-HS4)			21:54
37	08:30	07:41	16:00 (WEA-5 E-160)	06:40	07:03 (WEA-HS4)			05:13
38	16:57	17:53	31 16:33 (WEA-5 E-160)	18:43	20 07:23 (WEA-HS4)			21:55
39	08:29	07:39	16:00 (WEA-5 E-160)	06:38	07:00 (WEA-HS4)			05:13
40	16:59	17:55	27 16:31 (WEA-5 E-160)	18:44	22 07:22 (WEA-HS4)			21:55
41	08:28	07:37	16:00 (WEA-5 E-160)	06:35	06:59 (WEA-HS4)			05:13
42	17:00	17:57	25 16:30 (WEA-5 E-160)	18:46	23 07:22 (WEA-HS4)			21:55
43	08:27	07:35	16:00 (WEA-5 E-160)	06:33	23 06:59 (WEA-HS4)			05:14
44	17:02	17:59	20 16:28 (WEA-5 E-160)	18:48	23 07:22 (WEA-HS4)			21:56
45	08:26	07:33	16:00 (WEA-5 E-160)	06:31	06:58 (WEA-HS4)			05:14
46	17:04	18:00	14 16:25 (WEA-5 E-160)	18:50	23 07:21 (WEA-HS4)			21:56
47	08:25	07:31		06:28	06:58 (WEA-HS4)			05:14
48	17:06	18:02		18:51	22 07:20 (WEA-HS4)			21:56
49	08:23	16:13 (WEA-5 E-160)		06:26	06:59 (WEA-HS4)			05:14
50	17:07	5 16:18 (WEA-5 E-160)		18:53	21 07:20 (WEA-HS4)			21:56
51	08:22	16:08 (WEA-5 E-160)		06:24	06:46 (WEA_Heid7)			05:15
52	17:09	14 16:22 (WEA-5 E-160)		18:55	20 07:18 (WEA-HS4)			21:56
53	08:21	16:07 (WEA-5 E-160)		06:22	06:44 (WEA_Heid7)			05:15
54	17:11	18 16:25 (WEA-5 E-160)		18:56	21 07:16 (WEA-HS4)			21:56
55	08:19	16:04 (WEA-5 E-160)		06:19	06:42 (WEA_Heid7)			05:16
56	17:13	23 16:27 (WEA-5 E-160)		18:58	21 07:14 (WEA-HS4)			21:56
57	08:18	16:04 (WEA-5 E-160)		07:17	07:39 (WEA_Heid7)			05:16
58	17:14	25 16:29 (WEA-5 E-160)		20:00	12 07:51 (WEA_Heid7)			21:56
59	08:17	16:02 (WEA-5 E-160)		07:15	07:38 (WEA_Heid7)			05:17
60	17:16	28 16:30 (WEA-5 E-160)		20:02	13 07:51 (WEA_Heid7)			21:59
61	08:15	16:01 (WEA-5 E-160)		07:12	07:39 (WEA_Heid7)			05:21
62	17:18	30 16:31 (WEA-5 E-160)		20:03	12 07:51 (WEA_Heid7)			21:40
63	Sonnenscheinstunden	259		367	416		485	498
64	astr.max.mögl.Beschattung	143	781	301	36		27	
65	Red.Sonnenscheinwahrsch.	0,20	0,30	0,41	0,41		0,46	
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		0,84	
67	Reduktion Windrichtung	0,72	0,72	0,66	0,68		0,71	
68	Gesamte Reduktion	0,12	0,18	0,17	0,23		0,28	
69	Met.wahrsch.Beschattung	17	143	50	8		7	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 65 - IP 65 Leblicher Straße 10

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:23	20:22	19:12	17:07	16:26
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:19	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:54	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:20
	21:54	21:18	20:15	19:06	17:01	16:25
5	05:20	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:34	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:52	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:09	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:22
11	05:26	06:09	06:59	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:46	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:17	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:34
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:35	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:32	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:35	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	08:13	08:07	08:39
	21:34	20:37	19:26	18:20	16:32	16:26
26	05:45	06:34	07:24	08:15	08:09	08:39
	21:33	20:35	19:24	18:18	16:31	16:27
27	05:46	06:35	07:25	08:17	08:10	08:40
	21:31	20:33	19:22	18:16	16:30	16:27
28	05:48	06:37	07:27	08:18	08:12	08:40
	21:30	20:31	19:19	18:14	16:29	16:28
29	05:49	06:38	07:29	08:20	08:13	08:40
	21:28	20:28	19:17	18:12	16:28	16:29
30	05:51	06:40	07:30	08:22	08:15	08:40
	21:27	20:26	19:15	18:10	16:27	16:30
31	05:52	06:42		07:24	15:27 (WEA-5 E-160)	08:40
	21:25	20:24		17:08	16:06 (WEA-5 E-160)	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung		26	346	425	509	
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	
Reduktion Windrichtung		0,71	0,66	0,72	0,72	
Gesamte Reduktion		0,26	0,20	0,19	0,14	
Met.wahrsch.Beschattung		7	70	81	70	

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 66 - IP 66 Buschhausen 1

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1	08:40	08:14	07:20	16:45 (WEA-5 E-160)	07:10	07:40 (WEA-HS4)	06:06	05:20
	16:32	17:20	18:11	33 17:18 (WEA-5 E-160)	20:05	28 08:08 (WEA-HS4)	20:56	21:41
2	08:40	08:12	07:18	16:46 (WEA-5 E-160)	07:08	07:39 (WEA-HS4)	06:04	05:20
	16:33	17:22	18:13	32 17:18 (WEA-5 E-160)	20:07	28 08:07 (WEA-HS4)	20:57	21:42
3	08:40	08:10	07:16	16:45 (WEA-5 E-160)	07:05	07:39 (WEA-HS4)	06:02	05:19
	16:34	17:23	18:15	31 17:16 (WEA-5 E-160)	20:08	27 08:06 (WEA-HS4)	20:59	21:43
4	08:40	08:09	07:14	16:46 (WEA-5 E-160)	07:03	07:40 (WEA-HS4)	06:00	05:18
	16:36	17:25	18:17	29 17:15 (WEA-5 E-160)	20:10	26 08:06 (WEA-HS4)	21:01	21:44
5	08:39	08:07	07:12	16:48 (WEA-5 E-160)	07:01	07:40 (WEA-HS4)	05:58	05:17
	16:37	17:27	18:18	26 17:14 (WEA-5 E-160)	20:12	24 08:04 (WEA-HS4)	21:02	21:45
6	08:39	08:05	07:09	16:49 (WEA-5 E-160)	06:59	07:41 (WEA-HS4)	05:56	05:17
	16:38	17:29	18:20	24 17:13 (WEA-5 E-160)	20:13	22 08:03 (WEA-HS4)	21:04	21:46
7	08:39	08:04	07:07	16:50 (WEA-5 E-160)	06:56	07:20 (WEA_Heid7)	05:54	05:16
	16:39	17:31	18:22	20 17:10 (WEA-5 E-160)	20:15	24 08:01 (WEA-HS4)	21:05	21:47
8	08:38	08:02	07:05	16:53 (WEA-5 E-160)	06:54	07:17 (WEA_Heid3)	05:53	05:16
	16:41	17:33	18:24	15 17:08 (WEA-5 E-160)	20:17	26 07:59 (WEA-HS4)	21:07	21:48
9	08:38	08:00	07:03	16:57 (WEA-5 E-160)	06:52	07:15 (WEA_Heid3)	05:51	05:15
	16:42	17:35	18:25	6 17:03 (WEA-5 E-160)	20:19	23 07:56 (WEA-HS4)	21:09	21:49
10	08:37	07:58	07:00	06:50	07:12 (WEA_Heid3)	05:49	05:15	05:15
	16:43	17:36	18:27	17 07:29 (WEA_Heid7)	21:10	07:13 (WEA_Heid3)	05:48	05:14
11	08:37	07:57	06:58	06:47	07:29 (WEA_Heid7)	21:12	05:14	05:14
	16:45	17:38	18:29	16 07:29 (WEA_Heid7)	21:12	07:14 (WEA_Heid7)	05:46	05:14
12	08:36	07:55	06:56	06:45	07:14 (WEA_Heid7)	05:44	05:14	05:14
	16:46	17:40	18:31	15 07:29 (WEA_Heid7)	21:13	07:14 (WEA_Heid7)	05:44	05:14
13	08:35	07:53	06:54	06:43	07:14 (WEA_Heid7)	05:44	05:14	05:14
	16:48	17:42	18:32	15 07:29 (WEA_Heid7)	21:15	07:14 (WEA_Heid7)	05:43	05:14
14	08:35	07:51	06:51	06:41	07:14 (WEA_Heid7)	05:43	05:14	05:14
	16:49	17:44	18:34	14 07:28 (WEA_Heid7)	21:17	07:14 (WEA_Heid7)	05:41	05:13
15	08:34	07:49	06:49	06:39	07:14 (WEA_Heid7)	05:41	05:13	05:13
	16:51	17:46	18:36	13 07:27 (WEA_Heid7)	21:18	07:15 (WEA_Heid7)	05:40	05:13
16	08:33	07:47	06:47	06:36	07:15 (WEA_Heid7)	05:40	05:13	05:13
	16:52	17:48	18:38	10 07:25 (WEA_Heid7)	21:20	07:17 (WEA_Heid7)	05:38	05:13
17	08:32	07:45	06:45	06:34	07:17 (WEA_Heid7)	05:38	05:13	05:13
	16:54	17:49	18:39	6 07:23 (WEA_Heid7)	21:21	05:37	06:03 (WEA_Heid2)	05:13
18	08:31	07:43	06:42	06:32	07:17 (WEA_Heid7)	05:37	06:04 (WEA_Heid2)	05:13
	16:55	17:51	18:41	24 07:02 (WEA-HS4)	20:42	21:23	06:02 (WEA_Heid2)	05:13
19	08:30	07:41	06:40	06:30	07:05 (WEA-HS4)	05:35	06:01 (WEA_Heid2)	05:13
	16:57	17:53	18:43	27 07:05 (WEA-HS4)	20:44	21:24	06:00 (WEA_Heid2)	05:13
20	08:29	07:39	06:38	06:28	07:05 (WEA-HS4)	05:34	06:01 (WEA_Heid2)	05:13
	16:59	17:55	18:44	29 07:07 (WEA-HS4)	20:46	21:26	06:00 (WEA_Heid2)	05:13
21	08:28	07:37	06:35	06:26	07:06 (WEA-HS4)	05:33	06:00 (WEA_Heid2)	05:13
	17:00	17:57	18:46	31 07:08 (WEA-HS4)	20:47	21:27	06:00 (WEA_Heid2)	05:13
22	08:27	07:35	06:33	06:24	07:08 (WEA-HS4)	05:31	06:00 (WEA_Heid2)	05:13
	17:02	17:59	18:48	20:40	07:09 (WEA-HS4)	21:28	06:00 (WEA_Heid2)	05:13
23	08:26	07:33	06:31	06:22	07:09 (WEA-HS4)	05:30	06:00 (WEA_Heid2)	05:13
	17:04	18:00	18:50	9 07:02 (WEA-HS4)	20:42	21:30	06:00 (WEA_Heid2)	05:13
24	08:25	07:31	06:28	06:19	07:05 (WEA-HS4)	05:29	06:00 (WEA_Heid2)	05:13
	17:06	18:02	18:51	14 07:05 (WEA-HS4)	20:44	21:31	06:00 (WEA_Heid2)	05:13
25	08:23	07:29	06:26	06:17	07:06 (WEA-HS4)	05:28	06:00 (WEA_Heid2)	05:13
	17:07	18:04	18:53	17 07:06 (WEA-HS4)	20:46	21:33	06:00 (WEA_Heid2)	05:13
26	08:22	07:27	06:24	06:15	07:07 (WEA-HS4)	05:26	06:00 (WEA_Heid2)	05:13
	17:09	18:06	18:55	21 07:07 (WEA-HS4)	20:47	21:34	06:00 (WEA_Heid2)	05:13
27	08:21	07:25	06:22	06:13	07:08 (WEA-HS4)	05:25	06:00 (WEA_Heid2)	05:13
	17:11	18:08	18:56	24 07:08 (WEA-HS4)	20:49	21:35	06:00 (WEA_Heid2)	05:13
28	08:19	07:23	06:19	06:11	07:09 (WEA-HS4)	05:24	06:00 (WEA_Heid2)	05:13
	17:13	18:09	18:58	26 07:08 (WEA-HS4)	20:51	21:36	06:00 (WEA_Heid2)	05:13
29	08:18		07:17	06:09	07:40 (WEA-HS4)	05:23	06:00 (WEA_Heid2)	05:13
	17:14		20:00	28 08:08 (WEA-HS4)	20:52	21:38	06:00 (WEA_Heid2)	05:13
30	08:17		07:15	06:07	07:40 (WEA-HS4)	05:22	06:00 (WEA_Heid2)	05:13
	17:16		20:02	28 08:08 (WEA-HS4)	20:54	21:39	06:00 (WEA_Heid2)	05:13
31	08:15		07:12	06:07	07:40 (WEA-HS4)	05:21	06:00 (WEA_Heid2)	05:13
	17:18		20:03	28 08:08 (WEA-HS4)	21:40	21:40	06:00 (WEA_Heid2)	05:13
Sonnenscheinstunden	259	278	367	416	485	498		
astr.max.mögl.Beschattung		397	411	334	54			
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41	0,46			
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84			
Reduktion Windrichtung		0,72	0,70	0,68	0,72			
Gesamte Reduktion		0,18	0,17	0,23	0,28			
Met.wahrsch.Beschattung		73	72	78	15			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 66 - IP 66 Buschhausen 1

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember			
1	05:18		05:54		06:43		07:12 (WEA_Heid3)		07:32		07:26	08:16	
	21:55		21:23		20:22	16	07:28 (WEA_Heid7)		19:12		17:07	16:26	
2	05:18		05:55		06:45		07:11 (WEA_Heid3)		07:34		07:27	08:18	
	21:55		21:22		20:19	17	07:28 (WEA_Heid7)		19:10		17:05	16:26	
3	05:19		05:57		06:47		07:12 (WEA_Heid3)		07:35		07:29	08:19	
	21:54		21:20		20:17	23	07:53 (WEA_HS4)		19:08		17:03	16:25	
4	05:20		05:58		06:48		07:14 (WEA_Heid3)		07:37		07:31	08:20	
	21:54		21:18		20:15	26	07:56 (WEA_HS4)		19:06		17:01	16:25	
5	05:20		06:00		06:50		07:15 (WEA_Heid3)		07:39		07:33	08:22	
	21:54		21:17		20:13	25	07:57 (WEA_HS4)		19:03	12	17:43 (WEA-5 E-160)	16:59	16:24
6	05:21		06:02		06:51		07:37 (WEA_HS4)		07:40		17:28 (WEA-5 E-160)	07:34	08:23
	21:53		21:15		20:10	22	07:59 (WEA_HS4)		19:01	18	17:46 (WEA-5 E-160)	16:58	16:24
7	05:22		06:03		06:53		07:36 (WEA_HS4)		07:42		17:25 (WEA-5 E-160)	07:36	08:24
	21:52		21:13		20:08	24	08:00 (WEA_HS4)		18:59	22	17:47 (WEA-5 E-160)	16:56	16:23
8	05:23		06:05		06:55		07:34 (WEA_HS4)		07:44		17:23 (WEA-5 E-160)	07:38	08:26
	21:52		21:11		20:06	26	08:00 (WEA_HS4)		18:57	26	17:49 (WEA-5 E-160)	16:54	16:23
9	05:24		06:06		06:56		07:33 (WEA_HS4)		07:45		17:22 (WEA-5 E-160)	07:40	08:27
	21:51		21:09		20:04	27	08:00 (WEA_HS4)		18:54	28	17:50 (WEA-5 E-160)	16:53	16:23
10	05:25		06:08		06:58		07:32 (WEA_HS4)		07:47		17:20 (WEA-5 E-160)	07:42	08:28
	21:50		21:08		20:01	28	08:00 (WEA_HS4)		18:52	30	17:50 (WEA-5 E-160)	16:51	16:22
11	05:26		06:09		06:59		07:32 (WEA_HS4)		07:49		17:19 (WEA-5 E-160)	07:43	08:29
	21:50		21:06		19:59	28	08:00 (WEA_HS4)		18:50	32	17:51 (WEA-5 E-160)	16:50	16:22
12	05:27		06:11		07:01		07:31 (WEA_HS4)		07:50		17:19 (WEA-5 E-160)	07:45	08:30
	21:49		21:04		19:57	28	07:59 (WEA_HS4)		18:48	32	17:51 (WEA-5 E-160)	16:48	16:22
13	05:28		06:13		07:03		07:31 (WEA_HS4)		07:52		17:18 (WEA-5 E-160)	07:47	08:31
	21:48		21:02		19:54	28	07:59 (WEA_HS4)		18:45	34	17:52 (WEA-5 E-160)	16:46	16:22
14	05:29		06:14		07:04		07:31 (WEA_HS4)		07:54		17:18 (WEA-5 E-160)	07:49	08:32
	21:47		21:00		19:52	28	07:59 (WEA_HS4)		18:43	34	17:52 (WEA-5 E-160)	16:45	16:22
15	05:31		06:16		07:06		07:31 (WEA_HS4)		07:56		17:17 (WEA-5 E-160)	07:50	08:33
	21:46		20:58		19:50	27	07:58 (WEA_HS4)		18:41	34	17:51 (WEA-5 E-160)	16:44	16:22
16	05:32		06:17		07:08		07:33 (WEA_HS4)		07:57		17:17 (WEA-5 E-160)	07:52	08:34
	21:45		20:56		19:47	24	07:57 (WEA_HS4)		18:39	34	17:51 (WEA-5 E-160)	16:42	16:22
17	05:33		06:19		07:09		07:34 (WEA_HS4)		07:59		17:17 (WEA-5 E-160)	07:54	08:34
	21:44	5	06:13 (WEA_Heid2)		19:45	21	07:55 (WEA_HS4)		18:37	34	17:51 (WEA-5 E-160)	16:41	16:23
18	05:34		06:21		07:11		07:36 (WEA_HS4)		08:01		17:17 (WEA-5 E-160)	07:56	08:35
	21:43	6	06:13 (WEA_Heid2)		19:43	18	07:54 (WEA_HS4)		18:35	33	17:50 (WEA-5 E-160)	16:40	16:23
19	05:35		06:22		07:12		07:37 (WEA_HS4)		08:03		17:17 (WEA-5 E-160)	07:57	08:36
	21:42	8	06:14 (WEA_Heid2)		19:40	15	07:52 (WEA_HS4)		18:32	33	17:50 (WEA-5 E-160)	16:38	16:23
20	05:37		06:24		07:14		07:39 (WEA_HS4)		08:04		17:18 (WEA-5 E-160)	07:59	08:37
	21:41	8	06:14 (WEA_Heid2)		19:38	10	07:49 (WEA_HS4)		18:30	31	17:49 (WEA-5 E-160)	16:37	16:23
21	05:38		06:25		07:16		07:41 (WEA_HS4)		08:06		17:17 (WEA-5 E-160)	08:01	08:37
	21:39	7	06:15 (WEA_Heid2)		19:36	4	07:45 (WEA_HS4)		18:28	31	17:48 (WEA-5 E-160)	16:36	16:24
22	05:39		06:27		07:17				08:08		17:18 (WEA-5 E-160)	08:02	08:38
	21:38	6	06:15 (WEA_Heid2)		19:33				18:26	29	17:47 (WEA-5 E-160)	16:35	16:24
23	05:41		06:29		07:19				08:10		17:19 (WEA-5 E-160)	08:04	08:38
	21:37	5	06:15 (WEA_Heid2)		19:31				18:24	27	17:46 (WEA-5 E-160)	16:34	16:25
24	05:42		06:30		07:21				08:11		17:21 (WEA-5 E-160)	08:06	08:39
	21:35	3	06:15 (WEA_Heid2)		19:29				18:22	23	17:44 (WEA-5 E-160)	16:33	16:25
25	05:44		06:32		07:22				07:13		16:22 (WEA-5 E-160)	08:07	08:39
	21:34	2	06:15 (WEA_Heid2)		19:26				17:20	21	16:43 (WEA-5 E-160)	16:32	16:26
26	05:45		06:34		07:24				07:15		16:25 (WEA-5 E-160)	08:09	08:39
	21:33		07:19 (WEA_Heid7)		19:24				17:18	15	16:40 (WEA-5 E-160)	16:31	16:27
27	05:46		07:26 (WEA_Heid7)		19:24				07:17		16:29 (WEA-5 E-160)	08:10	08:40
	21:31		07:17 (WEA_Heid7)		19:22				17:16	8	16:37 (WEA-5 E-160)	16:30	16:27
28	05:48		07:15 (WEA_Heid7)		19:22				07:18			08:12	08:40
	21:30		07:28 (WEA_Heid7)		19:19				17:14			16:29	16:28
29	05:49		07:15 (WEA_Heid7)		19:19				07:20			08:13	08:40
	21:28		07:29 (WEA_Heid7)		19:17				17:12			16:28	16:29
30	05:51		07:13 (WEA_Heid7)		19:15				07:22			08:15	08:40
	21:27		07:29 (WEA_Heid7)		19:15				17:10			16:27	16:30
31	05:52		07:13 (WEA_Heid7)		19:15				07:24				08:40
	21:25		07:29 (WEA_Heid7)		19:15				17:08				16:31
Sonneneinstunden	501		453		381				332			267	244
astr.max.mögl.Beschattung	50		77		465				621				
Red.Sonnenscheinwahrsch.	0,41		0,43		0,36				0,32				
Reduktion Betriebsdauer	0,84		0,84		0,84				0,84				
Reduktion Windrichtung	0,72		0,69		0,68				0,72				
Gesamte Reduktion	0,25		0,25		0,21				0,19				
Met.wahrsch.Beschattung	13		19		95				119				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 67 - IP 67 Buschhausen 2

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1	08:40	08:14	07:20	16:48 (WEA-5 E-160)	07:10	07:36 (WEA-HS4)	06:06	05:20
	16:32	17:20	18:11	35 17:23 (WEA-5 E-160)	20:05	28 08:04 (WEA-HS4)	20:56	21:41
2	08:40	08:12	07:18	16:49 (WEA-5 E-160)	07:08	07:34 (WEA-HS4)	06:04	05:20
	16:33	17:22	18:13	34 17:23 (WEA-5 E-160)	20:07	29 08:03 (WEA-HS4)	20:57	21:42
3	08:40	08:10	07:16	16:48 (WEA-5 E-160)	07:05	07:34 (WEA-HS4)	06:02	05:19
	16:34	17:23	18:15	34 17:22 (WEA-5 E-160)	20:08	29 08:03 (WEA-HS4)	20:59	21:43
4	08:40	08:09	07:14	16:49 (WEA-5 E-160)	07:03	07:34 (WEA-HS4)	06:00	05:18
	16:36	17:25	18:17	32 17:21 (WEA-5 E-160)	20:10	28 08:02 (WEA-HS4)	21:01	21:44
5	08:39	08:07	07:12	16:49 (WEA-5 E-160)	07:01	07:34 (WEA-HS4)	05:58	05:17
	16:37	17:27	18:18	32 17:21 (WEA-5 E-160)	20:12	27 08:01 (WEA-HS4)	21:02	21:45
6	08:39	08:05	07:09	16:50 (WEA-5 E-160)	06:59	07:34 (WEA-HS4)	05:56	05:17
	16:38	17:29	18:20	30 17:20 (WEA-5 E-160)	20:13	26 08:00 (WEA-HS4)	21:04	21:46
7	08:39	08:04	07:07	16:50 (WEA-5 E-160)	06:56	07:35 (WEA-HS4)	05:54	05:16
	16:39	17:31	18:22	28 17:18 (WEA-5 E-160)	20:15	25 08:00 (WEA-HS4)	21:05	21:47
8	08:38	08:02	07:05	16:52 (WEA-5 E-160)	06:54	07:36 (WEA-HS4)	05:53	05:16
	16:41	17:33	18:24	25 17:17 (WEA-5 E-160)	20:17	22 07:58 (WEA-HS4)	21:07	21:48
9	08:38	08:00	07:03	16:54 (WEA-5 E-160)	06:52	07:15 (WEA_Heid3)	05:51	05:15
	16:42	17:35	18:25	21 17:15 (WEA-5 E-160)	20:18	23 07:57 (WEA-HS4)	21:09	21:49
10	08:37	07:58	07:00	16:55 (WEA-5 E-160)	06:50	07:12 (WEA_Heid3)	05:49	05:15
	16:43	17:36	18:27	17 17:12 (WEA-5 E-160)	20:20	25 07:54 (WEA-HS4)	21:10	21:50
11	08:37	07:57	06:58	16:59 (WEA-5 E-160)	06:47	07:10 (WEA_Heid3)	05:48	05:14
	16:45	17:38	18:29	9 17:08 (WEA-5 E-160)	20:22	24 07:51 (WEA-HS4)	21:12	21:50
12	08:36	07:55	06:56	17:09 (WEA-5 E-160)	06:45	07:10 (WEA_Heid3)	05:46	05:14
	16:46	17:40	18:31	14 20:24	14 07:24 (WEA_Heid7)	21:13	21:51	21:51
13	08:35	07:53	06:54	17:10 (WEA-5 E-160)	06:43	07:09 (WEA_Heid7)	05:44	05:14
	16:48	17:42	18:32	15 20:25	15 07:24 (WEA_Heid7)	21:15	21:52	21:52
14	08:35	07:51	06:51	17:11 (WEA-5 E-160)	06:41	07:09 (WEA_Heid7)	05:43	05:14
	16:49	17:44	18:34	15 20:27	15 07:24 (WEA_Heid7)	21:17	21:52	21:52
15	08:34	07:49	06:49	17:12 (WEA-5 E-160)	06:39	07:09 (WEA_Heid7)	05:41	05:13
	16:51	17:46	18:36	15 20:29	15 07:24 (WEA_Heid7)	21:18	21:53	21:53
16	08:33	07:47	06:47	17:13 (WEA-5 E-160)	06:36	07:08 (WEA_Heid7)	05:40	05:13
	16:52	17:48	18:38	15 20:30	15 07:23 (WEA_Heid7)	21:20	21:54	21:54
17	08:32	07:45	06:45	17:14 (WEA-5 E-160)	06:34	07:08 (WEA_Heid7)	05:38	05:13
	16:54	17:49	8 17:11 (WEA-5 E-160)	18:39	14 20:32	14 07:22 (WEA_Heid7)	21:21	21:54
18	08:31	07:43	06:42	16:58 (WEA-5 E-160)	06:32	07:09 (WEA_Heid7)	05:37	05:13
	16:55	17:51	16 17:14 (WEA-5 E-160)	18:41	12 20:34	12 07:21 (WEA_Heid7)	21:23	21:54
19	08:30	07:41	06:40	16:56 (WEA-5 E-160)	06:30	07:10 (WEA_Heid7)	05:35	05:13
	16:57	17:53	21 17:17 (WEA-5 E-160)	18:43	9 20:35	9 07:19 (WEA_Heid7)	21:24	21:55
20	08:29	07:39	06:38	16:54 (WEA-5 E-160)	06:28	05:34	06:01 (WEA_Heid2)	05:13
	16:59	17:55	24 17:18 (WEA-5 E-160)	18:44	20:37	21:26	1 06:02 (WEA_Heid2)	21:55
21	08:28	07:37	06:35	16:53 (WEA-5 E-160)	06:26	05:33	05:59 (WEA_Heid2)	05:13
	17:00	17:57	27 17:20 (WEA-5 E-160)	18:46	20:39	21:27	3 06:02 (WEA_Heid2)	21:55
22	08:27	07:35	06:33	16:52 (WEA-5 E-160)	06:24	05:31	05:58 (WEA_Heid2)	05:14
	17:02	17:59	29 17:21 (WEA-5 E-160)	18:48	20:40	21:28	4 06:02 (WEA_Heid2)	21:56
23	08:26	07:33	06:31	16:51 (WEA-5 E-160)	06:22	05:30	05:57 (WEA_Heid2)	05:14
	17:04	18:00	31 17:22 (WEA-5 E-160)	18:50	20:42	21:30	6 06:03 (WEA_Heid2)	21:56
24	08:25	07:31	06:28	16:50 (WEA-5 E-160)	06:19	05:29	05:56 (WEA_Heid2)	05:14
	17:06	18:02	32 17:22 (WEA-5 E-160)	18:51	20:44	21:31	7 06:03 (WEA_Heid2)	21:56
25	08:23	07:29	06:26	16:50 (WEA-5 E-160)	06:17	05:28	05:55 (WEA_Heid2)	05:14
	17:07	18:04	33 17:23 (WEA-5 E-160)	18:53	8 20:46	21:33	8 06:03 (WEA_Heid2)	21:56
26	08:22	07:27	06:24	16:48 (WEA-5 E-160)	06:15	05:26	05:54 (WEA_Heid2)	05:15
	17:09	18:06	34 17:22 (WEA-5 E-160)	18:55	13 20:47	21:34	8 06:02 (WEA_Heid2)	21:56
27	08:21	07:25	06:22	16:48 (WEA-5 E-160)	06:13	05:25	05:55 (WEA_Heid2)	05:15
	17:11	18:08	35 17:23 (WEA-5 E-160)	18:56	17 20:49	21:35	7 06:02 (WEA_Heid2)	21:56
28	08:19	07:23	06:19	16:48 (WEA-5 E-160)	06:11	05:24	05:55 (WEA_Heid2)	05:16
	17:13	18:09	35 17:23 (WEA-5 E-160)	18:58	20 07:02 (WEA-HS4)	20:51	6 06:01 (WEA_Heid2)	21:56
29	08:18		07:17	17:39 (WEA-HS4)	06:09	05:23	05:56 (WEA_Heid2)	05:16
	17:14		20:00	23 08:02 (WEA-HS4)	20:52	21:38	4 06:00 (WEA_Heid2)	21:56
30	08:17		07:15	17:37 (WEA-HS4)	06:07	05:22		05:17
	17:16		20:02	26 08:03 (WEA-HS4)	20:54	21:39		21:55
31	08:15		07:12	17:36 (WEA-HS4)		05:21		
	17:18		20:03	27 08:03 (WEA-HS4)		21:40		
Sonnenscheinstunden	259	278	367	416	485		498	
astr.max.mögl.Beschattung		325	431	395	54			
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41	0,46			
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84			
Reduktion Windrichtung		0,71	0,70	0,68	0,72			
Gesamte Reduktion		0,18	0,18	0,23	0,28			
Met.wahrsch.Beschattung		59	76	93	15			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 67 - IP 67 Buschhausen 2

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18		05:54		06:43		07:09 (WEA_Heid3)		07:32		07:26
	21:55		21:23		20:22	24	07:50 (WEA-HS4)		19:12		17:07
2	05:18		05:55		06:45		07:11 (WEA_Heid3)		07:34		07:27
	21:55		21:22		20:19	25	07:53 (WEA-HS4)		19:10		17:05
3	05:19		05:57		06:47		07:12 (WEA_Heid3)		07:35		07:29
	21:54		21:20		20:17	23	07:54 (WEA-HS4)		19:08	13	17:48 (WEA-5 E-160)
4	05:20		05:58		06:48		07:33 (WEA-HS4)		07:37		17:32 (WEA-5 E-160)
	21:54		21:18		20:15	22	07:55 (WEA-HS4)		19:06	19	17:51 (WEA-5 E-160)
5	05:20		06:00		06:50		07:31 (WEA-HS4)		07:39		17:30 (WEA-5 E-160)
	21:54		21:17		20:13	25	07:56 (WEA-HS4)		19:03	23	17:53 (WEA-5 E-160)
6	05:21		06:02		06:51		07:30 (WEA-HS4)		07:40		17:28 (WEA-5 E-160)
	21:53		21:15		20:10	26	07:56 (WEA-HS4)		19:01	26	17:54 (WEA-5 E-160)
7	05:22		06:03		06:53		07:30 (WEA-HS4)		07:42		17:26 (WEA-5 E-160)
	21:52		21:13		20:08	27	07:57 (WEA-HS4)		18:59	28	17:54 (WEA-5 E-160)
8	05:23		06:05		06:55		07:29 (WEA-HS4)		07:44		17:25 (WEA-5 E-160)
	21:52		21:11		20:06	28	07:57 (WEA-HS4)		18:57	30	17:55 (WEA-5 E-160)
9	05:24		06:06		06:56		07:29 (WEA-HS4)		07:45		17:24 (WEA-5 E-160)
	21:51		21:09		20:03	28	07:57 (WEA-HS4)		18:54	32	17:56 (WEA-5 E-160)
10	05:25		06:08		06:58		07:28 (WEA-HS4)		07:47		17:22 (WEA-5 E-160)
	21:50		21:08		20:01	28	07:56 (WEA-HS4)		18:52	33	17:55 (WEA-5 E-160)
11	05:26		06:09		06:59		07:28 (WEA-HS4)		07:49		17:22 (WEA-5 E-160)
	21:50		21:06		19:59	28	07:56 (WEA-HS4)		18:50	34	17:56 (WEA-5 E-160)
12	05:27		06:11		07:01		07:27 (WEA-HS4)		07:50		17:22 (WEA-5 E-160)
	21:49		21:04		19:57	28	07:55 (WEA-HS4)		18:48	34	17:56 (WEA-5 E-160)
13	05:28		06:13		07:03		07:28 (WEA-HS4)		07:52		17:22 (WEA-5 E-160)
	21:48		21:02		19:54	26	07:54 (WEA-HS4)		18:45	34	17:56 (WEA-5 E-160)
14	05:29		06:14		07:04		07:30 (WEA-HS4)		07:54		17:21 (WEA-5 E-160)
	21:47	2	06:08 (WEA_Heid2)		19:52	24	07:54 (WEA-HS4)		18:43	35	17:56 (WEA-5 E-160)
15	05:31		06:16		07:06		07:31 (WEA-HS4)		07:56		17:21 (WEA-5 E-160)
	21:46	5	06:10 (WEA_Heid2)		19:50	21	07:52 (WEA-HS4)		18:41	34	17:55 (WEA-5 E-160)
16	05:32		06:17		07:07		07:33 (WEA-HS4)		07:57		17:21 (WEA-5 E-160)
	21:45	7	06:11 (WEA_Heid2)		19:47	18	07:51 (WEA-HS4)		18:39	34	17:55 (WEA-5 E-160)
17	05:33		06:19		07:09		07:34 (WEA-HS4)		07:59		17:21 (WEA-5 E-160)
	21:44	8	06:12 (WEA_Heid2)		19:45	14	07:48 (WEA-HS4)		18:37	33	17:54 (WEA-5 E-160)
18	05:34		06:21		07:11		07:36 (WEA-HS4)		08:01		17:22 (WEA-5 E-160)
	21:43	8	06:12 (WEA_Heid2)		19:43	9	07:45 (WEA-HS4)		18:35	32	17:54 (WEA-5 E-160)
19	05:35		06:22		07:12				08:03		17:23 (WEA-5 E-160)
	21:42	7	06:12 (WEA_Heid2)		19:40				18:32	30	17:53 (WEA-5 E-160)
20	05:37		06:24		07:14				08:04		17:23 (WEA-5 E-160)
	21:41	6	06:12 (WEA_Heid2)		19:38				18:30	29	17:52 (WEA-5 E-160)
21	05:38		06:25		07:16				08:06		17:24 (WEA-5 E-160)
	21:39	5	06:13 (WEA_Heid2)		19:36				18:28	26	17:50 (WEA-5 E-160)
22	05:39		06:27		07:17				08:08		17:25 (WEA-5 E-160)
	21:38	4	06:13 (WEA_Heid2)		19:33				18:26	23	17:48 (WEA-5 E-160)
23	05:41		06:29		07:19				08:10		17:27 (WEA-5 E-160)
	21:37	2	06:12 (WEA_Heid2)		19:31				18:24	19	17:46 (WEA-5 E-160)
24	05:42		06:30		07:21				08:11		17:29 (WEA-5 E-160)
	21:35		06:39		19:29				18:22	15	17:44 (WEA-5 E-160)
25	05:44		06:32		07:22				07:13		16:34 (WEA-5 E-160)
	21:34		06:37		19:26				17:20	5	16:39 (WEA-5 E-160)
26	05:45		06:34		07:24				07:15		17:20 (WEA-5 E-160)
	21:33		06:35		19:24				17:18		16:31 (WEA-5 E-160)
27	05:46		06:38		07:25				07:17		17:16 (WEA-5 E-160)
	21:31		06:33		19:22				17:16		16:30 (WEA-5 E-160)
28	05:48		06:37		07:27				07:18		16:31 (WEA-5 E-160)
	21:30		06:31		19:19				17:14		16:29 (WEA-5 E-160)
29	05:49		06:38		07:29				07:20		16:30 (WEA-5 E-160)
	21:28		06:28		19:17				17:12		16:28 (WEA-5 E-160)
30	05:51		06:40		07:30				07:22		16:29 (WEA-5 E-160)
	21:27		06:26		19:15				17:10		16:27 (WEA-5 E-160)
31	05:52		06:42		07:30				07:24		16:27 (WEA-5 E-160)
	21:25		06:24		19:14				17:08		16:25 (WEA-5 E-160)
					07:24 (WEA_Heid7)						
Sonnenscheinstunden	501		453		381				332		267
astr.max.mögl.Beschattung	54		114		424				621		244
Red.Sonnenscheinwahrsch.	0,41		0,43		0,36				0,32		
Reduktion Betriebsdauer	0,84		0,84		0,84				0,84		
Reduktion Windrichtung	0,72		0,69		0,68				0,71		
Gesamte Reduktion	0,25		0,25		0,21				0,19		
Met.wahrsch.Beschattung	14		28		87				118		

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 68 - IP 68 Buschhausen 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni			
1	08:40	08:14	07:20	16:55 (WEA-5 E-160)	07:10	07:33 (WEA-HS4)	06:06	05:20	05:53 (WEA_Heid2)
	16:32	17:20	18:11	34 17:29 (WEA-5 E-160)	20:05	19 07:52 (WEA-HS4)	20:56	21:41	5 05:58 (WEA_Heid2)
2	08:40	08:12	07:18	16:55 (WEA-5 E-160)	07:08	07:30 (WEA-HS4)	06:04	05:20	05:54 (WEA_Heid2)
	16:33	17:22	18:13	35 17:30 (WEA-5 E-160)	20:07	22 07:52 (WEA-HS4)	20:57	21:42	3 05:57 (WEA_Heid2)
3	08:40	08:10	07:16	16:54 (WEA-5 E-160)	07:05	07:28 (WEA-HS4)	06:02	05:19	
	16:34	17:23	18:15	35 17:29 (WEA-5 E-160)	20:08	25 07:53 (WEA-HS4)	20:59	21:43	
4	08:40	08:09	07:14	16:54 (WEA-5 E-160)	07:03	07:26 (WEA-HS4)	06:00	05:18	
	16:36	17:25	18:17	35 17:29 (WEA-5 E-160)	20:10	27 07:53 (WEA-HS4)	21:01	21:44	
5	08:39	08:07	07:12	16:54 (WEA-5 E-160)	07:01	07:25 (WEA-HS4)	05:58	05:17	
	16:37	17:27	18:18	35 17:29 (WEA-5 E-160)	20:12	28 07:53 (WEA-HS4)	21:02	21:45	
6	08:39	08:05	07:09	16:54 (WEA-5 E-160)	06:59	07:25 (WEA-HS4)	05:56	05:17	
	16:38	17:29	18:20	35 17:29 (WEA-5 E-160)	20:13	28 07:53 (WEA-HS4)	21:04	21:46	
7	08:39	08:04	07:07	16:53 (WEA-5 E-160)	06:56	07:25 (WEA-HS4)	05:54	05:16	
	16:39	17:31	18:22	35 17:28 (WEA-5 E-160)	20:15	28 07:53 (WEA-HS4)	21:05	21:47	
8	08:38	08:02	07:05	16:54 (WEA-5 E-160)	06:54	07:25 (WEA-HS4)	05:53	05:16	
	16:41	17:33	18:24	34 17:28 (WEA-5 E-160)	20:17	27 07:52 (WEA-HS4)	21:07	21:48	
9	08:38	08:00	07:03	16:55 (WEA-5 E-160)	06:52	07:25 (WEA-HS4)	05:51	05:15	
	16:42	17:35	18:25	32 17:27 (WEA-5 E-160)	20:19	27 07:52 (WEA-HS4)	21:09	21:49	
10	08:37	07:58	07:00	16:54 (WEA-5 E-160)	06:50	07:25 (WEA-HS4)	05:49	05:15	
	16:43	17:36	18:27	31 17:25 (WEA-5 E-160)	20:20	25 07:50 (WEA-HS4)	21:10	21:50	
11	08:37	07:57	06:58	16:56 (WEA-5 E-160)	06:47	07:10 (WEA_Heid3)	05:48	05:14	
	16:45	17:38	18:29	28 17:24 (WEA-5 E-160)	20:22	27 07:50 (WEA-HS4)	21:12	21:50	
12	08:36	07:55	06:56	16:57 (WEA-5 E-160)	06:45	07:08 (WEA_Heid3)	05:46	05:14	
	16:46	17:40	18:31	26 17:23 (WEA-5 E-160)	20:24	27 07:49 (WEA-HS4)	21:13	21:51	
13	08:35	07:53	06:54	16:58 (WEA-5 E-160)	06:43	07:06 (WEA_Heid3)	05:44	05:14	
	16:48	17:42	18:32	23 17:21 (WEA-5 E-160)	20:25	26 07:47 (WEA-HS4)	21:15	21:52	
14	08:35	07:51	06:51	17:00 (WEA-5 E-160)	06:41	07:04 (WEA_Heid7)	05:43	05:14	
	16:49	17:44	18:34	19 17:19 (WEA-5 E-160)	20:27	23 07:45 (WEA-HS4)	21:17	21:52	
15	08:34	07:49	06:49	17:03 (WEA-5 E-160)	06:39	07:02 (WEA_Heid7)	05:41	05:13	
	16:51	17:46	18:36	12 17:15 (WEA-5 E-160)	20:29	23 07:43 (WEA-HS4)	21:18	21:53	
16	08:33	07:47	06:47		06:36	07:00 (WEA_Heid7)	05:40	05:13	
	16:52	17:48	18:38		20:30	13 07:13 (WEA_Heid7)	21:20	21:54	
17	08:32	07:45	06:45		06:34	06:59 (WEA_Heid7)	05:38	05:13	
	16:54	17:49	18:39		20:32	15 07:14 (WEA_Heid7)	21:21	21:54	
18	08:31	07:43	06:42		06:32	06:59 (WEA_Heid7)	05:37	05:13	
	16:55	17:51	18:41		20:34	15 07:14 (WEA_Heid7)	21:23	21:54	
19	08:30	07:41	06:40		06:30	06:58 (WEA_Heid7)	05:35	05:13	
	16:57	17:53	18:43		20:35	16 07:14 (WEA_Heid7)	21:24	21:55	
20	08:29	07:39	06:38		06:28	06:58 (WEA_Heid7)	05:34	05:13	
	16:59	17:55	18:44		20:37	15 07:13 (WEA_Heid7)	21:26	21:55	
21	08:28	07:37	06:35	17:08 (WEA-5 E-160)	06:26	06:59 (WEA_Heid7)	05:33	05:13	
	17:00	17:57	10 17:18 (WEA-5 E-160)	18:46	20:39	14 07:13 (WEA_Heid7)	21:27	21:55	
22	08:27	07:35	06:33	17:04 (WEA-5 E-160)	06:24	06:59 (WEA_Heid7)	05:31	05:14	
	17:02	17:59	17 17:21 (WEA-5 E-160)	18:48	20:40	13 07:12 (WEA_Heid7)	21:28	21:56	
23	08:26	07:33	06:31	17:02 (WEA-5 E-160)	06:22	07:00 (WEA_Heid7)	05:30	05:14	
	17:04	18:00	22 17:24 (WEA-5 E-160)	18:50	20:42	10 07:10 (WEA_Heid7)	21:30	1 05:57 (WEA_Heid2)	05:14
24	08:25	07:31	06:28	17:00 (WEA-5 E-160)	06:20	06:59 (WEA_Heid7)	05:29	05:56 (WEA_Heid2)	05:14
	17:06	18:02	26 17:26 (WEA-5 E-160)	18:51	20:44	6 07:08 (WEA_Heid7)	21:31	3 05:59 (WEA_Heid2)	21:56
25	08:23	07:29	06:26	16:59 (WEA-5 E-160)	06:17	05:28	05:55 (WEA_Heid2)	05:14	
	17:07	18:04	28 17:27 (WEA-5 E-160)	18:53	20:46	21:33	4 05:59 (WEA_Heid2)	21:56	
26	08:22	07:27	06:24	16:57 (WEA-5 E-160)	06:15	05:26	05:54 (WEA_Heid2)	05:15	
	17:09	18:06	30 17:27 (WEA-5 E-160)	18:55	20:47	21:34	5 05:59 (WEA_Heid2)	21:56	
27	08:21	07:25	06:22	16:56 (WEA-5 E-160)	06:13	05:25	05:53 (WEA_Heid2)	05:15	
	17:11	18:08	32 17:28 (WEA-5 E-160)	18:56	20:49	21:35	6 05:59 (WEA_Heid2)	21:56	
28	08:19	07:23	06:19	16:56 (WEA-5 E-160)	06:11	05:24	05:52 (WEA_Heid2)	05:16	
	17:13	18:09	33 17:29 (WEA-5 E-160)	18:58	20:51	21:36	7 05:59 (WEA_Heid2)	21:56	
29	08:18		06:09	07:39 (WEA-HS4)	06:09	05:23	05:51 (WEA_Heid2)	05:16	
	17:14		7 07:46 (WEA-HS4)	20:52	21:38	8 05:59 (WEA_Heid2)	21:56		
30	08:17		06:07	07:37 (WEA-HS4)	06:07	05:22	05:51 (WEA_Heid2)	05:17	
	17:16		12 07:49 (WEA-HS4)	20:54	21:39	7 05:58 (WEA_Heid2)	21:55		
31	08:15		06:05	07:35 (WEA-HS4)	06:05	05:21	05:52 (WEA_Heid2)		
	17:18		16 07:51 (WEA-HS4)		21:40	7 05:59 (WEA_Heid2)			
Sonnenscheinstunden	259	278	367		416	485		498	
astr.max.mögl.Beschattung		198	484		499	48		8	
Red.Sonnenscheinwahrsch.		0,30	0,30		0,41	0,46		0,36	
Reduktion Betriebsdauer		0,84	0,84		0,84	0,84		0,84	
Reduktion Windrichtung		0,71	0,71		0,69	0,72		0,72	
Gesamte Reduktion		0,18	0,18		0,24	0,28		0,22	
Met.wahrsch.Beschattung		36	86		118	13		2	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 68 - IP 68 Buschhausen 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	05:54	06:43	07:09 (WEA_Heid3)	07:32	17:36 (WEA-5 E-160)	07:26	08:16			
	21:55	21:23	20:22	27	20:22	19:12	25	18:01 (WEA-5 E-160)	17:07	16:26	
2	05:18	05:55	06:45	07:23 (WEA-HS4)	07:34	17:35 (WEA-5 E-160)	07:27	08:18			
	21:55	21:22	20:19	26	20:19	19:10	28	18:03 (WEA-5 E-160)	17:05	16:26	
3	05:19	05:57	06:47	07:22 (WEA-HS4)	07:35	17:33 (WEA-5 E-160)	07:29	08:19			
	21:54	21:20	20:17	27	20:17	19:08	30	18:03 (WEA-5 E-160)	17:03	16:25	
4	05:20	05:58	06:48	07:22 (WEA-HS4)	07:37	17:32 (WEA-5 E-160)	07:31	08:20			
	21:54	21:18	20:15	28	20:15	19:06	32	18:04 (WEA-5 E-160)	17:01	16:25	
5	05:20	06:00	06:50	07:21 (WEA-HS4)	07:39	17:31 (WEA-5 E-160)	07:33	08:22			
	21:54	21:17	20:13	28	20:13	19:03	33	18:04 (WEA-5 E-160)	16:59	16:24	
6	05:21	06:02	06:51	07:21 (WEA-HS4)	07:40	17:30 (WEA-5 E-160)	07:34	08:23			
	21:53	21:15	20:10	28	20:10	19:01	35	18:05 (WEA-5 E-160)	16:58	16:24	
7	05:22	06:03	06:53	07:21 (WEA-HS4)	07:42	17:29 (WEA-5 E-160)	07:36	08:24			
	21:52	21:13	20:08	28	20:08	18:59	35	18:04 (WEA-5 E-160)	16:56	16:23	
8	05:23	06:05	06:55	07:21 (WEA-HS4)	07:44	17:29 (WEA-5 E-160)	07:38	08:26			
	21:52	21:11	20:06	27	20:06	18:57	35	18:04 (WEA-5 E-160)	16:54	16:23	
9	05:24	06:06	06:56	07:22 (WEA-HS4)	07:45	17:29 (WEA-5 E-160)	07:40	08:27			
	21:51	21:09	20:04	25	20:04	18:54	35	18:04 (WEA-5 E-160)	16:53	16:23	
10	05:25	06:08	06:58	07:23 (WEA-HS4)	07:47	17:28 (WEA-5 E-160)	07:42	08:28			
	21:50	21:08	20:01	23	20:01	18:52	35	18:03 (WEA-5 E-160)	16:51	16:22	
11	05:26	06:01 (WEA_Heid2)	06:59	07:25 (WEA-HS4)	07:49	17:28 (WEA-5 E-160)	07:43	08:29			
	21:50	06:05 (WEA_Heid2)	21:06	19:59	20	07:45 (WEA-HS4)	18:50	35	18:03 (WEA-5 E-160)	16:50	16:22
12	05:27	06:00 (WEA_Heid2)	06:11	07:01	20	07:26 (WEA-HS4)	07:50	08:30			
	21:49	06:06 (WEA_Heid2)	21:04	19:57	16	07:42 (WEA-HS4)	18:48	35	18:03 (WEA-5 E-160)	16:48	16:22
13	05:28	05:59 (WEA_Heid2)	06:13	07:03	16	07:28 (WEA-HS4)	07:52	08:31			
	21:48	06:07 (WEA_Heid2)	21:02	19:54	13	07:41 (WEA-HS4)	18:45	34	18:02 (WEA-5 E-160)	16:46	16:22
14	05:29	05:59 (WEA_Heid2)	06:14	07:04	13	07:30 (WEA-HS4)	07:54	08:32			
	21:47	06:07 (WEA_Heid2)	21:00	19:52	8	07:38 (WEA-HS4)	18:43	33	18:02 (WEA-5 E-160)	16:45	16:22
15	05:31	06:01 (WEA_Heid2)	06:16	07:06	8	07:56	18:43	33	18:02 (WEA-5 E-160)	16:45	16:22
	21:46	06:08 (WEA_Heid2)	20:58	19:50		18:41	31	18:00 (WEA-5 E-160)	16:44	16:22	
16	05:32	06:02 (WEA_Heid2)	06:17	07:08		07:57	18:41	31	18:00 (WEA-5 E-160)	16:44	16:22
	21:45	06:09 (WEA_Heid2)	20:56	19:47		18:39	29	17:59 (WEA-5 E-160)	16:42	16:22	
17	05:33	06:03 (WEA_Heid2)	06:19	07:09		07:59	18:39	29	17:59 (WEA-5 E-160)	16:42	16:22
	21:44	06:09 (WEA_Heid2)	20:54	19:45		18:37	27	17:58 (WEA-5 E-160)	16:41	16:23	
18	05:34	06:04 (WEA_Heid2)	06:21	07:11		08:01	18:37	27	17:58 (WEA-5 E-160)	16:41	16:23
	21:43	06:09 (WEA_Heid2)	20:52	19:43		18:35	24	17:56 (WEA-5 E-160)	16:40	16:23	
19	05:35	06:05 (WEA_Heid2)	06:22	07:12		08:03	18:35	24	17:56 (WEA-5 E-160)	16:40	16:23
	21:42	06:08 (WEA_Heid2)	20:50	7 07:14 (WEA_Heid7)	19:40	18:32	20	17:54 (WEA-5 E-160)	16:38	16:23	
20	05:37	06:06 (WEA_Heid2)	06:24	07:06 (WEA_Heid7)	19:38	08:04	15	17:52 (WEA-5 E-160)	16:37	16:23	
	21:41	06:08 (WEA_Heid2)	20:48	10 07:16 (WEA_Heid7)	19:38	18:30	15	17:52 (WEA-5 E-160)	16:37	16:23	
21	05:38	06:25	07:04 (WEA_Heid7)	07:16	19:36	08:06	6	17:40 (WEA-5 E-160)	16:36	16:24	
	21:39	20:46	07:17 (WEA_Heid7)	19:36	18:28	08:06	6	17:40 (WEA-5 E-160)	16:36	16:24	
22	05:39	06:27	07:03 (WEA_Heid7)	07:17	19:33	08:08			16:36	16:24	
	21:38	20:44	07:17 (WEA_Heid7)	19:33	18:26	08:08			16:35	16:24	
23	05:41	06:29	07:02 (WEA_Heid7)	07:19	19:31	08:10			16:35	16:24	
	21:37	20:41	07:17 (WEA_Heid7)	19:31	18:24	08:11			16:34	16:25	
24	05:42	06:30	07:02 (WEA_Heid7)	07:21	19:29	08:11			16:34	16:25	
	21:35	20:39	07:17 (WEA_Heid7)	19:29	18:22	08:12			16:33	16:25	
25	05:44	06:32	07:02 (WEA_Heid7)	07:22	19:26	08:12			16:33	16:25	
	21:34	20:37	07:18 (WEA_Heid7)	19:26	18:20	08:13			16:32	16:26	
26	05:45	06:34	07:02 (WEA_Heid7)	07:24	19:24	08:13			16:32	16:26	
	21:33	20:35	07:16 (WEA_Heid7)	19:24	18:18	08:14			16:31	16:27	
27	05:46	06:35	07:03 (WEA_Heid7)	07:25	19:22	08:14			16:31	16:27	
	21:31	20:33	07:40 (WEA-HS4)	19:22	18:16	08:15			16:30	16:27	
28	05:48	06:37	07:03 (WEA_Heid7)	07:27	19:20	08:15			16:30	16:27	
	21:30	20:31	07:44 (WEA-HS4)	19:19	8 17:46 (WEA-5 E-160)	08:16			16:30	16:27	
29	05:49	06:38	07:06 (WEA_Heid7)	07:29	19:18	08:16			16:29	16:28	
	21:28	20:28	07:46 (WEA-HS4)	19:17	16 17:42 (WEA-5 E-160)	08:17			16:29	16:28	
30	05:51	06:40	07:06 (WEA_Heid3)	07:30	19:16	08:17			16:28	16:29	
	21:27	20:26	07:47 (WEA-HS4)	19:15	22 17:38 (WEA-5 E-160)	08:18			16:28	16:29	
31	05:52	06:42	07:08 (WEA_Heid3)	07:31	19:14	08:19			16:27	16:30	
	21:25	20:24	07:48 (WEA-HS4)	19:14	22 18:00 (WEA-5 E-160)	08:20			16:27	16:30	
Sonnenscheinstunden	501	453	381			332			267	244	
astr.max.mögl.Beschattung	56	218	370			612					
Red.Sonnenscheinwahrsch.	0,41	0,43	0,36			0,32					
Reduktion Betriebsdauer	0,84	0,84	0,84			0,84					
Reduktion Windrichtung	0,72	0,69	0,69			0,71					
Gesamte Reduktion	0,25	0,25	0,21			0,19					
Met.wahrsch.Beschattung	14	54	77			116					

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 69 - IP 69 Buschhausen 5

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	05:48 (WEA_Heid2)	05:54		06:43	07:09 (WEA-HS4)	07:32	17:56 (WEA-5 E-160)	07:26	08:16	
	21:55	05:51 (WEA_Heid2)	21:23		20:22	07:35 (WEA-HS4)	19:12	18:28 (WEA-5 E-160)	17:07	16:26	
2	05:18	05:49 (WEA_Heid2)	05:55		06:45	07:11 (WEA-HS4)	07:34	17:56 (WEA-5 E-160)	07:27	08:18	
	21:55	05:51 (WEA_Heid2)	21:22		20:19	07:34 (WEA-HS4)	19:10	18:28 (WEA-5 E-160)	17:05	16:26	
3	05:19	05:49 (WEA_Heid2)	05:57	06:48 (WEA_Heid7)	06:47	07:12 (WEA-HS4)	07:35	17:55 (WEA-5 E-160)	07:29	08:19	
	21:54	05:50 (WEA_Heid2)	21:20	9	06:57 (WEA_Heid7)	07:32 (WEA-HS4)	19:08	18:27 (WEA-5 E-160)	17:03	16:25	
4	05:20	05:50 (WEA_Heid2)	05:58		06:47 (WEA_Heid7)	07:31 (WEA-HS4)	07:37	17:56 (WEA-5 E-160)	07:31	08:20	
	21:54	05:51 (WEA_Heid2)	21:18	12	06:59 (WEA_Heid7)	07:30 (WEA-HS4)	19:06	18:27 (WEA-5 E-160)	17:01	16:25	
5	05:20		06:00		06:46 (WEA_Heid7)	07:29 (WEA-HS4)	07:39	17:56 (WEA-5 E-160)	07:33	08:22	
	21:53		21:17	13	06:59 (WEA_Heid7)	07:27 (WEA-HS4)	19:03	18:26 (WEA-5 E-160)	16:59	16:24	
6	05:21		06:02		06:45 (WEA_Heid7)	07:26 (WEA-HS4)	07:40	17:57 (WEA-5 E-160)	07:34	08:23	
	21:53		21:15	16	07:01 (WEA_Heid7)	07:25 (WEA-HS4)	19:01	18:25 (WEA-5 E-160)	16:58	16:24	
7	05:22		06:03		06:44 (WEA_Heid7)	07:24 (WEA-HS4)	07:42	17:57 (WEA-5 E-160)	07:36	08:24	
	21:52		21:13	17	07:01 (WEA_Heid7)	07:23 (WEA-HS4)	18:59	18:26 (WEA-5 E-160)	16:56	16:23	
8	05:23		06:05		06:44 (WEA_Heid7)	07:22 (WEA-HS4)	07:44	17:58 (WEA-5 E-160)	07:38	08:26	
	21:52		21:11	17	07:01 (WEA_Heid7)	07:21 (WEA-HS4)	18:57	18:22 (WEA-5 E-160)	16:54	16:23	
9	05:24		06:06		06:43 (WEA_Heid7)	07:20 (WEA-HS4)	07:45	18:00 (WEA-5 E-160)	07:40	08:27	
	21:51		21:09	18	07:01 (WEA_Heid7)	07:19 (WEA-HS4)	18:54	18:00 (WEA-5 E-160)	16:53	16:23	
10	05:25		06:08		06:44 (WEA_Heid7)	07:18 (WEA-HS4)	07:47	18:01 (WEA-5 E-160)	07:42	08:28	
	21:50		21:08	17	07:01 (WEA_Heid7)	07:17 (WEA-HS4)	18:52	18:17 (WEA-5 E-160)	16:51	16:22	
11	05:26		06:09		06:43 (WEA_Heid7)	07:16 (WEA-HS4)	07:49	18:05 (WEA-5 E-160)	07:43	08:29	
	21:50		21:06	18	07:01 (WEA_Heid7)	07:15 (WEA-HS4)	18:50	18:14 (WEA-5 E-160)	16:50	16:22	
12	05:27		06:11		06:44 (WEA_Heid7)	07:14 (WEA-HS4)	07:50		07:45	08:30	
	21:49		21:04	17	07:01 (WEA_Heid7)	07:13 (WEA-HS4)	18:48		16:48	16:22	
13	05:28		06:13		06:44 (WEA_Heid7)	07:12 (WEA-HS4)	07:52		07:47	08:31	
	21:48		21:02	15	06:59 (WEA_Heid7)	07:11 (WEA-HS4)	18:45		16:46	16:22	
14	05:29		06:14		06:45 (WEA_Heid7)	07:10 (WEA-HS4)	07:54		07:49	08:32	
	21:47		21:00	14	06:59 (WEA_Heid7)	07:09 (WEA-HS4)	18:43		16:45	16:22	
15	05:31		06:16		06:45 (WEA_Heid7)	07:08 (WEA-HS4)	07:56		07:50	08:33	
	21:46		20:58	24	07:32 (WEA-HS4)	07:07 (WEA-HS4)	18:41		16:44	16:22	
16	05:32		06:17		06:48 (WEA_Heid7)	07:06 (WEA-HS4)	07:57		07:52	08:34	
	21:45		20:56	25	07:35 (WEA-HS4)	07:05 (WEA-HS4)	18:39		16:42	16:22	
17	05:33		06:19		07:15 (WEA-HS4)	07:04 (WEA-HS4)	07:59		07:54	08:34	
	21:44		20:54	21	07:36 (WEA-HS4)	07:03 (WEA-HS4)	18:37		16:41	16:23	
18	05:34		06:21		07:14 (WEA-HS4)	07:02 (WEA-HS4)	08:01		07:56	08:35	
	21:43		20:52	24	07:38 (WEA-HS4)	07:01 (WEA-HS4)	18:35		16:40	16:23	
19	05:35		06:22		07:12 (WEA-HS4)	07:00 (WEA-HS4)	08:03		07:57	08:36	
	21:42		20:50	26	07:38 (WEA-HS4)	06:59 (WEA-HS4)	18:32		16:38	16:23	
20	05:37		06:24		07:12 (WEA-HS4)	06:58 (WEA-HS4)	08:04		07:59	08:37	
	21:41		20:48	27	07:39 (WEA-HS4)	06:57 (WEA-HS4)	18:30		16:37	16:23	
21	05:38		06:25		07:10 (WEA-HS4)	06:56 (WEA-HS4)	08:06	18:12 (WEA-5 E-160)	08:01	08:37	
	21:39		20:46	29	07:39 (WEA-HS4)	06:55 (WEA-HS4)	18:28	18:21 (WEA-5 E-160)	16:36	16:24	
22	05:39		06:27		07:10 (WEA-HS4)	06:54 (WEA-HS4)	08:08	18:08 (WEA-5 E-160)	08:02	08:38	
	21:38		20:43	30	07:40 (WEA-HS4)	06:53 (WEA-HS4)	18:26	18:23 (WEA-5 E-160)	16:35	16:24	
23	05:41		06:29		06:58 (WEA_Heid3)	06:52 (WEA-HS4)	08:10	18:05 (WEA-5 E-160)	08:04	08:38	
	21:37		20:41	36	07:40 (WEA-HS4)	06:51 (WEA-HS4)	18:24	18:26 (WEA-5 E-160)	16:34	16:25	
24	05:42		06:30		06:57 (WEA_Heid3)	06:50 (WEA-HS4)	08:11	18:04 (WEA-5 E-160)	08:06	08:39	
	21:35		20:39	38	07:40 (WEA-HS4)	06:49 (WEA-HS4)	18:22	18:27 (WEA-5 E-160)	16:33	16:25	
25	05:44		06:32		06:58 (WEA_Heid3)	06:48 (WEA-HS4)	07:13	18:01 (WEA-5 E-160)	08:07	08:39	
	21:34		20:37	38	07:40 (WEA-HS4)	06:47 (WEA-HS4)	17:20	18:28 (WEA-5 E-160)	16:32	16:26	
26	05:45		06:34		07:00 (WEA_Heid3)	06:46 (WEA-HS4)	07:15	18:00 (WEA-5 E-160)	08:09	08:39	
	21:33		20:35	36	07:40 (WEA-HS4)	06:45 (WEA-HS4)	17:18	18:29 (WEA-5 E-160)	16:31	16:27	
27	05:46		06:35		07:02 (WEA_Heid3)	06:44 (WEA-HS4)	07:17	17:59 (WEA-5 E-160)	08:10	08:40	
	21:31		20:33	34	07:40 (WEA-HS4)	06:43 (WEA-HS4)	17:16	18:28 (WEA-5 E-160)	16:30	16:27	
28	05:48		06:37		07:07 (WEA-HS4)	06:42 (WEA-HS4)	07:18	17:58 (WEA-5 E-160)	08:12	08:40	
	21:30		20:31	32	07:39 (WEA-HS4)	06:41 (WEA-HS4)	17:14	18:29 (WEA-5 E-160)	16:29	16:28	
29	05:49		06:38		07:08 (WEA-HS4)	06:40 (WEA-HS4)	07:20	17:58 (WEA-5 E-160)	08:13	08:40	
	21:28		20:28	31	07:39 (WEA-HS4)	06:39 (WEA-HS4)	17:12	18:29 (WEA-5 E-160)	16:28	16:29	
30	05:51		06:40		07:08 (WEA-HS4)	06:38 (WEA-HS4)	07:22	17:56 (WEA-5 E-160)	08:15	08:40	
	21:27		20:26	29	07:37 (WEA-HS4)	06:37 (WEA-HS4)	17:10	18:28 (WEA-5 E-160)	16:27	16:30	
31	05:52		06:42		07:08 (WEA-HS4)	06:36 (WEA-HS4)	07:24		08:16	08:40	
	21:25		20:24	29	07:37 (WEA-HS4)	06:35 (WEA-HS4)	17:08		16:31	16:31	
Sonnenscheinstunden	501		453		381		332		267	244	
astr.max.mögl.Beschattung	7		692		344		280				
Red.Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32				
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84				
Reduktion Windrichtung	0,72		0,70		0,69		0,70				
Gesamte Reduktion	0,25		0,25		0,21		0,18				
Met.wahrsch.Beschattung	2		173		72		52				

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 71 - IP 71 Große Heide 6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:11 (WEA03)	08:14		08:54 (WEA08)	07:20	17:05 (WEA-4 E-160)	07:10	06:06	05:21	
	16:32	3	09:14 (WEA03)	17:20	48	16:25 (WEA-3 E-160)	18:11	29	17:34 (WEA-4 E-160)	20:05	20:56
2	08:40	09:11 (WEA03)	08:12		08:53 (WEA08)	07:18	17:05 (WEA-4 E-160)	07:08	06:04	05:20	
	16:33	4	09:15 (WEA03)	17:22	50	16:25 (WEA-3 E-160)	18:13	29	17:34 (WEA-4 E-160)	20:07	20:57
3	08:40	09:11 (WEA03)	08:10		08:53 (WEA08)	07:16	17:03 (WEA-4 E-160)	07:06	06:02	05:19	
	16:34	6	09:17 (WEA03)	17:24	48	16:24 (WEA-3 E-160)	18:15	31	17:34 (WEA-4 E-160)	20:08	20:59
4	08:40	09:10 (WEA03)	08:09		08:54 (WEA08)	07:14	17:03 (WEA-4 E-160)	07:03	06:00	05:18	
	16:36	7	09:17 (WEA03)	17:25	48	16:25 (WEA-3 E-160)	18:17	31	17:34 (WEA-4 E-160)	20:10	21:01
5	08:39	09:10 (WEA03)	08:07		08:54 (WEA08)	07:12	17:04 (WEA-4 E-160)	07:01	05:58	05:18	
	16:37	8	09:18 (WEA03)	17:27	45	16:24 (WEA-3 E-160)	18:18	30	17:34 (WEA-4 E-160)	20:12	21:02
6	08:39	09:10 (WEA03)	08:06		08:54 (WEA08)	07:09	17:04 (WEA-4 E-160)	06:59	05:56	05:17	
	16:38	9	09:19 (WEA03)	17:29	43	16:23 (WEA-3 E-160)	18:20	30	17:34 (WEA-4 E-160)	20:13	21:04
7	08:39	09:09 (WEA03)	08:04		08:54 (WEA08)	07:07	17:03 (WEA-4 E-160)	06:56	05:54	05:16	
	16:39	10	09:19 (WEA03)	17:31	40	16:21 (WEA-3 E-160)	18:22	29	17:32 (WEA-4 E-160)	20:15	21:06
8	08:38	09:08 (WEA03)	08:02		08:55 (WEA08)	07:05	17:04 (WEA-4 E-160)	06:54	05:53	05:16	
	16:41	11	09:19 (WEA03)	17:33	34	16:19 (WEA-3 E-160)	18:24	28	17:32 (WEA-4 E-160)	20:17	21:07
9	08:38	09:08 (WEA03)	08:00		08:55 (WEA08)	07:03	17:05 (WEA-4 E-160)	06:52	05:51	05:15	
	16:42	13	09:21 (WEA03)	17:35	28	16:17 (WEA-3 E-160)	18:25	26	17:31 (WEA-4 E-160)	20:19	21:09
10	08:37	09:07 (WEA03)	07:59		08:56 (WEA08)	07:01	17:05 (WEA-4 E-160)	06:50	05:49	05:15	
	16:43	14	09:21 (WEA03)	17:37	16	09:12 (WEA08)	18:27	24	17:29 (WEA-4 E-160)	20:20	21:10
11	08:37	09:07 (WEA03)	07:57		08:59 (WEA08)	06:58	17:06 (WEA-4 E-160)	06:47	05:48	05:15	
	16:45	14	09:21 (WEA03)	17:38	12	09:11 (WEA08)	18:29	22	17:28 (WEA-4 E-160)	20:22	21:12
12	08:36	09:08 (WEA03)	07:55		09:02 (WEA08)	06:56	17:08 (WEA-4 E-160)	06:45	05:46	05:14	
	16:46	14	09:22 (WEA03)	17:40	6	09:08 (WEA08)	18:31	18	17:26 (WEA-4 E-160)	20:24	21:14
13	08:35	09:09 (WEA03)	07:53			06:54	17:11 (WEA-4 E-160)	06:43	05:44	05:14	
	16:48	13	09:22 (WEA03)	17:42		18:32	17:23 (WEA-4 E-160)	20:25	21:15	21:52	
14	08:35	09:09 (WEA03)	07:51			06:51		06:41	05:43	05:14	
	16:49	19	16:09 (WEA-3 E-160)	17:44		18:34		20:27	21:17	21:52	
15	08:34	09:10 (WEA03)	07:49			06:49		06:39	05:41	05:13	
	16:51	24	16:12 (WEA-3 E-160)	17:46		18:36		20:29	21:18	21:53	
16	08:33	09:11 (WEA03)	07:47			06:47		06:36	05:40	05:13	
	16:52	25	16:14 (WEA-3 E-160)	17:48		18:38		20:30	21:20	21:54	
17	08:32	09:12 (WEA03)	07:45			06:45		06:34	05:38	05:13	
	16:54	27	16:16 (WEA-3 E-160)	17:49		18:39		20:32	21:21	21:54	
18	08:31	09:13 (WEA03)	07:43			06:42		06:32	05:37	05:13	
	16:55	28	16:17 (WEA-3 E-160)	17:51		18:41		20:34	21:23	21:54	
19	08:30	09:14 (WEA03)	07:41			06:40		06:30	05:35	05:13	
	16:57	27	16:18 (WEA-3 E-160)	17:53		18:43		20:35	21:24	21:55	
20	08:29	15:56 (WEA-3 E-160)	07:39			06:38		06:28	05:34	05:13	
	16:59	23	16:19 (WEA-3 E-160)	17:55		18:45		20:37	21:26	21:55	
21	08:28	15:56 (WEA-3 E-160)	07:37			06:35		06:26	05:33	05:14	
	17:00	24	16:20 (WEA-3 E-160)	17:57		18:46		20:39	21:27	21:55	
22	08:27	15:56 (WEA-3 E-160)	07:35			06:33		06:24	05:31	05:14	
	17:02	26	16:22 (WEA-3 E-160)	17:59		18:48		20:41	21:28	21:56	
23	08:26	15:55 (WEA-3 E-160)	07:33		17:14 (WEA-4 E-160)	06:31		06:22	05:30	05:14	
	17:04	27	16:22 (WEA-3 E-160)	18:00	13	17:27 (WEA-4 E-160)	18:50	20:42	21:30	21:56	
24	08:25	15:56 (WEA-3 E-160)	07:31			06:29		06:20	05:29	05:14	
	17:06	27	16:23 (WEA-3 E-160)	18:02	18	17:29 (WEA-4 E-160)	18:51	20:44	21:31	21:56	
25	08:23	15:56 (WEA-3 E-160)	07:29			06:26		06:17	05:28	05:15	
	17:07	28	16:24 (WEA-3 E-160)	18:04	21	17:31 (WEA-4 E-160)	18:53	20:46	21:33	21:56	
26	08:22	08:59 (WEA08)	07:27			06:24		06:15	05:27	05:15	
	17:09	36	16:24 (WEA-3 E-160)	18:06	24	17:31 (WEA-4 E-160)	18:55	20:47	21:34	21:56	
27	08:21	08:57 (WEA08)	07:25			06:22		06:13	05:25	05:15	
	17:11	41	16:25 (WEA-3 E-160)	18:08	26	17:32 (WEA-4 E-160)	18:56	20:49	21:35	21:56	
28	08:19	08:56 (WEA08)	07:23			06:19		06:11	05:24	05:16	
	17:13	44	16:25 (WEA-3 E-160)	18:09	27	17:33 (WEA-4 E-160)	18:58	20:51	21:36	21:56	
29	08:18	08:55 (WEA08)				07:17		06:09	05:23	05:16	
	17:14	46	16:25 (WEA-3 E-160)			20:00		20:52	21:38	21:56	
30	08:17	08:54 (WEA08)				07:15		06:08	05:22	05:17	
	17:16	48	16:25 (WEA-3 E-160)			20:02		20:54	21:39	21:55	
31	08:15	08:53 (WEA08)				07:12			05:21		
	17:18	49	16:25 (WEA-3 E-160)			20:03			21:40		
Sonnenscheinstunden		259		278		367		416	485	498	
astr.max.mögl.Beschattung		695		547		339					
Red.Sonnenscheinwahrsch.		0,20		0,30		0,30					
Reduktion Betriebsdauer		0,84		0,84		0,84					
Reduktion Windrichtung		0,65		0,66		0,71					
Gesamte Reduktion		0,11		0,17		0,18					
Met.wahrsch.Beschattung		74		91		60					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 71 - IP 71 Große Heide 6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember									
1	05:18 21:55	05:54 21:23	06:43 20:22	07:32 19:13	17:48 (WEA-4 E-160) 19:13	07:26 16 08:42 (WEA08) 16:27	08:49 (WEA03) 09:03 (WEA03)								
2	05:18 21:55	05:55 21:22	06:45 20:19	07:34 19:10	17:46 (WEA-4 E-160) 19:10	07:27 29 15:47 (WEA-3 E-160) 16:26	08:50 (WEA03) 09:04 (WEA03)								
3	05:19 21:54	05:57 21:20	06:47 20:17	07:35 19:08	17:43 (WEA-4 E-160) 19:08	07:29 36 15:49 (WEA-3 E-160) 16:25	08:19 13 09:04 (WEA03)								
4	05:20 21:54	05:59 21:18	06:48 20:15	07:37 19:06	17:42 (WEA-4 E-160) 19:06	07:31 39 15:51 (WEA-3 E-160) 16:25	08:20 12 09:05 (WEA03)								
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	17:41 (WEA-4 E-160) 19:03	07:33 43 15:52 (WEA-3 E-160) 16:24	08:22 10 09:04 (WEA03)								
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	17:41 (WEA-4 E-160) 19:01	07:35 46 15:54 (WEA-3 E-160) 16:24	08:23 (WEA08) 9 09:05 (WEA03)								
7	05:22 21:52	06:03 21:13	06:53 20:08	07:42 18:59	17:39 (WEA-4 E-160) 18:59	07:36 47 15:54 (WEA-3 E-160) 16:23	08:24 (WEA08) 8 09:05 (WEA03)								
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57	17:39 (WEA-4 E-160) 18:57	07:38 48 15:55 (WEA-3 E-160) 16:23	08:24 (WEA08) 7 09:05 (WEA03)								
9	05:24 21:51	06:06 21:09	06:56 20:04	07:45 18:54	17:39 (WEA-4 E-160) 18:54	07:40 49 15:56 (WEA-3 E-160) 16:23	08:24 (WEA08) 6 09:05 (WEA03)								
10	05:25 21:50	06:08 21:08	06:58 20:01	07:47 18:52	17:38 (WEA-4 E-160) 18:52	07:42 48 15:56 (WEA-3 E-160) 16:23	08:28 (WEA08) 5 09:05 (WEA03)								
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50	17:38 (WEA-4 E-160) 18:50	07:43 49 15:57 (WEA-3 E-160) 16:22	08:29 (WEA08) 3 09:05 (WEA03)								
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48	17:38 (WEA-4 E-160) 18:48	07:45 47 15:57 (WEA-3 E-160) 16:22	08:30 2 09:05 (WEA03)								
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:45	17:38 (WEA-4 E-160) 18:45	07:47 46 15:56 (WEA-3 E-160) 16:22	08:31 1 09:04 (WEA03)								
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43	17:39 (WEA-4 E-160) 18:43	07:49 44 15:57 (WEA-3 E-160) 16:22	08:32 (WEA08) 09:05 (WEA03)								
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41	17:39 (WEA-4 E-160) 18:41	07:50 41 15:57 (WEA-3 E-160) 16:22	08:33 (WEA08) 16:22								
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39	17:40 (WEA-4 E-160) 18:03 (WEA-4 E-160)	07:52 36 15:57 (WEA-3 E-160) 16:22	08:34 (WEA08) 16:22								
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37	17:41 (WEA-4 E-160) 18:02 (WEA-4 E-160)	07:54 28 15:57 (WEA-3 E-160) 16:23	08:34 (WEA08) 16:23								
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35	17:43 (WEA-4 E-160) 18:00 (WEA-4 E-160)	07:56 27 15:57 (WEA-3 E-160) 16:23	08:35 (WEA08) 16:23								
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33	17:46 (WEA-4 E-160) 17:57 (WEA-4 E-160)	07:57 27 15:57 (WEA-3 E-160) 16:23	15:30 (WEA-3 E-160) 16:23								
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30	17:57 (WEA-4 E-160) 18:04 (WEA-4 E-160)	07:59 26 15:57 (WEA-3 E-160) 16:23	15:31 (WEA-3 E-160) 16:23								
21	05:38 21:39	06:26 20:46	07:16 19:36	08:06 18:28	18:01 18:28	08:01 24 15:55 (WEA-3 E-160) 16:24	15:31 (WEA-3 E-160) 16:24								
22	05:39 21:38	06:27 20:44	07:17 19:33	08:08 18:26	18:02 18:26	08:02 23 15:55 (WEA-3 E-160) 16:24	15:32 (WEA-3 E-160) 16:24								
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24	18:03 18:24	08:04 27 15:55 (WEA-3 E-160) 16:25	08:51 (WEA03) 16:25								
24	05:42 21:35	06:30 20:39	07:21 19:29	08:11 18:22	18:04 18:22	08:06 28 15:54 (WEA-3 E-160) 16:25	08:50 (WEA03) 16:25								
25	05:44 21:34	06:32 20:37	07:22 19:26	08:13 18:20	18:07 18:20	08:07 27 15:54 (WEA-3 E-160) 16:26	08:50 (WEA03) 16:26								
26	05:45 21:33	06:34 20:35	07:24 19:24	08:15 18:18	18:09 18:18	08:09 25 15:52 (WEA-3 E-160) 16:27	08:49 (WEA03) 16:27								
27	05:47 21:31	06:35 20:33	07:25 19:22	08:17 18:16	18:10 18:16	08:10 24 15:51 (WEA-3 E-160) 16:28	08:49 (WEA03) 16:28								
28	05:48 21:30	06:37 20:31	07:27 19:19	08:18 18:14	18:12 18:14	08:12 21 15:50 (WEA-3 E-160) 16:28	08:49 (WEA03) 16:28								
29	05:49 21:28	06:39 20:28	07:29 19:17	08:20 18:12	18:13 18:12	08:13 13 09:02 (WEA03) 16:29	08:49 (WEA03) 16:29								
30	05:51 21:27	06:40 20:26	07:30 19:15	08:22 18:10	18:15 18:10	08:15 14 09:03 (WEA03) 16:30	08:49 (WEA03) 16:30								
31	05:52 21:25	06:42 20:24		08:24 17:09	18:17 17:09	08:17 13 08:40 (WEA08) 16:31	08:40 16:31								
Sonnenscheinstunden							501	453	381		332	267		244	
astr.max.mögl.Beschattung									9		496		998		107
Red.Sonnenscheinwahrsch.									0,36		0,32		0,23		0,15
Reduktion Betriebsdauer									0,84		0,84		0,84		0,84
Reduktion Windrichtung									0,71		0,70		0,66		0,55
Gesamte Reduktion									0,21		0,19		0,13		0,07
Met.wahrsch.Beschattung									2		92		125		7

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 72 - IP 72 Horenfeld 20

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	14:06 (WEA-2 E-138)	08:14	08:41 (WEA03)	07:20	08:17 (WEA08)	
1	16:32	50 15:41 (WEA-1)	17:20	08:56 (WEA03)	18:11	32 16:56 (WEA-3 E-160)	
2	08:40	14:07 (WEA-2 E-138)	08:12	08:41 (WEA03)	07:18	08:18 (WEA08)	
2	16:33	50 15:42 (WEA-1)	17:22	08:57 (WEA03)	18:13	19 08:37 (WEA08)	
3	08:40	14:09 (WEA-2 E-138)	08:10	08:41 (WEA03)	07:16	08:19 (WEA08)	
3	16:34	47 15:42 (WEA-1)	17:24	08:57 (WEA03)	18:15	15 08:34 (WEA08)	
4	08:40	09:10 (WEA04)	08:09	08:41 (WEA03)	07:14	08:21 (WEA08)	
4	16:36	49 15:42 (WEA-1)	17:25	08:56 (WEA03)	18:17	11 08:32 (WEA08)	
5	08:39	09:10 (WEA04)	08:07	08:42 (WEA03)	07:12	07:01	
5	16:37	51 15:43 (WEA-1)	17:27	08:57 (WEA03)	18:18	20:12	
6	08:39	09:10 (WEA04)	08:05	08:42 (WEA03)	07:09	06:59	
6	16:38	50 15:44 (WEA-1)	17:29	08:56 (WEA03)	18:20	20:13	
7	08:39	09:09 (WEA04)	08:04	08:43 (WEA03)	07:07	06:56	
7	16:39	49 15:44 (WEA-1)	17:31	08:55 (WEA03)	18:22	20:15	
8	08:38	09:08 (WEA04)	08:02	08:44 (WEA03)	07:05	06:54	
8	16:41	49 15:44 (WEA-1)	17:33	16:53 (WEA-3 E-160)	18:24	20:17	
9	08:38	09:08 (WEA04)	08:00	08:47 (WEA03)	07:03	06:52	
9	16:42	48 15:45 (WEA-1)	17:35	16:57 (WEA-3 E-160)	18:25	20:19	
10	08:37	09:07 (WEA04)	07:59	16:42 (WEA-3 E-160)	07:01	06:50	
10	16:43	46 15:45 (WEA-1)	17:37	17:00 (WEA-3 E-160)	18:27	20:20	
11	08:37	09:06 (WEA04)	07:57	16:41 (WEA-3 E-160)	06:58	06:47	
11	16:45	42 15:45 (WEA-1)	17:38	17:02 (WEA-3 E-160)	18:29	20:22	
12	08:36	09:06 (WEA04)	07:55	16:40 (WEA-3 E-160)	06:56	06:45	
12	16:46	35 15:46 (WEA-1)	17:40	17:04 (WEA-3 E-160)	18:31	20:24	
13	08:35	09:06 (WEA04)	07:53	16:39 (WEA-3 E-160)	06:54	06:43	
13	16:48	35 15:45 (WEA-1)	17:42	17:05 (WEA-3 E-160)	18:32	20:25	
14	08:35	09:06 (WEA04)	07:51	16:38 (WEA-3 E-160)	06:51	06:41	
14	16:49	34 15:45 (WEA-1)	17:44	17:06 (WEA-3 E-160)	18:34	20:27	
15	08:34	09:06 (WEA04)	07:49	16:37 (WEA-3 E-160)	06:49	06:39	
15	16:51	33 15:45 (WEA-1)	17:46	17:06 (WEA-3 E-160)	18:36	20:29	
16	08:33	09:07 (WEA04)	07:47	16:37 (WEA-3 E-160)	06:47	17:58 (WEA-4 E-160)	
16	16:52	32 15:45 (WEA-1)	17:48	17:07 (WEA-3 E-160)	18:38	4 18:02 (WEA-4 E-160)	
17	08:32	09:08 (WEA04)	07:45	08:24 (WEA08)	06:45	17:52 (WEA-4 E-160)	
17	16:54	30 15:45 (WEA-1)	17:49	17:07 (WEA-3 E-160)	18:39	14 18:06 (WEA-4 E-160)	
18	08:31	09:08 (WEA04)	07:43	08:20 (WEA08)	06:42	17:49 (WEA-4 E-160)	
18	16:55	28 15:44 (WEA-1)	17:51	17:06 (WEA-3 E-160)	18:41	20 18:09 (WEA-4 E-160)	
19	08:30	09:09 (WEA04)	07:41	08:19 (WEA08)	06:40	17:48 (WEA-4 E-160)	
19	16:57	23 15:42 (WEA-1)	17:53	17:07 (WEA-3 E-160)	18:43	22 18:10 (WEA-4 E-160)	
20	08:29	09:10 (WEA04)	07:39	08:18 (WEA08)	06:38	17:45 (WEA-4 E-160)	
20	16:59	17 15:41 (WEA-1)	17:55	17:07 (WEA-3 E-160)	18:45	26 18:11 (WEA-4 E-160)	
21	08:28	09:12 (WEA04)	07:37	08:17 (WEA08)	06:35	17:44 (WEA-4 E-160)	
21	17:00	6 09:18 (WEA04)	17:57	17:06 (WEA-3 E-160)	18:46	28 18:12 (WEA-4 E-160)	
22	08:27	07:35	08:16 (WEA08)	06:33	17:44 (WEA-4 E-160)	06:24	
22	17:02	17:59	17:06 (WEA-3 E-160)	18:48	29 18:13 (WEA-4 E-160)	20:41	
23	08:26	07:33	08:16 (WEA08)	06:31	17:42 (WEA-4 E-160)	06:22	
23	17:04	18:00	17:06 (WEA-3 E-160)	18:50	30 18:12 (WEA-4 E-160)	20:42	
24	08:25	07:31	08:16 (WEA08)	06:29	17:42 (WEA-4 E-160)	06:20	
24	17:06	18:02	17:05 (WEA-3 E-160)	18:51	31 18:13 (WEA-4 E-160)	20:44	
25	08:23	07:29	08:16 (WEA08)	06:26	17:42 (WEA-4 E-160)	06:17	
25	17:07	18:04	17:04 (WEA-3 E-160)	18:53	31 18:13 (WEA-4 E-160)	20:46	
26	08:22	07:27	08:15 (WEA08)	06:24	17:41 (WEA-4 E-160)	06:15	
26	17:09	18:06	17:02 (WEA-3 E-160)	18:55	31 18:12 (WEA-4 E-160)	20:47	
27	08:21	07:25	08:16 (WEA08)	06:22	17:41 (WEA-4 E-160)	06:13	
27	17:11	18:08	17:01 (WEA-3 E-160)	18:56	31 18:12 (WEA-4 E-160)	20:49	
28	08:19	08:46 (WEA03)	07:23	08:16 (WEA08)	06:19	17:41 (WEA-4 E-160)	
28	17:13	5 08:51 (WEA03)	18:09	16:59 (WEA-3 E-160)	18:58	30 18:11 (WEA-4 E-160)	
29	08:18	08:45 (WEA03)	07:17	07:17	06:09	18:40 (WEA-4 E-160)	
29	17:14	9 08:54 (WEA03)	07:15	20:00	30 19:10 (WEA-4 E-160)	20:52	
30	08:17	08:43 (WEA03)	07:15	07:15	06:08	18:41 (WEA-4 E-160)	
30	17:16	12 08:55 (WEA03)	20:02	20:02	28 19:09 (WEA-4 E-160)	20:54	
31	08:15	08:41 (WEA03)	07:12	07:12	06:08	18:42 (WEA-4 E-160)	
31	17:18	14 08:55 (WEA03)	20:03	20:03	27 19:09 (WEA-4 E-160)	21:40	
	Sonnenscheinstunden	259	278	367	416	485	498
	astr.max.mögl.Beschattung	844	903	489	76		
	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41		
	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		
	Reduktion Windrichtung	0,65	0,67	0,68	0,69		
	Gesamte Reduktion	0,11	0,17	0,17	0,24		
	Met.wahrsch.Beschattung	91	154	83	18		

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 72 - IP 72 Horenfeld 20

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:23	06:43 20:22	07:32 19:13	07:26 17:07	08:16 16:29 (WEA-3 E-160)
2	05:18 21:55	05:55 21:22	06:45 20:19	07:34 19:10	07:27 17:05	08:18 16:26 (WEA-3 E-160)
3	05:19 21:54	05:57 21:20	06:47 20:17	07:35 19:08	07:29 17:03	08:19 16:25 (WEA-3 E-160)
4	05:20 21:54	05:59 21:18	06:48 20:15	07:37 19:06	07:31 17:01	08:20 16:25 (WEA-3 E-160)
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	07:33 17:00	08:22 16:24 (WEA-3 E-160)
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	07:35 16:58	08:23 16:24 (WEA-3 E-160)
7	05:22 21:52	06:03 21:13	06:53 20:08	07:42 18:59	07:36 16:56	08:24 16:23 (WEA-3 E-160)
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57 (WEA-4 E-160)	07:38 16:54	08:26 16:23 (WEA-3 E-160)
9	05:24 21:51	06:06 21:09	06:56 20:04	07:45 18:54 (WEA-4 E-160)	07:40 16:53	08:27 16:23 (WEA-3 E-160)
10	05:25 21:50	06:08 21:08	06:58 20:01	07:47 18:52 (WEA-4 E-160)	07:42 16:51	08:28 16:23 (WEA-3 E-160)
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50 (WEA-4 E-160)	07:43 16:50	08:29 16:22 (WEA-3 E-160)
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48 (WEA-4 E-160)	07:45 16:48	08:30 16:22 (WEA-3 E-160)
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:45 (WEA-4 E-160)	07:47 16:47	08:31 16:22 (WEA-3 E-160)
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43 (WEA-4 E-160)	07:49 16:45	08:32 16:22 (WEA-3 E-160)
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41 (WEA-4 E-160)	07:50 16:44	08:33 16:22 (WEA-3 E-160)
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39 (WEA-4 E-160)	07:52 16:42	08:34 16:22 (WEA-3 E-160)
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37 (WEA-4 E-160)	07:54 16:41	08:35 16:23 (WEA-3 E-160)
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35 (WEA-4 E-160)	07:56 16:40	08:36 16:23 (WEA-3 E-160)
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33 (WEA-4 E-160)	07:57 16:38	08:37 16:23 (WEA-3 E-160)
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30 (WEA-4 E-160)	07:59 16:37	08:38 16:24 (WEA-3 E-160)
21	05:38 21:39	06:26 20:46	07:16 19:36	08:06 18:28 (WEA-4 E-160)	08:01 16:36	08:39 16:24 (WEA-3 E-160)
22	05:40 21:38	06:27 20:44	07:17 19:33	08:08 18:26 (WEA-4 E-160)	08:02 16:35	08:40 16:24 (WEA-3 E-160)
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24 (WEA-4 E-160)	08:04 16:34	08:41 16:25 (WEA-3 E-160)
24	05:42 21:35	06:30 20:39	07:21 19:29	08:11 18:22 (WEA-4 E-160)	08:06 16:33	08:42 16:25 (WEA-3 E-160)
25	05:44 21:34	06:32 20:37	07:22 19:26	08:13 18:20 (WEA-4 E-160)	08:07 16:32	08:43 16:26 (WEA-3 E-160)
26	05:45 21:33	06:34 20:35	07:24 19:24	08:15 18:18 (WEA-4 E-160)	08:09 16:31	08:44 16:27 (WEA-3 E-160)
27	05:47 21:31	06:35 20:33	07:25 19:22	08:17 18:16 (WEA-4 E-160)	08:10 16:30	08:45 16:28 (WEA-3 E-160)
28	05:48 21:30	06:37 20:31	07:27 19:19	08:18 18:14 (WEA-4 E-160)	08:12 16:29	08:46 16:28 (WEA-3 E-160)
29	05:49 21:28	06:39 20:28	07:29 19:17	08:20 18:12 (WEA-4 E-160)	08:13 16:28	08:47 16:29 (WEA-3 E-160)
30	05:51 21:27	06:40 20:26	07:30 19:15	08:22 18:10 (WEA-4 E-160)	08:15 16:27	08:48 16:30 (WEA-3 E-160)
31	05:52 21:25	06:42 20:24		08:24 18:09 (WEA-4 E-160)	08:16 16:27	08:49 16:31 (WEA-3 E-160)
Sonnenscheinstunden	501	453	381	332	267	244
astr. max. mögl. Beschattung			497	849	462	1565
Red. Sonnenscheinwahrsch.			0,36	0,32	0,23	0,15
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,69	0,68	0,62	0,68
Gesamte Reduktion			0,21	0,18	0,12	0,08
Met. wahrsch. Beschattung			104	153	55	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 (WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
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Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 73 - IP 73 Horenfeld 21

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni				
1	08:40	14:19 (WEA-2 E-138)	08:14	08:40 (WEA03)	07:20	08:09 (WEA08)	07:10	18:51 (WEA-4 E-160)	06:06	05:21
2	16:32	54 15:50 (WEA-1)	17:20	08:51 (WEA03)	18:11	55 17:17 (WEA-3 E-160)	20:05	30 19:21 (WEA-4 E-160)	20:56	21:41
3	08:40	14:20 (WEA-2 E-138)	08:12	08:38 (WEA03)	07:18	08:09 (WEA08)	07:08	18:50 (WEA-4 E-160)	06:04	05:20
4	16:33	53 15:51 (WEA-1)	17:22	08:52 (WEA03)	18:13	52 17:16 (WEA-3 E-160)	20:07	29 19:19 (WEA-4 E-160)	20:57	21:42
5	08:40	14:20 (WEA-2 E-138)	08:10	08:37 (WEA03)	07:16	08:09 (WEA08)	07:06	18:51 (WEA-4 E-160)	06:02	05:19
6	16:34	55 15:52 (WEA-1)	17:24	08:52 (WEA03)	18:15	49 17:14 (WEA-3 E-160)	20:08	28 19:19 (WEA-4 E-160)	20:59	21:43
7	08:40	14:20 (WEA-2 E-138)	08:09	08:37 (WEA03)	07:14	08:09 (WEA08)	07:03	18:52 (WEA-4 E-160)	06:00	05:18
8	16:36	55 15:52 (WEA-1)	17:25	08:53 (WEA03)	18:17	46 17:13 (WEA-3 E-160)	20:10	26 19:18 (WEA-4 E-160)	21:01	21:44
9	08:39	14:21 (WEA-2 E-138)	08:07	08:37 (WEA03)	07:12	08:10 (WEA08)	07:01	18:53 (WEA-4 E-160)	05:58	05:18
10	16:37	55 15:53 (WEA-1)	17:27	08:54 (WEA03)	18:18	41 17:11 (WEA-3 E-160)	20:12	24 19:17 (WEA-4 E-160)	21:02	21:45
11	08:39	09:10 (WEA04)	08:05	08:37 (WEA03)	07:09	08:11 (WEA08)	06:59	18:53 (WEA-4 E-160)	05:56	05:17
12	16:38	56 15:55 (WEA-1)	17:29	08:54 (WEA03)	18:20	34 17:09 (WEA-3 E-160)	20:13	22 19:15 (WEA-4 E-160)	21:04	21:46
13	08:39	09:09 (WEA04)	08:04	08:37 (WEA03)	07:07	08:11 (WEA08)	06:56	18:54 (WEA-4 E-160)	05:55	05:16
14	16:39	58 15:55 (WEA-1)	17:31	08:54 (WEA03)	18:22	18 08:29 (WEA08)	20:15	19 19:14 (WEA-4 E-160)	21:05	21:47
15	08:38	09:08 (WEA04)	08:02	08:37 (WEA03)	07:05	08:13 (WEA08)	06:54	18:57 (WEA-4 E-160)	05:53	05:16
16	16:41	59 15:55 (WEA-1)	17:33	08:53 (WEA03)	18:24	14 08:27 (WEA08)	20:17	14 19:11 (WEA-4 E-160)	21:07	21:48
17	08:38	09:08 (WEA04)	08:00	08:38 (WEA03)	07:03	08:17 (WEA08)	06:52	19:01 (WEA-4 E-160)	05:51	05:15
18	16:42	61 15:56 (WEA-1)	17:35	08:53 (WEA03)	18:25	7 08:24 (WEA08)	20:19	5 19:06 (WEA-4 E-160)	21:09	21:49
19	08:37	09:07 (WEA04)	07:59	08:38 (WEA03)	07:01		06:50		05:49	05:15
20	16:43	63 15:57 (WEA-1)	17:37	08:52 (WEA03)	18:27		20:20		21:10	21:50
21	08:37	09:06 (WEA04)	07:57	08:41 (WEA03)	06:58		06:47		05:48	05:15
22	16:45	64 15:57 (WEA-1)	17:38	08:52 (WEA03)	18:29		20:22		21:12	21:50
23	08:36	09:05 (WEA04)	07:55	08:43 (WEA03)	06:56		06:45		05:46	05:14
24	16:46	64 15:57 (WEA-1)	17:40	08:50 (WEA03)	18:31		20:24		21:13	21:51
25	08:35	09:05 (WEA04)	07:53		06:54		06:43		05:44	05:14
26	16:48	64 15:58 (WEA-1)	17:42		18:32		20:25		21:15	21:52
27	08:35	09:04 (WEA04)	07:51		06:51		06:41		05:43	05:14
28	16:49	66 15:59 (WEA-1)	17:44		18:34		20:27		21:17	21:52
29	08:34	09:04 (WEA04)	07:49	16:58 (WEA-3 E-160)	06:49		06:39		05:41	05:14
30	16:51	64 15:59 (WEA-1)	17:46	17:11 (WEA-3 E-160)	18:36		20:29		21:18	21:53
31	08:33	09:05 (WEA04)	07:47	16:56 (WEA-3 E-160)	06:47		06:36		05:40	05:13
32	16:52	60 15:59 (WEA-1)	17:48	17:13 (WEA-3 E-160)	18:38		20:30		21:20	21:54
33	08:32	09:05 (WEA04)	07:45	16:54 (WEA-3 E-160)	06:45		06:34		05:38	05:13
34	16:54	60 16:00 (WEA-1)	17:49	17:15 (WEA-3 E-160)	18:39		20:32		21:21	21:54
35	08:31	09:06 (WEA04)	07:43	16:52 (WEA-3 E-160)	06:42		06:32		05:37	05:13
36	16:55	55 16:00 (WEA-1)	17:51	17:15 (WEA-3 E-160)	18:41		20:34		21:23	21:54
37	08:30	09:05 (WEA04)	07:41	16:51 (WEA-3 E-160)	06:40		06:30		05:35	05:13
38	16:57	49 15:59 (WEA-1)	17:53	17:16 (WEA-3 E-160)	18:43		20:35		21:24	21:55
39	08:29	09:06 (WEA04)	07:39	08:21 (WEA08)	06:38		06:28		05:34	05:13
40	16:59	43 15:59 (WEA-1)	17:55	17:17 (WEA-3 E-160)	18:45		20:37		21:26	21:55
41	08:28	09:07 (WEA04)	07:37	08:17 (WEA08)	06:35	18:05 (WEA-4 E-160)	06:26		05:33	05:14
42	17:00	33 15:59 (WEA-1)	17:57	17:18 (WEA-3 E-160)	18:46	8 18:13 (WEA-4 E-160)	20:39		21:27	21:55
43	08:27	09:09 (WEA04)	07:35	08:15 (WEA08)	06:33	18:01 (WEA-4 E-160)	06:24		05:31	05:14
44	17:02	30 15:59 (WEA-1)	17:59	17:19 (WEA-3 E-160)	18:48	16 18:17 (WEA-4 E-160)	20:41		21:28	21:56
45	08:26	09:09 (WEA04)	07:33	08:13 (WEA08)	06:31	17:58 (WEA-4 E-160)	06:22		05:30	05:14
46	17:04	27 15:58 (WEA-1)	18:00	17:19 (WEA-3 E-160)	18:50	20 18:18 (WEA-4 E-160)	20:42		21:30	21:56
47	08:25	09:12 (WEA04)	07:31	08:12 (WEA08)	06:29	17:56 (WEA-4 E-160)	06:20		05:29	05:14
48	17:06	21 15:58 (WEA-1)	18:02	17:19 (WEA-3 E-160)	18:51	23 18:19 (WEA-4 E-160)	20:44		21:31	21:56
49	08:23	15:44 (WEA-1)	07:29	08:11 (WEA08)	06:26	17:55 (WEA-4 E-160)	06:17		05:28	05:15
50	17:07	13 15:57 (WEA-1)	18:04	17:19 (WEA-3 E-160)	18:53	26 18:21 (WEA-4 E-160)	20:46		21:33	21:56
51	08:22	15:46 (WEA-1)	07:27	08:10 (WEA08)	06:24	17:53 (WEA-4 E-160)	06:15		05:27	05:15
52	17:09	9 15:55 (WEA-1)	18:06	17:18 (WEA-3 E-160)	18:55	27 18:20 (WEA-4 E-160)	20:47		21:34	21:56
53	08:21		07:25	08:09 (WEA08)	06:22	17:53 (WEA-4 E-160)	06:13		05:25	05:15
54	17:11		18:08	17:18 (WEA-3 E-160)	18:56	28 18:21 (WEA-4 E-160)	20:49		21:35	21:56
55	08:19		07:23	08:09 (WEA08)	06:19	17:52 (WEA-4 E-160)	06:11		05:24	05:16
56	17:13		18:09	17:18 (WEA-3 E-160)	18:58	30 18:22 (WEA-4 E-160)	20:51		21:36	21:56
57	08:18				07:17	18:51 (WEA-4 E-160)	06:09		05:23	05:16
58	17:14				20:00	19:21 (WEA-4 E-160)	20:52		21:38	21:56
59	08:17				07:15	18:51 (WEA-4 E-160)	06:08		05:22	05:17
60	17:16				20:02	19:21 (WEA-4 E-160)	20:54		21:39	21:55
61	08:15	08:41 (WEA03)			07:12	18:51 (WEA-4 E-160)			05:21	
62	17:18	08:48 (WEA03)			20:03	19:21 (WEA-4 E-160)			21:40	
63	Sonnenscheinstunden	259	278		367		416		485	498
64	astr.max.mögl.Beschattung	1298	714		584		197			
65	Red.Sonnenscheinwahrsch.	0,20	0,30		0,30		0,41			
66	Reduktion Betriebsdauer	0,84	0,84		0,84		0,84			
67	Reduktion Windrichtung	0,67	0,66		0,67		0,69			
68	Gesamte Reduktion	0,11	0,17		0,17		0,24			
69	Met.wahrsch.Beschattung	143	121		98		46			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 73 - IP 73 Horenfeld 21

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:23	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:19	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:54	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:20
	21:54	21:18	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	08:52 (WEA08)	07:33
	21:54	21:17	20:13	19:03	11	17:00
6	05:21	06:02	06:51	07:40	08:49 (WEA08)	07:35
	21:53	21:15	20:10	19:01	16	17:00
7	05:22	06:03	06:53	07:42	08:47 (WEA08)	07:36
	21:52	21:13	20:08	18:59	26	17:41
8	05:23	06:05	06:55	07:44	08:45 (WEA08)	07:38
	21:52	21:11	20:06	18:57	37	17:45
9	05:24	06:06	06:56	07:45	08:45 (WEA08)	07:40
	21:51	21:09	20:04	18:54	42	17:47
10	05:25	06:08	06:58	07:47	08:44 (WEA08)	07:42
	21:50	21:08	20:01	18:52	48	17:49
11	05:26	06:10	07:00	07:49	08:42 (WEA08)	07:43
	21:50	21:06	19:59	18:50	51	17:49
12	05:27	06:11	07:01	07:51	08:42 (WEA08)	07:45
	21:49	21:04	19:57	18:48	54	17:50
13	05:28	06:13	07:03	07:52	08:42 (WEA08)	07:47
	21:48	21:02	19:54	18:45	56	17:51
14	05:29	06:14	07:04	07:54	08:42 (WEA08)	07:49
	21:47	21:00	19:52	18:43	57	17:51
15	05:31	06:16	07:06	07:56	08:42 (WEA08)	07:50
	21:46	20:58	19:50	18:41	55	17:50
16	05:32	06:18	07:08	07:57	08:42 (WEA08)	07:52
	21:45	20:56	19:47	18:39	56	17:51
17	05:33	06:19	07:09	07:59	08:43 (WEA08)	07:54
	21:44	20:54	19:45	18:37	55	17:51
18	05:34	06:21	07:11	08:01	08:44 (WEA08)	07:56
	21:43	20:52	19:43	18:35	51	17:50
19	05:36	06:22	07:12	08:03	08:45 (WEA08)	07:57
	21:42	20:50	19:40	18:33	49	17:50
20	05:37	06:24	07:14	08:04	08:46 (WEA08)	07:59
	21:41	20:48	19:38	18:30	46	17:50
21	05:38	06:26	07:16	08:06	08:48 (WEA08)	08:01
	21:39	20:46	19:36	18:28	39	17:48
22	05:40	06:27	07:17	08:08	17:20 (WEA-3 E-160)	08:02
	21:38	20:44	19:33	18:26	28	17:48
23	05:41	06:29	07:19	08:10	17:21 (WEA-3 E-160)	08:04
	21:37	20:41	19:31	18:24	26	17:47
24	05:42	06:30	07:21	08:11	17:22 (WEA-3 E-160)	08:06
	21:35	20:39	19:29	18:22	23	17:45
25	05:44	06:32	07:22	07:13	16:24 (WEA-3 E-160)	08:07
	21:34	20:37	19:26	17:20	20	16:44
26	05:45	06:34	07:24	07:15	16:26 (WEA-3 E-160)	08:09
	21:33	20:35	19:24	17:18	16	16:42
27	05:47	06:35	07:25	07:17	16:29 (WEA-3 E-160)	08:10
	21:31	20:33	19:22	17:16	10	16:39
28	05:48	06:37	07:27	07:18	08:12	08:12
	21:30	20:31	19:19	17:14	16:29	66
29	05:49	06:39	07:29	07:20	08:13	08:13
	21:28	20:28	19:17	17:12	16:28	65
30	05:51	06:40	07:30	07:22	08:11 (WEA03)	08:15
	21:27	20:26	19:15	17:10	8	08:19
31	05:52	06:42		07:24	08:09 (WEA03)	
	21:25	20:24		17:09	12	08:21
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung			469	892	816	1669
Red.Sonnenscheinwahrsch.			0,36	0,32	0,23	0,15
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84
Reduktion Windrichtung			0,69	0,67	0,64	0,68
Gesamte Reduktion			0,21	0,18	0,12	0,08
Met.wahrsch.Beschattung			97	159	101	142

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

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



Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 74 - IP 74 Horenfeld 23

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni				
1	08:40	09:11 (WEA05)	08:14	08:44 (WEA04)	07:20	17:21 (WEA-3 E-160)	07:10	06:06	05:21	
1	16:32	83 15:15 (WEA-2 E-138)	17:20	16:22 (WEA-1)	18:11	15 17:36 (WEA-3 E-160)	20:05	20:56	21:41	
2	08:40	09:11 (WEA05)	08:12	08:44 (WEA04)	07:18	17:19 (WEA-3 E-160)	07:08	06:04	05:20	
2	16:33	83 15:15 (WEA-2 E-138)	17:22	16:22 (WEA-1)	18:13	20 17:39 (WEA-3 E-160)	20:07	20:57	21:42	
3	08:40	09:11 (WEA05)	08:10	08:44 (WEA04)	07:16	17:16 (WEA-3 E-160)	07:06	06:02	05:19	
3	16:34	84 15:16 (WEA-2 E-138)	17:24	16:21 (WEA-1)	18:15	24 17:40 (WEA-3 E-160)	20:08	20:59	21:43	
4	08:40	09:10 (WEA05)	08:09	08:44 (WEA04)	07:14	17:15 (WEA-3 E-160)	07:03	19:27 (WEA-4 E-160)	06:00	05:18
4	16:36	86 15:17 (WEA-2 E-138)	17:25	16:20 (WEA-1)	18:17	26 17:41 (WEA-3 E-160)	20:10	19:37 (WEA-4 E-160)	21:01	21:44
5	08:39	09:11 (WEA05)	08:07	08:46 (WEA04)	07:12	17:14 (WEA-3 E-160)	07:01	19:24 (WEA-4 E-160)	05:58	05:18
5	16:37	85 15:18 (WEA-2 E-138)	17:27	16:19 (WEA-1)	18:18	28 17:42 (WEA-3 E-160)	20:12	19:40 (WEA-4 E-160)	21:02	21:45
6	08:39	09:12 (WEA05)	08:05	08:47 (WEA04)	07:09	17:13 (WEA-3 E-160)	06:59	19:21 (WEA-4 E-160)	05:56	05:17
6	16:38	85 15:19 (WEA-2 E-138)	17:29	16:17 (WEA-1)	18:20	30 17:43 (WEA-3 E-160)	20:13	19:41 (WEA-4 E-160)	21:04	21:46
7	08:39	09:12 (WEA05)	08:04	08:48 (WEA04)	07:07	17:12 (WEA-3 E-160)	06:56	19:19 (WEA-4 E-160)	05:55	05:16
7	16:39	84 15:19 (WEA-2 E-138)	17:31	16:14 (WEA-1)	18:22	31 17:43 (WEA-3 E-160)	20:15	19:42 (WEA-4 E-160)	21:05	21:47
8	08:38	09:12 (WEA05)	08:02	07:05	18:24	32 17:43 (WEA-3 E-160)	20:17	19:18 (WEA-4 E-160)	05:53	05:16
8	16:41	83 15:19 (WEA-2 E-138)	17:33	07:03	18:25	44 17:44 (WEA-3 E-160)	20:19	19:43 (WEA-4 E-160)	21:07	21:48
9	08:38	09:13 (WEA05)	08:00	07:03	18:25	44 17:44 (WEA-3 E-160)	20:19	19:17 (WEA-4 E-160)	05:51	05:15
9	16:42	83 15:20 (WEA-2 E-138)	17:35	07:01	18:25	44 17:44 (WEA-3 E-160)	20:19	19:44 (WEA-4 E-160)	21:09	21:49
10	08:37	09:14 (WEA05)	07:59	07:01	18:27	49 17:43 (WEA-3 E-160)	20:20	19:15 (WEA-4 E-160)	05:49	05:15
10	16:43	82 15:21 (WEA-2 E-138)	17:37	06:58	18:27	49 17:43 (WEA-3 E-160)	20:20	19:44 (WEA-4 E-160)	21:10	21:50
11	08:37	09:14 (WEA05)	07:57	06:58	18:29	52 17:43 (WEA-3 E-160)	20:22	19:14 (WEA-4 E-160)	05:48	05:15
11	16:45	81 15:21 (WEA-2 E-138)	17:38	06:56	18:29	52 17:43 (WEA-3 E-160)	20:22	19:44 (WEA-4 E-160)	21:12	21:50
12	08:36	09:15 (WEA05)	07:55	06:56	18:31	56 17:43 (WEA-3 E-160)	20:24	19:14 (WEA-4 E-160)	05:46	05:14
12	16:46	80 15:22 (WEA-2 E-138)	17:40	06:54	18:31	56 17:43 (WEA-3 E-160)	20:24	19:44 (WEA-4 E-160)	21:13	21:51
13	08:35	09:16 (WEA05)	07:53	06:54	18:32	56 17:42 (WEA-3 E-160)	20:25	19:14 (WEA-4 E-160)	05:44	05:14
13	16:48	78 15:23 (WEA-2 E-138)	17:42	06:51	18:32	56 17:42 (WEA-3 E-160)	20:25	19:44 (WEA-4 E-160)	21:15	21:52
14	08:35	09:17 (WEA05)	07:51	06:51	18:34	57 17:41 (WEA-3 E-160)	20:27	19:14 (WEA-4 E-160)	05:43	05:14
14	16:49	73 15:23 (WEA-2 E-138)	17:44	06:49	18:34	57 17:41 (WEA-3 E-160)	20:27	19:44 (WEA-4 E-160)	21:17	21:52
15	08:34	09:18 (WEA05)	07:49	06:49	18:36	56 17:40 (WEA-3 E-160)	20:29	19:14 (WEA-4 E-160)	05:41	05:14
15	16:51	79 16:10 (WEA-1)	17:46	06:47	18:36	56 17:40 (WEA-3 E-160)	20:29	19:44 (WEA-4 E-160)	21:18	21:53
16	08:33	09:20 (WEA05)	07:47	08:14 (WEA03)	06:47	07:33 (WEA08)	06:36	19:13 (WEA-4 E-160)	05:40	05:13
16	16:52	77 16:12 (WEA-1)	17:48	08:18 (WEA03)	18:38	54 17:39 (WEA-3 E-160)	20:30	19:43 (WEA-4 E-160)	21:20	21:54
17	08:32	10:41 (WEA-01)	07:45	08:11 (WEA03)	06:45	07:32 (WEA08)	06:34	19:13 (WEA-4 E-160)	05:38	05:13
17	16:54	71 16:14 (WEA-1)	17:49	08:22 (WEA03)	18:39	53 17:37 (WEA-3 E-160)	20:32	19:42 (WEA-4 E-160)	21:21	21:54
18	08:31	10:45 (WEA-01)	07:43	08:09 (WEA03)	06:42	07:32 (WEA08)	06:32	19:14 (WEA-4 E-160)	05:37	05:13
18	16:55	66 16:15 (WEA-1)	17:51	08:22 (WEA03)	18:41	49 17:36 (WEA-3 E-160)	20:34	19:42 (WEA-4 E-160)	21:23	21:54
19	08:30	14:42 (WEA-2 E-138)	07:41	08:08 (WEA03)	06:40	07:32 (WEA08)	06:30	19:14 (WEA-4 E-160)	05:35	05:13
19	16:57	62 16:16 (WEA-1)	17:53	08:23 (WEA03)	18:43	45 17:34 (WEA-3 E-160)	20:35	19:41 (WEA-4 E-160)	21:24	21:55
20	08:29	14:43 (WEA-2 E-138)	07:39	08:07 (WEA03)	06:38	07:32 (WEA08)	06:28	19:15 (WEA-4 E-160)	05:34	05:13
20	16:59	62 16:17 (WEA-1)	17:55	08:24 (WEA03)	18:45	38 17:30 (WEA-3 E-160)	20:37	19:40 (WEA-4 E-160)	21:26	21:55
21	08:28	14:44 (WEA-2 E-138)	07:37	08:07 (WEA03)	06:35	07:32 (WEA08)	06:26	19:16 (WEA-4 E-160)	05:33	05:14
21	17:00	63 16:18 (WEA-1)	17:57	08:24 (WEA03)	18:46	25 07:57 (WEA08)	20:39	19:38 (WEA-4 E-160)	21:27	21:55
22	08:27	14:44 (WEA-2 E-138)	07:35	08:07 (WEA03)	06:33	07:33 (WEA08)	06:24	19:17 (WEA-4 E-160)	05:31	05:14
22	17:02	64 16:19 (WEA-1)	17:59	08:24 (WEA03)	18:48	23 07:56 (WEA08)	20:41	19:37 (WEA-4 E-160)	21:28	21:56
23	08:26	14:44 (WEA-2 E-138)	07:33	08:07 (WEA03)	06:31	07:33 (WEA08)	06:22	19:19 (WEA-4 E-160)	05:30	05:14
23	17:04	65 16:19 (WEA-1)	18:00	08:24 (WEA03)	18:50	21 07:54 (WEA08)	20:42	19:35 (WEA-4 E-160)	21:30	21:56
24	08:25	14:45 (WEA-2 E-138)	07:31	08:07 (WEA03)	06:29	07:35 (WEA08)	06:20	19:22 (WEA-4 E-160)	05:29	05:14
24	17:06	65 16:20 (WEA-1)	18:02	08:24 (WEA03)	18:51	17 07:52 (WEA08)	20:44	19:31 (WEA-4 E-160)	21:31	21:56
25	08:23	14:46 (WEA-2 E-138)	07:29	08:08 (WEA03)	06:26	07:38 (WEA08)	06:17	19:22 (WEA-4 E-160)	05:28	05:15
25	17:07	66 16:21 (WEA-1)	18:04	08:23 (WEA03)	18:53	12 07:50 (WEA08)	20:46	19:22 (WEA-4 E-160)	21:33	21:56
26	08:22	08:49 (WEA04)	07:27	08:08 (WEA03)	06:24	06:15	20:47	19:22 (WEA-4 E-160)	05:27	05:15
26	17:09	69 16:21 (WEA-1)	18:06	08:21 (WEA03)	18:55	06:13	20:49	19:22 (WEA-4 E-160)	21:34	21:56
27	08:21	08:48 (WEA04)	07:25	08:10 (WEA03)	06:22	06:13	20:49	19:22 (WEA-4 E-160)	05:25	05:15
27	17:11	73 16:22 (WEA-1)	18:08	08:19 (WEA03)	18:56	06:13	20:49	19:22 (WEA-4 E-160)	21:35	21:56
28	08:19	08:46 (WEA04)	07:23	17:26 (WEA-3 E-160)	06:19	06:11	20:51	19:22 (WEA-4 E-160)	05:24	05:16
28	17:13	75 16:22 (WEA-1)	18:09	17:32 (WEA-3 E-160)	18:58	06:09	20:52	19:22 (WEA-4 E-160)	21:36	21:56
29	08:18	08:45 (WEA04)	07:21	07:17	18:58	06:09	20:52	19:22 (WEA-4 E-160)	05:23	05:16
29	17:14	76 16:23 (WEA-1)	18:11	07:15	19:00	06:08	20:54	19:22 (WEA-4 E-160)	21:38	21:56
30	08:17	08:44 (WEA04)	07:19	07:15	19:00	06:08	20:54	19:22 (WEA-4 E-160)	05:22	05:17
30	17:16	75 16:22 (WEA-1)	18:13	07:12	19:00	06:08	20:54	19:22 (WEA-4 E-160)	21:39	21:55
31	08:15	08:43 (WEA04)	07:17	07:12	19:00	06:08	20:54	19:22 (WEA-4 E-160)	05:21	05:17
31	17:18	75 16:22 (WEA-1)	18:15	20:03	19:00	06:08	20:54	19:22 (WEA-4 E-160)	21:40	21:55
Sonnenscheinstunden	259	278	367	416	485	498				
astr.max.mögl.Beschattung	2333	525	913	506						
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41						
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84						
Reduktion Windrichtung	0,66	0,65	0,67	0,66						
Gesamte Reduktion	0,11	0,17	0,17	0,22						
Met.wahrsch.Beschattung	251	87	151	114						

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 74 - IP 74 Horenfeld 23

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember		
1	05:18	05:54	06:43	19:13 (WEA-4 E-160) 07:32	08:15 (WEA08) 07:26	08:16	08:56 (WEA05)	
	21:55	21:23	20:22	30 19:43 (WEA-4 E-160) 19:13	55 18:21 (WEA-3 E-160) 17:07	16:27	81 15:03 (WEA-2 E-138)	
2	05:18	05:55	06:45	19:14 (WEA-4 E-160) 07:34	08:16 (WEA08) 07:27	08:18	08:57 (WEA05)	
	21:55	21:22	20:19	29 19:43 (WEA-4 E-160) 19:10	54 18:22 (WEA-3 E-160) 17:05	16:26	82 15:04 (WEA-2 E-138)	
3	05:19	05:57	06:47	19:14 (WEA-4 E-160) 07:35	08:17 (WEA08) 07:29	08:19	08:56 (WEA05)	
	21:54	21:20	20:17	27 19:41 (WEA-4 E-160) 19:08	50 18:21 (WEA-3 E-160) 17:03	16:25	84 15:04 (WEA-2 E-138)	
4	05:20	05:59	06:48	19:15 (WEA-4 E-160) 07:37	08:19 (WEA08) 07:31	08:20	08:57 (WEA05)	
	21:54	21:18	20:15	25 19:40 (WEA-4 E-160) 19:06	46 18:21 (WEA-3 E-160) 17:01	17 15:45 (WEA-1) 16:25	83 15:04 (WEA-2 E-138)	
5	05:21	06:00	06:50	19:16 (WEA-4 E-160) 07:39	08:24 (WEA08) 07:33	08:16 (WEA04) 08:22	08:57 (WEA05)	
	21:53	21:17	20:13	23 19:39 (WEA-4 E-160) 19:03	35 18:20 (WEA-3 E-160) 17:00	36 15:47 (WEA-1) 16:24	84 15:04 (WEA-2 E-138)	
6	05:21	06:02	06:51	19:17 (WEA-4 E-160) 07:40	17:48 (WEA-3 E-160) 07:34	08:15 (WEA04) 08:23	08:57 (WEA05)	
	21:53	21:15	20:10	20 19:37 (WEA-4 E-160) 19:01	32 18:20 (WEA-3 E-160) 16:58	49 15:49 (WEA-1) 16:24	86 15:04 (WEA-2 E-138)	
7	05:22	06:03	06:53	19:19 (WEA-4 E-160) 07:42	17:48 (WEA-3 E-160) 07:36	08:15 (WEA04) 08:24	08:58 (WEA05)	
	21:52	21:13	20:08	16 19:35 (WEA-4 E-160) 18:59	30 18:18 (WEA-3 E-160) 16:56	58 15:51 (WEA-1) 16:23	85 15:05 (WEA-2 E-138)	
8	05:23	06:05	06:55	19:21 (WEA-4 E-160) 07:44	17:49 (WEA-3 E-160) 07:38	08:15 (WEA04) 08:26	08:58 (WEA05)	
	21:52	21:11	20:06	10 19:31 (WEA-4 E-160) 18:57	29 18:18 (WEA-3 E-160) 16:54	64 15:52 (WEA-1) 16:23	86 15:05 (WEA-2 E-138)	
9	05:24	06:06	06:56	07:45	17:49 (WEA-3 E-160) 07:40	08:15 (WEA04) 08:27	08:59 (WEA05)	
	21:51	21:09	20:04	18:54	28 18:17 (WEA-3 E-160) 16:53	67 15:52 (WEA-1) 16:23	85 15:05 (WEA-2 E-138)	
10	05:25	06:08	06:58	07:47	17:51 (WEA-3 E-160) 07:42	08:15 (WEA04) 08:28	09:00 (WEA05)	
	21:50	21:08	20:01	18:52	24 18:15 (WEA-3 E-160) 16:51	72 15:53 (WEA-1) 16:23	84 15:05 (WEA-2 E-138)	
11	05:26	06:10	07:00	07:49	17:51 (WEA-3 E-160) 07:43	08:15 (WEA04) 08:29	09:02 (WEA05)	
	21:50	21:06	19:59	18:50	22 18:13 (WEA-3 E-160) 16:50	75 15:54 (WEA-1) 16:22	83 15:06 (WEA-2 E-138)	
12	05:27	06:11	07:01	07:51	17:53 (WEA-3 E-160) 07:45	08:16 (WEA04) 08:30	09:03 (WEA05)	
	21:49	21:04	19:57	18:48	18 18:11 (WEA-3 E-160) 16:48	76 15:54 (WEA-1) 16:22	82 15:06 (WEA-2 E-138)	
13	05:28	06:13	07:03	07:52	17:56 (WEA-3 E-160) 07:47	08:16 (WEA04) 08:31	09:04 (WEA05)	
	21:48	21:02	19:54	18:45	12 18:08 (WEA-3 E-160) 16:47	76 15:54 (WEA-1) 16:22	80 15:06 (WEA-2 E-138)	
14	05:30	06:14	07:04	07:54	08:45 (WEA03) 07:49	08:18 (WEA04) 08:32	09:05 (WEA05)	
	21:47	21:00	19:52	18:43	6 08:51 (WEA03) 16:45	74 15:54 (WEA-1) 16:22	80 15:06 (WEA-2 E-138)	
15	05:31	06:16	07:06	07:56	08:41 (WEA03) 07:50	08:20 (WEA04) 08:33	09:05 (WEA05)	
	21:46	20:58	19:50	18:41	12 08:53 (WEA03) 16:44	73 15:54 (WEA-1) 16:22	80 15:06 (WEA-2 E-138)	
16	05:32	06:18	07:08	07:57	08:40 (WEA03) 07:52	08:22 (WEA04) 08:34	09:06 (WEA05)	
	21:45	20:56	19:47	18:39	14 08:54 (WEA03) 16:42	69 15:54 (WEA-1) 16:22	78 15:06 (WEA-2 E-138)	
17	05:33	06:19	07:09	07:59	08:39 (WEA03) 07:54	14:19 (WEA-2 E-138) 08:34	09:07 (WEA05)	
	21:44	20:54	19:45	18:37	16 08:55 (WEA03) 16:41	66 15:54 (WEA-1) 16:23	78 15:07 (WEA-2 E-138)	
18	05:34	06:21	07:11	08:01	08:38 (WEA03) 07:56	14:19 (WEA-2 E-138) 08:35	09:08 (WEA05)	
	21:43	20:52	19:43	10 08:36 (WEA08) 18:35	17 08:55 (WEA03) 16:40	65 15:54 (WEA-1) 16:23	77 15:07 (WEA-2 E-138)	
19	05:36	06:22	07:12	08:03	08:38 (WEA03) 07:57	14:19 (WEA-2 E-138) 08:36	09:08 (WEA05)	
	21:42	20:50	19:40	16 08:39 (WEA08) 18:33	18 08:56 (WEA03) 16:38	65 15:54 (WEA-1) 16:23	77 15:07 (WEA-2 E-138)	
20	05:37	06:24	07:14	08:04	08:38 (WEA03) 08:04	14:19 (WEA-2 E-138) 08:37	09:09 (WEA05)	
	21:41	20:48	19:38	20 08:40 (WEA08) 18:30	18 08:56 (WEA03) 16:37	64 15:54 (WEA-1) 16:24	77 15:08 (WEA-2 E-138)	
21	05:38	06:26	07:16	08:06	08:37 (WEA03) 08:01	14:19 (WEA-2 E-138) 08:37	09:10 (WEA05)	
	21:39	20:46	19:36	22 08:41 (WEA08) 18:28	18 08:55 (WEA03) 16:36	63 15:53 (WEA-1) 16:24	77 15:09 (WEA-2 E-138)	
22	05:40	06:27	07:17	08:08	08:38 (WEA03) 08:02	14:19 (WEA-2 E-138) 08:38	09:10 (WEA05)	
	21:38	20:44	19:33	24 08:41 (WEA08) 18:26	16 08:54 (WEA03) 16:35	62 15:53 (WEA-1) 16:24	77 15:09 (WEA-2 E-138)	
23	05:41	06:29	07:19	08:10	08:38 (WEA03) 08:04	14:19 (WEA-2 E-138) 08:38	09:11 (WEA05)	
	21:37	20:41	19:31	35 18:13 (WEA-3 E-160) 18:24	15 08:53 (WEA03) 16:34	62 15:53 (WEA-1) 16:25	77 15:10 (WEA-2 E-138)	
24	05:42	06:30	07:21	08:11	08:40 (WEA03) 08:06	10:22 (WEA-01) 08:39	09:11 (WEA05)	
	21:35	20:39	19:29	44 18:17 (WEA-3 E-160) 18:22	12 08:52 (WEA03) 16:33	65 15:52 (WEA-1) 16:25	77 15:10 (WEA-2 E-138)	
25	05:44	06:32	07:22	08:13	08:40 (WEA03) 08:07	10:18 (WEA-01) 08:39	09:11 (WEA05)	
	21:34	20:37	19:26	48 18:18 (WEA-3 E-160) 17:20	10 07:51 (WEA03) 16:32	71 15:51 (WEA-1) 16:26	78 15:10 (WEA-2 E-138)	
26	05:45	06:34	07:24	08:15	08:40 (WEA03) 08:07	08:58 (WEA05) 08:39	09:11 (WEA05)	
	21:33	20:35	19:24	52 18:20 (WEA-3 E-160) 17:18	16:31 77 15:50 (WEA-1) 16:27	77 15:11 (WEA-2 E-138)		
27	05:47	06:35	07:25	08:14	08:40 (WEA03) 07:17	08:10 79 15:49 (WEA-1) 16:28	09:12 (WEA05)	
	21:31	20:33	19:22	54 18:20 (WEA-3 E-160) 17:16	16:30 79 15:49 (WEA-1) 16:28	78 15:12 (WEA-2 E-138)		
28	05:48	06:37	07:27	08:14	08:40 (WEA03) 07:18	08:12 74 15:04 (WEA-2 E-138) 16:28	09:12 (WEA05)	
	21:30	20:31	19:19	56 18:21 (WEA-3 E-160) 17:14	16:29 74 15:04 (WEA-2 E-138) 16:28	79 15:13 (WEA-2 E-138)		
29	05:49	06:39	07:29	08:14	08:40 (WEA03) 07:20	08:13 77 15:03 (WEA-2 E-138) 16:29	09:12 (WEA05)	
	21:28	20:28	19:17	57 18:21 (WEA-3 E-160) 17:12	16:28 77 15:03 (WEA-2 E-138) 16:29	80 15:13 (WEA-2 E-138)		
30	05:51	06:40	07:30	08:14	08:40 (WEA03) 07:22	08:15 79 15:04 (WEA-2 E-138) 16:30	09:12 (WEA05)	
	21:27	20:26	19:15	56 18:21 (WEA-3 E-160) 17:10	16:27 79 15:04 (WEA-2 E-138) 16:30	80 15:14 (WEA-2 E-138)		
31	05:52	06:42	07:31	08:15	08:40 (WEA03) 07:24	08:16 81 15:15 (WEA-2 E-138) 16:31	09:12 (WEA05)	
	21:25	20:24	19:14	56 18:21 (WEA-3 E-160) 17:09	16:26 81 15:15 (WEA-2 E-138) 16:31	81 15:15 (WEA-2 E-138)		
Sonnenscheinstunden	501	453	381	332	267	244	2493	
astr.max.mögl.Beschattung		331	674	607	1775		2493	
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23		0,15	
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84		0,84	
Reduktion Windrichtung		0,66	0,65	0,66	0,68		0,62	
Gesamte Reduktion		0,24	0,20	0,18	0,13		0,08	
Met.wahrsch.Beschattung		78	132	107	229		191	

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 74/1 - IP 74/1 Horenfeld 23a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	09:11 (WEA05)	08:14	08:44 (WEA04)	07:20	17:17 (WEA-3 E-160)
2	16:32	15:12 (WEA-2 E-138)	17:20	16:20 (WEA-1)	18:11	19:36 (WEA-3 E-160)
3	08:40	09:11 (WEA05)	08:12	08:44 (WEA04)	07:18	17:15 (WEA-3 E-160)
4	16:33	15:13 (WEA-2 E-138)	17:22	16:19 (WEA-1)	18:13	19:38 (WEA-3 E-160)
5	08:40	09:11 (WEA05)	08:10	08:45 (WEA04)	07:16	17:13 (WEA-3 E-160)
6	16:34	15:14 (WEA-2 E-138)	17:24	16:18 (WEA-1)	18:15	19:33 (WEA-4 E-160)
7	08:40	09:11 (WEA05)	08:09	08:45 (WEA04)	07:14	17:12 (WEA-3 E-160)
8	16:36	15:14 (WEA-2 E-138)	17:25	16:16 (WEA-1)	18:17	19:38 (WEA-4 E-160)
9	08:39	09:11 (WEA05)	08:07	08:47 (WEA04)	07:12	17:11 (WEA-3 E-160)
10	16:37	15:15 (WEA-2 E-138)	17:27	16:16 (WEA-1)	18:18	19:41 (WEA-3 E-160)
11	08:39	09:12 (WEA05)	08:05	08:48 (WEA04)	07:09	17:11 (WEA-3 E-160)
12	16:38	15:16 (WEA-2 E-138)	17:29	16:13 (WEA-1)	18:20	19:42 (WEA-3 E-160)
13	08:39	09:12 (WEA05)	08:04	08:50 (WEA04)	07:07	17:09 (WEA-3 E-160)
14	16:39	15:16 (WEA-2 E-138)	17:31	16:13 (WEA-1)	18:22	19:42 (WEA-3 E-160)
15	08:38	09:12 (WEA05)	08:02	08:55 (WEA04)	07:05	17:41 (WEA-3 E-160)
16	16:41	15:16 (WEA-2 E-138)	17:33	18:24	18:24	19:43 (WEA-4 E-160)
17	08:38	09:13 (WEA05)	08:00	07:03	07:42 (WEA08)	19:15 (WEA-4 E-160)
18	16:42	15:17 (WEA-2 E-138)	17:35	18:25	17:42 (WEA-3 E-160)	19:43 (WEA-4 E-160)
19	08:37	09:14 (WEA05)	07:59	07:01	07:39 (WEA08)	19:13 (WEA-4 E-160)
20	16:43	15:18 (WEA-2 E-138)	17:37	18:27	17:41 (WEA-3 E-160)	19:43 (WEA-4 E-160)
21	08:37	09:14 (WEA05)	07:57	06:58	07:38 (WEA08)	19:13 (WEA-4 E-160)
22	16:45	15:18 (WEA-2 E-138)	17:38	18:29	17:41 (WEA-3 E-160)	19:43 (WEA-4 E-160)
23	08:36	09:15 (WEA05)	07:55	06:56	07:37 (WEA08)	19:12 (WEA-4 E-160)
24	16:46	15:18 (WEA-2 E-138)	17:40	18:31	17:40 (WEA-3 E-160)	19:43 (WEA-4 E-160)
25	08:35	09:17 (WEA05)	07:53	06:54	07:36 (WEA08)	19:12 (WEA-4 E-160)
26	16:48	16:06 (WEA-1)	17:42	18:32	17:40 (WEA-3 E-160)	19:43 (WEA-4 E-160)
27	08:35	09:18 (WEA05)	07:51	06:51	07:35 (WEA08)	19:12 (WEA-4 E-160)
28	16:49	16:08 (WEA-1)	17:44	18:34	17:38 (WEA-3 E-160)	19:43 (WEA-4 E-160)
29	08:34	09:19 (WEA05)	07:49	06:49	07:34 (WEA08)	19:12 (WEA-4 E-160)
30	16:51	16:10 (WEA-1)	17:46	18:36	17:38 (WEA-3 E-160)	19:43 (WEA-4 E-160)
31	08:33	09:21 (WEA05)	07:47	06:47	07:34 (WEA08)	19:11 (WEA-4 E-160)
32	16:52	16:12 (WEA-1)	17:48	18:22 (WEA03)	18:38	19:41 (WEA-4 E-160)
33	08:32	10:42 (WEA-01)	07:45	08:11 (WEA03)	06:45	07:33 (WEA08)
34	16:54	16:13 (WEA-1)	17:49	18:23 (WEA03)	18:39	19:41 (WEA-4 E-160)
35	08:31	14:39 (WEA-2 E-138)	07:43	08:09 (WEA03)	06:42	07:34 (WEA08)
36	16:55	16:14 (WEA-1)	17:51	18:24 (WEA03)	18:41	19:42 (WEA-4 E-160)
37	08:30	14:39 (WEA-2 E-138)	07:41	08:08 (WEA03)	06:40	07:34 (WEA08)
38	16:57	16:15 (WEA-1)	17:53	18:25 (WEA03)	18:43	19:13 (WEA-4 E-160)
39	08:29	14:40 (WEA-2 E-138)	07:39	08:08 (WEA03)	06:38	07:34 (WEA08)
40	16:59	16:16 (WEA-1)	17:55	18:25 (WEA03)	18:45	19:14 (WEA-4 E-160)
41	08:28	14:40 (WEA-2 E-138)	07:37	08:08 (WEA03)	06:35	07:34 (WEA08)
42	17:00	16:17 (WEA-1)	17:57	18:25 (WEA03)	18:46	19:15 (WEA-4 E-160)
43	08:27	14:41 (WEA-2 E-138)	07:35	08:08 (WEA03)	06:33	07:36 (WEA08)
44	17:02	16:18 (WEA-1)	17:59	18:25 (WEA03)	18:48	19:17 (WEA-4 E-160)
45	08:26	14:41 (WEA-2 E-138)	07:33	08:08 (WEA03)	06:31	07:36 (WEA08)
46	17:04	16:18 (WEA-1)	18:00	18:25 (WEA03)	18:50	19:19 (WEA-4 E-160)
47	08:25	14:42 (WEA-2 E-138)	07:31	08:09 (WEA03)	06:29	07:39 (WEA08)
48	17:06	16:19 (WEA-1)	18:02	18:24 (WEA03)	18:51	19:32 (WEA-4 E-160)
49	08:23	14:43 (WEA-2 E-138)	07:29	08:10 (WEA03)	06:26	07:51 (WEA08)
50	17:07	16:20 (WEA-1)	18:04	18:23 (WEA03)	18:53	19:13 (WEA-4 E-160)
51	08:22	08:49 (WEA04)	07:27	08:10 (WEA03)	06:24	07:34 (WEA08)
52	17:09	16:19 (WEA-1)	18:06	18:21 (WEA03)	18:55	19:14 (WEA-4 E-160)
53	08:21	08:48 (WEA04)	07:25	08:13 (WEA03)	06:22	07:34 (WEA08)
54	17:11	16:20 (WEA-1)	18:08	18:25 (WEA03)	18:56	19:15 (WEA-4 E-160)
55	08:19	08:46 (WEA04)	07:23	17:20 (WEA-3 E-160)	06:19	07:34 (WEA08)
56	17:13	16:20 (WEA-1)	18:09	17:34 (WEA-3 E-160)	18:58	19:16 (WEA-4 E-160)
57	08:18	08:45 (WEA04)	07:17	07:17	07:17	19:16 (WEA-4 E-160)
58	17:14	16:20 (WEA-1)	18:00	20:00	20:00	19:17 (WEA-4 E-160)
59	08:17	08:44 (WEA04)	07:15	07:15	07:15	19:18 (WEA-4 E-160)
60	17:16	16:20 (WEA-1)	18:00	20:02	20:02	19:19 (WEA-4 E-160)
61	08:15	08:44 (WEA04)	07:12	07:12	07:12	19:20 (WEA-4 E-160)
62	17:18	16:19 (WEA-1)	18:00	20:03	20:03	19:21 (WEA-4 E-160)
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	2340	468	893	513		
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41		
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		
Reduktion Windrichtung	0,66	0,65	0,67	0,66		
Gesamte Reduktion	0,11	0,16	0,17	0,23		
Met.wahrsch.Beschattung	252	77	148	116		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 74/1 - IP 74/1 Horenfeld 23a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1	05:18	05:54	06:43	19:12 (WEA-4 E-160) 07:32	08:15 (WEA08) 07:26	08:16	08:56 (WEA05)
	21:55	21:23	20:22	30 19:42 (WEA-4 E-160) 19:13	57 18:19 (WEA-3 E-160) 17:07	16:27	80 15:00 (WEA-2 E-138)
2	05:18	05:55	06:45	19:12 (WEA-4 E-160) 07:34	08:16 (WEA08) 07:27	08:18	08:57 (WEA05)
	21:55	21:22	20:19	30 19:42 (WEA-4 E-160) 19:10	55 18:19 (WEA-3 E-160) 17:05	16:26	81 15:01 (WEA-2 E-138)
3	05:19	05:57	06:47	19:12 (WEA-4 E-160) 07:35	08:16 (WEA08) 07:29	08:19	08:57 (WEA05)
	21:54	21:20	20:17	28 19:40 (WEA-4 E-160) 19:08	54 18:19 (WEA-3 E-160) 17:03	16:25	82 15:01 (WEA-2 E-138)
4	05:20	05:59	06:48	19:13 (WEA-4 E-160) 07:37	08:18 (WEA08) 07:31	08:20	08:57 (WEA05)
	21:54	21:18	20:15	27 19:40 (WEA-4 E-160) 19:06	50 18:19 (WEA-3 E-160) 17:01	16:25	84 15:01 (WEA-2 E-138)
5	05:21	06:00	06:50	19:14 (WEA-4 E-160) 07:39	08:21 (WEA08) 07:33	08:22	08:57 (WEA05)
	21:53	21:17	20:13	25 19:39 (WEA-4 E-160) 19:03	44 18:18 (WEA-3 E-160) 17:00	16:24	84 15:01 (WEA-2 E-138)
6	05:21	06:02	06:51	19:14 (WEA-4 E-160) 07:40	17:46 (WEA-3 E-160) 07:34	08:16 (WEA04)	08:23 08:57 (WEA05)
	21:53	21:15	20:10	23 19:37 (WEA-4 E-160) 19:01	32 18:18 (WEA-3 E-160) 16:58	16:24	85 15:01 (WEA-2 E-138)
7	05:22	06:03	06:53	19:16 (WEA-4 E-160) 07:42	17:45 (WEA-3 E-160) 07:36	08:16 (WEA04)	08:24 08:58 (WEA05)
	21:52	21:13	20:08	19 19:35 (WEA-4 E-160) 18:59	32 18:17 (WEA-3 E-160) 16:56	16:23	87 15:02 (WEA-2 E-138)
8	05:23	06:05	06:55	19:17 (WEA-4 E-160) 07:44	17:46 (WEA-3 E-160) 07:38	08:15 (WEA04)	08:26 08:59 (WEA05)
	21:52	21:11	20:06	15 19:32 (WEA-4 E-160) 18:57	30 18:16 (WEA-3 E-160) 16:54	16:23	85 15:02 (WEA-2 E-138)
9	05:24	06:06	06:56	19:21 (WEA-4 E-160) 07:45	17:47 (WEA-3 E-160) 07:40	08:15 (WEA04)	08:27 08:59 (WEA05)
	21:51	21:09	20:04	7 19:28 (WEA-4 E-160) 18:54	28 18:15 (WEA-3 E-160) 16:53	16:23	86 15:02 (WEA-2 E-138)
10	05:25	06:08	06:58	07:47	17:47 (WEA-3 E-160) 07:42	08:15 (WEA04)	08:28 09:00 (WEA05)
	21:50	21:08	20:01	18:52	28 18:15 (WEA-3 E-160) 16:51	16:23	84 15:02 (WEA-2 E-138)
11	05:26	06:10	07:00	07:49	17:48 (WEA-3 E-160) 07:43	08:16 (WEA04)	08:29 09:02 (WEA05)
	21:50	21:06	19:59	18:50	24 18:12 (WEA-3 E-160) 16:50	16:22	84 15:03 (WEA-2 E-138)
12	05:27	06:11	07:01	07:51	17:49 (WEA-3 E-160) 07:45	08:16 (WEA04)	08:30 09:03 (WEA05)
	21:49	21:04	19:57	18:48	22 18:11 (WEA-3 E-160) 16:48	16:22	82 15:03 (WEA-2 E-138)
13	05:28	06:13	07:03	07:52	17:51 (WEA-3 E-160) 07:47	08:16 (WEA04)	08:31 09:04 (WEA05)
	21:48	21:02	19:54	18:45	18 18:09 (WEA-3 E-160) 16:47	16:22	83 15:04 (WEA-2 E-138)
14	05:30	06:14	07:04	07:54	17:54 (WEA-3 E-160) 07:49	08:18 (WEA04)	08:32 09:05 (WEA05)
	21:47	21:00	19:52	18:43	12 18:06 (WEA-3 E-160) 16:45	16:22	81 15:04 (WEA-2 E-138)
15	05:31	06:16	07:06	07:56	08:44 (WEA03) 07:50	08:20 (WEA04)	08:33 09:05 (WEA05)
	21:46	20:58	19:50	18:41	8 08:52 (WEA03) 16:44	16:22	80 15:03 (WEA-2 E-138)
16	05:32	06:18	07:08	07:57	08:42 (WEA03) 07:52	08:22 (WEA04)	08:34 09:06 (WEA05)
	21:45	20:56	19:47	18:39	12 08:54 (WEA03) 16:42	16:22	81 15:04 (WEA-2 E-138)
17	05:33	06:19	07:09	07:59	08:40 (WEA03) 07:54	14:16 (WEA-2 E-138)	08:34 09:07 (WEA05)
	21:44	20:54	19:45	18:37	15 08:55 (WEA03) 16:41	16:23	80 15:04 (WEA-2 E-138)
18	05:34	06:21	07:11	08:01	08:40 (WEA03) 07:56	14:16 (WEA-2 E-138)	08:35 09:08 (WEA05)
	21:43	20:52	19:43	18:35	16 08:56 (WEA03) 16:40	16:23	78 15:05 (WEA-2 E-138)
19	05:36	06:22	07:12	08:27 (WEA08) 08:03	08:39 (WEA03) 07:57	14:16 (WEA-2 E-138)	08:36 09:08 (WEA05)
	21:42	20:50	19:40	10 08:37 (WEA08) 18:33	17 08:56 (WEA03) 16:38	16:23	79 15:05 (WEA-2 E-138)
20	05:37	06:24	07:14	08:23 (WEA08) 08:04	08:39 (WEA03) 07:59	14:16 (WEA-2 E-138)	08:37 09:09 (WEA05)
	21:41	20:48	19:38 (WEA-4 E-160) 19:38	16 08:39 (WEA08) 18:30	18 08:57 (WEA03) 16:37	16:24	78 15:05 (WEA-2 E-138)
21	05:38	06:26	07:16	08:22 (WEA08) 08:06	08:38 (WEA03) 08:01	14:15 (WEA-2 E-138)	08:37 09:10 (WEA05)
	21:39	20:46	19:36	19 08:41 (WEA08) 18:28	18 08:56 (WEA03) 16:36	16:24	78 15:06 (WEA-2 E-138)
22	05:40	06:27	07:17	08:19 (WEA08) 08:08	08:38 (WEA03) 08:02	14:16 (WEA-2 E-138)	08:38 09:10 (WEA05)
	21:38	20:44	19:33	23 08:42 (WEA08) 18:26	17 08:55 (WEA03) 16:35	16:24	78 15:06 (WEA-2 E-138)
23	05:41	06:29	07:19	08:18 (WEA08) 08:10	08:39 (WEA03) 08:04	14:16 (WEA-2 E-138)	08:38 09:11 (WEA05)
	21:37	20:41	19:31	25 08:43 (WEA08) 18:24	16 08:55 (WEA03) 16:34	16:25	78 15:07 (WEA-2 E-138)
24	05:42	06:30	07:21	08:18 (WEA08) 08:11	08:40 (WEA03) 08:06	14:17 (WEA-2 E-138)	08:39 09:11 (WEA05)
	21:35	20:39	19:29	36 18:12 (WEA-3 E-160) 18:22	14 08:54 (WEA03) 16:33	16:25	79 15:08 (WEA-2 E-138)
25	05:44	06:32	07:22	08:16 (WEA08) 07:13	07:41 (WEA03) 08:07	10:19 (WEA-01)	08:39 09:11 (WEA05)
	21:34	20:37	19:26	44 18:14 (WEA-3 E-160) 17:20	12 07:53 (WEA03) 16:32	16:26	78 15:08 (WEA-2 E-138)
26	05:45	06:34	07:24	08:16 (WEA08) 07:15	07:43 (WEA03) 08:09	08:59 (WEA05)	08:39 09:11 (WEA05)
	21:33	20:35	19:24	48 18:16 (WEA-3 E-160) 17:18	7 07:50 (WEA03) 16:31	16:27	79 15:08 (WEA-2 E-138)
27	05:47	06:35	07:25	08:15 (WEA08) 07:17	08:10	08:58 (WEA05)	08:40 09:12 (WEA05)
	21:31	20:33	19:22	52 18:17 (WEA-3 E-160) 17:16	16:30	15:49 (WEA-1)	16:28 81 15:10 (WEA-2 E-138)
28	05:48	06:37	07:27	08:15 (WEA08) 07:18	08:12	08:58 (WEA05)	08:40 09:12 (WEA05)
	21:30	20:31	19:19	54 18:18 (WEA-3 E-160) 17:14	16:29	15:49 (WEA-1)	16:28 79 15:10 (WEA-2 E-138)
29	05:49	06:39	07:29	08:15 (WEA08) 07:20	08:13	08:57 (WEA05)	08:40 09:12 (WEA05)
	21:28	20:28	19:17	56 18:19 (WEA-3 E-160) 17:12	16:28	15:46 (WEA-1)	16:29 81 15:11 (WEA-2 E-138)
30	05:51	06:40	07:30	08:15 (WEA08) 07:22	08:15	08:57 (WEA05)	08:40 09:12 (WEA05)
	21:27	20:26	19:15	57 18:19 (WEA-3 E-160) 17:10	16:27	15:01 (WEA-2 E-138)	16:30 82 15:11 (WEA-2 E-138)
31	05:52	06:42	07:24	07:24	17:09	08:40	09:12 (WEA05)
	21:25	20:24	19:13 (WEA-4 E-160) 19:13	381	332	267	244 82 15:12 (WEA-2 E-138)
Sonnenscheinstunden	501	453	381	332	267	244	2519
astr.max.mögl.Beschattung		316	644	656	1711		0,15
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23		0,84
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84		0,62
Reduktion Windrichtung		0,66	0,65	0,67	0,68		0,08
Gesamte Reduktion		0,24	0,20	0,18	0,13		193
Met.wahrsch.Beschattung		75	127	115	221		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 77 - IP 77 Buschhausen 10

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1	08:40	08:14	07:20	16:59 (WEA-5 E-160)	07:10	07:41 (WEA-HS4) 06:06	05:20	05:49 (WEA_Heid2)
	16:32	17:20	18:11	30 17:29 (WEA-5 E-160)	20:05	33 08:14 (WEA-HS4) 20:56	21:41	10 05:59 (WEA_Heid2)
2	08:40	08:12	07:18	16:59 (WEA-5 E-160)	07:08	07:40 (WEA-HS4) 06:04	05:20	05:49 (WEA_Heid2)
	16:33	17:22	18:13	30 17:29 (WEA-5 E-160)	20:07	33 08:13 (WEA-HS4) 20:57	21:42	10 05:59 (WEA_Heid2)
3	08:40	08:10	07:16	16:58 (WEA-5 E-160)	07:05	07:40 (WEA-HS4) 06:02	05:19	05:51 (WEA_Heid2)
	16:34	17:23	18:15	29 17:27 (WEA-5 E-160)	20:08	32 08:12 (WEA-HS4) 20:59	21:43	8 05:59 (WEA_Heid2)
4	08:40	08:09	07:14	16:59 (WEA-5 E-160)	07:03	07:40 (WEA-HS4) 06:00	05:18	05:51 (WEA_Heid2)
	16:36	17:25	18:17	28 17:27 (WEA-5 E-160)	20:10	32 08:12 (WEA-HS4) 21:01	21:44	8 05:59 (WEA_Heid2)
5	08:39	08:07	07:12	17:00 (WEA-5 E-160)	07:01	07:40 (WEA-HS4) 05:58	05:17	05:51 (WEA_Heid2)
	16:37	17:27	18:18	26 17:26 (WEA-5 E-160)	20:12	31 08:11 (WEA-HS4) 21:02	21:45	7 05:58 (WEA_Heid2)
6	08:39	08:05	07:09	17:01 (WEA-5 E-160)	06:59	07:40 (WEA-HS4) 05:56	05:17	05:52 (WEA_Heid2)
	16:38	17:29	18:20	24 17:25 (WEA-5 E-160)	20:13	30 08:10 (WEA-HS4) 21:04	21:46	6 05:58 (WEA_Heid2)
7	08:39	08:04	07:07	17:01 (WEA-5 E-160)	06:56	07:41 (WEA-HS4) 05:54	05:16	05:53 (WEA_Heid2)
	16:39	17:31	18:22	22 17:23 (WEA-5 E-160)	20:15	28 08:09 (WEA-HS4) 21:05	21:47	4 05:57 (WEA_Heid2)
8	08:38	08:02	07:05	17:03 (WEA-5 E-160)	06:54	07:17 (WEA_Heid3) 05:53	05:16	05:55 (WEA_Heid2)
	16:40	17:33	18:24	19 17:22 (WEA-5 E-160)	20:17	28 08:08 (WEA-HS4) 21:07	21:48	1 05:56 (WEA_Heid2)
9	08:38	08:00	07:03	17:05 (WEA-5 E-160)	06:52	07:15 (WEA_Heid3) 05:51	05:15	
	16:42	17:35	18:25	14 17:19 (WEA-5 E-160)	20:18	27 08:06 (WEA-HS4) 21:09	21:49	
10	08:37	07:58	07:00	17:10 (WEA-5 E-160)	06:50	07:12 (WEA_Heid3) 05:49	05:15	
	16:43	17:36	18:27	3 17:13 (WEA-5 E-160)	20:20	32 08:03 (WEA-HS4) 21:10	21:50	
11	08:37	07:57	06:58		06:47	07:10 (WEA_Heid3) 05:48	05:14	
	16:45	17:38	18:29		20:22	32 08:01 (WEA-HS4) 21:12	21:50	
12	08:36	07:55	06:56		06:45	07:11 (WEA_Heid3) 05:46	05:14	
	16:46	17:40	18:31		20:24	22 07:56 (WEA-HS4) 21:13	21:51	
13	08:35	07:53	06:54		06:43	07:12 (WEA_Heid7) 05:44	05:14	
	16:48	17:42	18:32		20:25	17 07:29 (WEA_Heid7) 21:15	21:52	
14	08:35	07:51	06:51		06:41	07:11 (WEA_Heid7) 05:43	05:14	
	16:49	17:44	18:34		20:27	18 07:29 (WEA_Heid7) 21:17	21:52	
15	08:34	07:49	06:49		06:39	07:06 (WEA-HS2) 05:41	05:13	
	16:51	17:46	18:36		20:29	23 07:29 (WEA_Heid7) 21:18	21:53	
16	08:33	07:47	06:47		06:36	07:03 (WEA-HS2) 05:40	05:13	
	16:52	17:48	18:38		20:30	25 07:28 (WEA_Heid7) 21:20	21:54	
17	08:32	07:45	06:45		06:34	07:01 (WEA-HS2) 05:38	05:13	
	16:54	17:49	18:39		20:32	26 07:27 (WEA_Heid7) 21:21	21:54	
18	08:31	07:43	06:42		06:32	07:00 (WEA-HS2) 05:37	05:13	
	16:55	17:51	18:41		20:34	27 07:27 (WEA_Heid7) 21:23	21:54	
19	08:30	07:41	06:40		06:30	07:00 (WEA-HS2) 05:35	05:13	
	16:57	17:53	12 17:20 (WEA-5 E-160)	18:43	20:35	26 07:26 (WEA_Heid7) 21:24	21:55	
20	08:29	07:39	17:06 (WEA-5 E-160)	06:38	06:28	06:59 (WEA-HS2) 05:34	05:13	
	16:59	17:55	17 17:23 (WEA-5 E-160)	18:44	20:37	26 07:25 (WEA_Heid7) 21:26	21:55	
21	08:28	07:37	17:04 (WEA-5 E-160)	06:35	06:26	06:59 (WEA-HS2) 05:33	05:13	
	17:00	17:57	21 17:25 (WEA-5 E-160)	18:46	20:39	24 07:23 (WEA_Heid7) 21:27	21:55	
22	08:27	07:35	17:02 (WEA-5 E-160)	06:33	06:57 (WEA-HS4) 06:24	06:58 (WEA-HS2) 05:31	05:14	
	17:02	17:59	24 17:26 (WEA-5 E-160)	18:48	07:04 (WEA-HS4) 20:40	20 07:18 (WEA-HS2) 21:28	21:56	
23	08:26	07:33	17:01 (WEA-5 E-160)	06:31	06:53 (WEA-HS4) 06:22	06:58 (WEA-HS2) 05:30	05:14	
	17:04	18:00	26 17:27 (WEA-5 E-160)	18:50	14 07:07 (WEA-HS4) 20:42	20 07:18 (WEA-HS2) 21:30	21:56	
24	08:25	07:31	17:01 (WEA-5 E-160)	06:28	06:51 (WEA-HS4) 06:19	06:59 (WEA-HS2) 05:29	05:14	
	17:05	18:02	27 17:28 (WEA-5 E-160)	18:51	19 07:10 (WEA-HS4) 20:44	18 07:17 (WEA-HS2) 21:31	1 05:57 (WEA_Heid2) 21:56	
25	08:23	07:29	17:00 (WEA-5 E-160)	06:26	06:49 (WEA-HS4) 06:17	06:59 (WEA-HS2) 05:28	05:55 (WEA_Heid2) 05:14	
	17:07	18:04	29 17:29 (WEA-5 E-160)	18:53	22 07:11 (WEA-HS4) 20:46	17 07:16 (WEA-HS2) 21:33	2 05:57 (WEA_Heid2) 21:56	
26	08:22	07:27	16:59 (WEA-5 E-160)	06:24	06:46 (WEA-HS4) 06:15	07:00 (WEA-HS2) 05:26	05:54 (WEA_Heid2) 05:15	
	17:09	18:06	29 17:28 (WEA-5 E-160)	18:55	26 07:12 (WEA-HS4) 20:47	15 07:15 (WEA-HS2) 21:34	4 05:58 (WEA_Heid2) 21:56	
27	08:21	07:25	16:58 (WEA-5 E-160)	06:22	06:44 (WEA-HS4) 06:13	07:01 (WEA-HS2) 05:25	05:53 (WEA_Heid2) 05:15	
	17:11	18:08	31 17:29 (WEA-5 E-160)	18:56	29 07:13 (WEA-HS4) 20:49	12 07:13 (WEA-HS2) 21:35	5 05:58 (WEA_Heid2) 21:56	
28	08:19	07:23	16:58 (WEA-5 E-160)	06:19	06:44 (WEA-HS4) 06:11	07:03 (WEA-HS2) 05:24	05:52 (WEA_Heid2) 05:16	
	17:13	18:09	31 17:29 (WEA-5 E-160)	18:58	30 07:14 (WEA-HS4) 20:51	8 07:11 (WEA-HS2) 21:36	7 05:59 (WEA_Heid2) 21:56	
29	08:18		07:17		06:09	05:23	05:51 (WEA_Heid2) 05:16	
	17:14		20:00		08:13 (WEA-HS4) 20:52	21:38	8 05:59 (WEA_Heid2) 21:56	
30	08:17		07:15		06:07	05:22	05:50 (WEA_Heid2) 05:17	
	17:16		20:02		08:14 (WEA-HS4) 20:54	21:39	9 05:59 (WEA_Heid2) 21:55	
31	08:15		07:12		07:41 (WEA-HS4)	05:21	05:50 (WEA_Heid2)	
	17:18		20:03		08:14 (WEA-HS4)	21:40	9 05:59 (WEA_Heid2)	
Sonnenscheinstunden	259	278	367	416	485	498		
astr.max.mögl.Beschattung		247	469	682	45	54		
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41	0,46	0,36		
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84		
Reduktion Windrichtung		0,71	0,69	0,68	0,72	0,72		
Gesamte Reduktion		0,18	0,17	0,23	0,28	0,22		
Met.wahrsch.Beschattung		45	81	160	13	12		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 77 - IP 77 Buschhausen 10

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18		05:54		06:43		07:09 (WEA_Heid3) 07:32		07:26		08:16
	21:55		21:23		20:22	32	08:00 (WEA-HS4) 19:12		17:07		16:26
2	05:18		05:55		06:45		07:11 (WEA_Heid3) 07:34		07:27		08:18
	21:55		21:22		20:19	32	08:02 (WEA-HS4) 19:10		17:05		16:26
3	05:19		05:57		06:47		07:12 (WEA_Heid3) 07:35		07:29		08:19
	21:54		21:20		20:17	27	08:03 (WEA-HS4) 19:08		17:03		16:25
4	05:20		05:58		06:48		07:14 (WEA_Heid3) 07:37		07:31		08:20
	21:54		21:18		20:15	28	08:05 (WEA-HS4) 19:06	10	17:44 (WEA-5 E-160) 17:01		16:25
5	05:20	4	05:59 (WEA_Heid2) 06:00		06:50		07:37 (WEA-HS4) 07:39		17:41 (WEA-5 E-160) 07:33		08:22
	21:53		21:17		20:13	28	08:05 (WEA-HS4) 19:03	16	17:57 (WEA-5 E-160) 16:59		16:24
6	05:21		06:02		06:51		07:36 (WEA-HS4) 07:40		17:39 (WEA-5 E-160) 07:34		08:23
	21:53	5	06:04 (WEA_Heid2) 21:15		20:10	30	08:06 (WEA-HS4) 19:01	20	17:59 (WEA-5 E-160) 16:58		16:24
7	05:22		06:03		06:53		07:36 (WEA-HS4) 07:42		17:36 (WEA-5 E-160) 07:36		08:24
	21:52	6	06:05 (WEA_Heid2) 21:13		20:08	31	08:07 (WEA-HS4) 18:59	24	18:00 (WEA-5 E-160) 16:56		16:23
8	05:23		06:05		06:55		07:35 (WEA-HS4) 07:44		17:35 (WEA-5 E-160) 07:38		08:26
	21:52	8	06:06 (WEA_Heid2) 21:11		20:06	31	08:06 (WEA-HS4) 18:57	26	18:01 (WEA-5 E-160) 16:54		16:23
9	05:24		06:06		06:56		07:34 (WEA-HS4) 07:45		17:34 (WEA-5 E-160) 07:40		08:27
	21:51	8	06:05 (WEA_Heid2) 21:09		20:03	33	08:07 (WEA-HS4) 18:54	28	18:02 (WEA-5 E-160) 16:53		16:23
10	05:25		06:08		06:58		07:33 (WEA-HS4) 07:47		17:33 (WEA-5 E-160) 07:42		08:28
	21:50	9	06:06 (WEA_Heid2) 21:08		20:01	33	08:06 (WEA-HS4) 18:52	28	18:01 (WEA-5 E-160) 16:51		16:22
11	05:26		06:09		06:59		07:33 (WEA-HS4) 07:49		17:32 (WEA-5 E-160) 07:43		08:29
	21:50	9	06:06 (WEA_Heid2) 21:06		19:59	33	08:06 (WEA-HS4) 18:50	30	18:02 (WEA-5 E-160) 16:50		16:22
12	05:27		06:11		07:01		07:32 (WEA-HS4) 07:50		17:32 (WEA-5 E-160) 07:45		08:30
	21:49	10	06:07 (WEA_Heid2) 21:04		19:57	33	08:05 (WEA-HS4) 18:48	30	18:02 (WEA-5 E-160) 16:48		16:22
13	05:28		06:13		07:03		07:33 (WEA-HS4) 07:52		17:32 (WEA-5 E-160) 07:47		08:31
	21:48	9	06:07 (WEA_Heid2) 21:02		19:54	32	08:05 (WEA-HS4) 18:45	30	18:02 (WEA-5 E-160) 16:46		16:22
14	05:29		06:14		07:04		07:33 (WEA-HS4) 07:54		17:32 (WEA-5 E-160) 07:49		08:32
	21:47	8	06:07 (WEA_Heid2) 21:00		19:52	32	08:05 (WEA-HS4) 18:43	30	18:02 (WEA-5 E-160) 16:45		16:22
15	05:31		06:16		07:06		07:33 (WEA-HS4) 07:56		17:31 (WEA-5 E-160) 07:50		08:33
	21:46	7	06:08 (WEA_Heid2) 20:58	9	07:19 (WEA-HS2) 19:50	30	08:03 (WEA-HS4) 18:41	30	18:01 (WEA-5 E-160) 16:44		16:22
16	05:32		06:17		07:08 (WEA-HS2) 07:08		07:34 (WEA-HS4) 07:57		17:31 (WEA-5 E-160) 07:52		08:34
	21:45	6	06:08 (WEA_Heid2) 20:56	13	07:21 (WEA-HS2) 19:47	28	08:02 (WEA-HS4) 18:39	29	18:00 (WEA-5 E-160) 16:42		16:22
17	05:33		06:19		07:06 (WEA-HS2) 07:09		07:34 (WEA-HS4) 07:59		17:32 (WEA-5 E-160) 07:54		08:34
	21:44	5	06:08 (WEA_Heid2) 20:54	16	07:22 (WEA-HS2) 19:45	26	08:00 (WEA-HS4) 18:37	28	18:00 (WEA-5 E-160) 16:41		16:23
18	05:34		06:21		07:06 (WEA-HS2) 07:11		07:36 (WEA-HS4) 08:01		17:32 (WEA-5 E-160) 07:56		08:35
	21:43	3	06:07 (WEA_Heid2) 20:52	17	07:23 (WEA-HS2) 19:43	23	07:59 (WEA-HS4) 18:35	27	17:59 (WEA-5 E-160) 16:40		16:23
19	05:35		06:22		07:04 (WEA-HS2) 07:12		07:37 (WEA-HS4) 08:03		17:33 (WEA-5 E-160) 07:57		08:36
	21:42	2	06:07 (WEA_Heid2) 20:50	19	07:23 (WEA-HS2) 19:40	20	07:57 (WEA-HS4) 18:32	25	17:58 (WEA-5 E-160) 16:38		16:23
20	05:37		06:24		07:04 (WEA-HS2) 07:14		07:39 (WEA-HS4) 08:04		17:33 (WEA-5 E-160) 07:59		08:37
	21:41		06:25		07:23 (WEA-HS2) 19:38	15	07:54 (WEA-HS4) 18:30	23	17:56 (WEA-5 E-160) 16:37		16:23
21	05:38		06:25		07:03 (WEA-HS2) 07:16		07:41 (WEA-HS4) 08:06		17:35 (WEA-5 E-160) 08:01		08:37
	21:39		06:27	21	07:24 (WEA_Heid7) 19:36	10	07:51 (WEA-HS4) 18:28	20	17:55 (WEA-5 E-160) 16:36		16:24
22	05:39		06:27		07:03 (WEA-HS2) 07:17		08:08		17:37 (WEA-5 E-160) 08:02		08:38
	21:38		06:29	25	07:28 (WEA_Heid7) 19:33		18:26	16	17:53 (WEA-5 E-160) 16:35		16:24
23	05:41		06:29		07:03 (WEA-HS2) 07:19		08:10		17:40 (WEA-5 E-160) 08:04		08:38
	21:37		06:30	25	07:28 (WEA_Heid7) 19:31		18:24	10	17:50 (WEA-5 E-160) 16:34		16:25
24	05:42		06:30		07:03 (WEA-HS2) 07:20		08:11		18:06		08:39
	21:35		06:32	27	07:30 (WEA_Heid7) 19:29		18:22		16:33		16:25
25	05:44		06:32		07:03 (WEA-HS2) 07:22		07:13		18:07		08:39
	21:34		06:34	27	07:30 (WEA_Heid7) 19:26		17:20		16:32		16:26
26	05:45		06:34		07:04 (WEA-HS2) 07:24		07:15		18:09		08:39
	21:33		06:35	26	07:30 (WEA_Heid7) 19:24		17:18		16:31		16:27
27	05:46		06:35		07:06 (WEA-HS2) 07:25		07:17		18:10		08:40
	21:31		06:37	25	07:31 (WEA_Heid7) 19:22		17:16		16:30		16:27
28	05:48		06:37		07:08 (WEA-HS2) 07:27		07:18		18:12		08:40
	21:30		06:38	22	07:30 (WEA_Heid7) 19:19		17:14		16:29		16:28
29	05:49		06:38		07:12 (WEA_Heid7) 07:29		07:20		18:13		08:40
	21:28		06:38	18	07:30 (WEA_Heid7) 19:17		17:12		16:28		16:29
30	05:51		06:40		07:12 (WEA_Heid7) 07:30		07:22		18:15		08:40
	21:27		06:42	17	07:29 (WEA_Heid7) 19:15		17:10		16:27		16:30
31	05:52		06:42		07:10 (WEA_Heid3) 07:30		07:24		18:16		08:40
	21:25		06:42	23	07:56 (WEA-HS4) 19:08		17:08		16:31		16:31
	Sonneneinstunden	501	453		381		332		267		244
	astr.max.mögl.Beschattung	99	349		587		480				
	Red.Sonneneinstunden	0,41	0,43		0,36		0,32				
	Reduktion Betriebsdauer	0,84	0,84		0,84		0,84				
	Reduktion Windrichtung	0,72	0,69		0,67		0,71				
	Gesamte Reduktion	0,25	0,25		0,20		0,19				
	Met.wahrsch.Beschattung	25	87		120		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)	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
	Minuten mit Schatten	

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 78 - IP 78 Buschhausen 11

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	08:14	07:20	17:05 (WEA-5 E-160)	07:10	07:33 (WEA-HS4)	06:06
	16:32	17:20	18:11	30 17:35 (WEA-5 E-160)	20:05	26 07:59 (WEA-HS4)	20:56
2	08:40	08:12	07:18	17:04 (WEA-5 E-160)	07:08	07:30 (WEA-HS4)	06:04
	16:33	17:22	18:13	31 17:35 (WEA-5 E-160)	20:07	29 07:59 (WEA-HS4)	20:57
3	08:40	08:10	07:16	17:03 (WEA-5 E-160)	07:05	07:30 (WEA-HS4)	06:02
	16:34	17:23	18:15	31 17:34 (WEA-5 E-160)	20:08	29 07:59 (WEA-HS4)	20:59
4	08:40	08:09	07:14	17:03 (WEA-5 E-160)	07:03	07:29 (WEA-HS4)	06:00
	16:36	17:25	18:17	32 17:35 (WEA-5 E-160)	20:10	31 08:00 (WEA-HS4)	21:01
5	08:39	08:07	07:12	17:03 (WEA-5 E-160)	07:01	07:28 (WEA-HS4)	05:58
	16:37	17:27	18:18	32 17:35 (WEA-5 E-160)	20:12	31 07:59 (WEA-HS4)	21:02
6	08:39	08:05	07:09	17:03 (WEA-5 E-160)	06:59	07:27 (WEA-HS4)	05:56
	16:38	17:29	18:20	32 17:35 (WEA-5 E-160)	20:13	32 07:59 (WEA-HS4)	21:04
7	08:39	08:04	07:07	17:03 (WEA-5 E-160)	06:56	07:27 (WEA-HS4)	05:54
	16:39	17:31	18:22	30 17:33 (WEA-5 E-160)	20:15	32 07:59 (WEA-HS4)	21:05
8	08:38	08:02	07:05	17:03 (WEA-5 E-160)	06:54	07:27 (WEA-HS4)	05:53
	16:41	17:33	18:24	30 17:33 (WEA-5 E-160)	20:17	32 07:59 (WEA-HS4)	21:07
9	08:38	08:00	07:03	17:04 (WEA-5 E-160)	06:52	07:28 (WEA-HS4)	05:51
	16:42	17:35	18:25	28 17:32 (WEA-5 E-160)	20:18	30 07:58 (WEA-HS4)	21:09
10	08:37	07:58	07:00	17:04 (WEA-5 E-160)	06:50	07:27 (WEA-HS4)	05:49
	16:43	17:36	18:27	26 17:30 (WEA-5 E-160)	20:20	30 07:57 (WEA-HS4)	21:10
11	08:37	07:57	06:58	17:05 (WEA-5 E-160)	06:47	07:10 (WEA-Heid3)	05:48
	16:45	17:38	18:29	24 17:29 (WEA-5 E-160)	20:22	31 07:56 (WEA-HS4)	21:12
12	08:36	07:55	06:56	17:07 (WEA-5 E-160)	06:45	07:08 (WEA-Heid3)	05:46
	16:46	17:40	18:31	21 17:28 (WEA-5 E-160)	20:24	32 07:55 (WEA-HS4)	21:13
13	08:35	07:53	06:54	17:08 (WEA-5 E-160)	06:43	07:06 (WEA-Heid3)	05:44
	16:48	17:42	18:32	17 17:25 (WEA-5 E-160)	20:25	31 07:54 (WEA-HS4)	21:15
14	08:35	07:51	06:51	17:12 (WEA-5 E-160)	06:41	07:05 (WEA-Heid3)	05:43
	16:49	17:44	18:34	9 17:21 (WEA-5 E-160)	20:27	29 07:53 (WEA-HS4)	21:17
15	08:34	07:49	06:49		06:39	07:06 (WEA-Heid7)	05:41
	16:51	17:46	18:36		20:29	25 07:51 (WEA-HS4)	21:18
16	08:33	07:47	06:47		06:36	07:02 (WEA-Heid7)	05:40
	16:52	17:48	18:38		20:30	26 07:48 (WEA-HS4)	21:20
17	08:32	07:45	06:45		06:34	07:00 (WEA-Heid7)	05:38
	16:54	17:49	18:39		20:32	22 07:44 (WEA-HS4)	21:21
18	08:31	07:43	06:42		06:32	06:59 (WEA-Heid7)	05:37
	16:55	17:51	18:41		20:34	16 07:15 (WEA-Heid7)	21:23
19	08:30	07:41	06:40		06:30	06:58 (WEA-Heid7)	05:35
	16:57	17:53	18:43		20:35	17 07:15 (WEA-Heid7)	21:24
20	08:29	07:39	06:38		06:28	06:58 (WEA-Heid7)	05:34
	16:59	17:55	18:44		20:37	17 07:15 (WEA-Heid7)	21:26
21	08:28	07:37	06:35		06:26	06:57 (WEA-Heid7)	05:33
	17:00	17:57	18:46		20:39	18 07:15 (WEA-Heid7)	21:27
22	08:27	07:35	17:18 (WEA-5 E-160)	06:33	06:24	06:57 (WEA-Heid7)	05:31
	17:02	17:59	5 17:23 (WEA-5 E-160)	18:48	20:40	18 07:15 (WEA-Heid7)	21:28
23	08:26	07:33	17:13 (WEA-5 E-160)	06:31	06:22	06:57 (WEA-Heid7)	05:30
	17:04	18:00	14 17:27 (WEA-5 E-160)	18:50	20:42	17 07:14 (WEA-Heid7)	21:30
24	08:25	07:31	17:11 (WEA-5 E-160)	06:28	06:19	06:58 (WEA-Heid7)	05:29
	17:06	18:02	19 17:30 (WEA-5 E-160)	18:51	20:44	15 07:13 (WEA-Heid7)	21:31
25	08:23	07:29	17:09 (WEA-5 E-160)	06:26	06:17	06:58 (WEA-Heid7)	05:28
	17:07	18:04	23 17:32 (WEA-5 E-160)	18:53	20:46	14 07:12 (WEA-Heid7)	21:33
26	08:22	07:27	17:07 (WEA-5 E-160)	06:24	06:15	07:00 (WEA-Heid7)	05:26
	17:09	18:06	25 17:32 (WEA-5 E-160)	18:55	20:47	10 07:10 (WEA-Heid7)	21:34
27	08:21	07:25	17:06 (WEA-5 E-160)	06:22	06:13	07:02 (WEA-Heid7)	05:25
	17:11	18:08	27 17:33 (WEA-5 E-160)	18:56	20:49	6 07:08 (WEA-Heid7)	21:35
28	08:19	07:23	17:05 (WEA-5 E-160)	06:19	06:11	05:24	
	17:13	18:09	29 17:34 (WEA-5 E-160)	18:58	20:51	2 05:54 (WEA-Heid2)	05:16
29	08:18		07:17	06:52 (WEA-HS4)	06:09	05:23	05:51 (WEA-Heid2)
	17:14		20:00	07:54 (WEA-HS4)	20:52	3 05:54 (WEA-Heid2)	05:16
30	08:17		07:15	07:37 (WEA-HS4)	06:07	05:22	05:50 (WEA-Heid2)
	17:16		20:02	07:56 (WEA-HS4)	20:54	4 05:54 (WEA-Heid2)	05:17
31	08:15		07:12	07:35 (WEA-HS4)	05:21	5 05:50 (WEA-Heid2)	05:15
	17:18		20:03	07:58 (WEA-HS4)	21:40	5 05:55 (WEA-Heid2)	05:15
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung		142	440	646	14	103	
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41	0,46	0,36	
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,84	
Reduktion Windrichtung		0,71	0,70	0,69	0,72	0,72	
Gesamte Reduktion		0,18	0,18	0,24	0,28	0,22	
Met.wahrsch.Beschattung		26	78	152	4	23	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 78 - IP 78 Buschhausen 11

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	05:54 (WEA_Heid2)	05:54	06:43	07:09 (WEA_Heid3)	07:32	17:47 (WEA-5 E-160)	07:26	08:16		
	21:55	05:59 (WEA_Heid2)	21:23	20:22	31	07:55 (WEA-HS4)	19:12	19	18:06 (WEA-5 E-160)	17:07	16:26
2	05:18	05:54 (WEA_Heid2)	05:55	06:45		07:26 (WEA-HS4)	07:34		17:45 (WEA-5 E-160)	07:27	08:18
	21:55	06:00 (WEA_Heid2)	21:22	20:19	30	07:56 (WEA-HS4)	19:10	22	18:07 (WEA-5 E-160)	17:05	16:26
3	05:19	05:53 (WEA_Heid2)	05:57	06:47		07:25 (WEA-HS4)	07:35		17:43 (WEA-5 E-160)	07:29	08:19
	21:54	06:00 (WEA_Heid2)	21:20	20:17	30	07:55 (WEA-HS4)	19:08	25	18:08 (WEA-5 E-160)	17:03	16:25
4	05:20	05:53 (WEA_Heid2)	05:58	06:48		07:24 (WEA-HS4)	07:37		17:41 (WEA-5 E-160)	07:31	08:20
	21:54	06:01 (WEA_Heid2)	21:18	20:15	32	07:56 (WEA-HS4)	19:06	28	18:09 (WEA-5 E-160)	17:01	16:25
5	05:20	05:53 (WEA_Heid2)	06:00	06:50		07:23 (WEA-HS4)	07:39		17:41 (WEA-5 E-160)	07:33	08:22
	21:53	06:01 (WEA_Heid2)	21:17	20:13	32	07:55 (WEA-HS4)	19:03	29	18:10 (WEA-5 E-160)	16:59	16:24
6	05:21	05:53 (WEA_Heid2)	06:02	06:51		07:24 (WEA-HS4)	07:40		17:40 (WEA-5 E-160)	07:34	08:23
	21:53	06:02 (WEA_Heid2)	21:15	20:10	31	07:55 (WEA-HS4)	19:01	30	18:10 (WEA-5 E-160)	16:58	16:24
7	05:22	05:53 (WEA_Heid2)	06:03	06:53		07:24 (WEA-HS4)	07:42		17:38 (WEA-5 E-160)	07:36	08:24
	21:52	06:03 (WEA_Heid2)	21:13	20:08	31	07:55 (WEA-HS4)	18:59	31	18:09 (WEA-5 E-160)	16:56	16:23
8	05:23	05:54 (WEA_Heid2)	06:05	06:55		07:23 (WEA-HS4)	07:44		17:38 (WEA-5 E-160)	07:38	08:26
	21:52	06:03 (WEA_Heid2)	21:11	20:06	31	07:54 (WEA-HS4)	18:57	32	18:10 (WEA-5 E-160)	16:54	16:23
9	05:24	05:54 (WEA_Heid2)	06:06	06:56		07:24 (WEA-HS4)	07:45		17:38 (WEA-5 E-160)	07:40	08:27
	21:51	06:02 (WEA_Heid2)	21:09	20:03	30	07:54 (WEA-HS4)	18:54	32	18:10 (WEA-5 E-160)	16:53	16:23
10	05:25	05:55 (WEA_Heid2)	06:08	06:58		07:23 (WEA-HS4)	07:47		17:37 (WEA-5 E-160)	07:42	08:28
	21:50	06:03 (WEA_Heid2)	21:08	20:01	29	07:52 (WEA-HS4)	18:52	32	18:09 (WEA-5 E-160)	16:51	16:22
11	05:26	05:56 (WEA_Heid2)	06:09	06:59		07:25 (WEA-HS4)	07:49		17:37 (WEA-5 E-160)	07:43	08:29
	21:50	06:03 (WEA_Heid2)	21:06	19:59	26	07:51 (WEA-HS4)	18:50	31	18:08 (WEA-5 E-160)	16:50	16:22
12	05:27	05:57 (WEA_Heid2)	06:11	07:01		07:26 (WEA-HS4)	07:50		17:37 (WEA-5 E-160)	07:45	08:30
	21:49	06:03 (WEA_Heid2)	21:04	19:57	23	07:49 (WEA-HS4)	18:48	31	18:08 (WEA-5 E-160)	16:48	16:22
13	05:28	05:58 (WEA_Heid2)	06:13	07:03		07:28 (WEA-HS4)	07:52		17:38 (WEA-5 E-160)	07:47	08:31
	21:48	06:03 (WEA_Heid2)	21:02	19:54	20	07:48 (WEA-HS4)	18:45	30	18:08 (WEA-5 E-160)	16:46	16:22
14	05:29	05:59 (WEA_Heid2)	06:14	07:04		07:30 (WEA-HS4)	07:54		17:39 (WEA-5 E-160)	07:49	08:32
	21:47	06:03 (WEA_Heid2)	21:00	19:52	16	07:46 (WEA-HS4)	18:43	28	18:07 (WEA-5 E-160)	16:45	16:22
15	05:31	06:01 (WEA_Heid2)	06:16	07:06		07:31 (WEA-HS4)	07:56		17:38 (WEA-5 E-160)	07:50	08:33
	21:46	06:02 (WEA_Heid2)	20:58	19:50	11	07:42 (WEA-HS4)	18:41	27	18:05 (WEA-5 E-160)	16:44	16:22
16	05:32	06:02 (WEA_Heid2)	06:17	07:08		07:57	18:40		17:40 (WEA-5 E-160)	07:52	08:34
	21:45	06:03 (WEA_Heid2)	20:56	19:47		18:39	24	18:04 (WEA-5 E-160)	16:42	16:22	
17	05:33	06:19	07:06 (WEA_Heid7)	07:09		07:59		17:41 (WEA-5 E-160)	07:54	08:34	
	21:44	20:54	11	07:17 (WEA_Heid7)	19:45	18:37	21	18:02 (WEA-5 E-160)	16:41	16:23	
18	05:34	06:21	07:05 (WEA_Heid7)	07:11		08:01		17:43 (WEA-5 E-160)	07:56	08:35	
	21:43	20:52	14	07:19 (WEA_Heid7)	19:43	18:35	17	18:00 (WEA-5 E-160)	16:40	16:23	
19	05:35	06:22	07:03 (WEA_Heid7)	07:12		08:03		17:46 (WEA-5 E-160)	07:57	08:36	
	21:42	20:50	16	07:19 (WEA_Heid7)	19:40	18:32	12	17:58 (WEA-5 E-160)	16:38	16:23	
20	05:37	06:24	07:03 (WEA_Heid7)	07:14		08:04			07:59	08:37	
	21:41	20:48	17	07:20 (WEA_Heid7)	19:38	18:30			16:37	16:23	
21	05:38	06:25	07:02 (WEA_Heid7)	07:16		08:06			08:01	08:37	
	21:39	20:46	17	07:19 (WEA_Heid7)	19:36	18:28			16:36	16:24	
22	05:39	06:27	07:02 (WEA_Heid7)	07:17		08:08			08:02	08:38	
	21:38	20:43	18	07:20 (WEA_Heid7)	19:33	18:26			16:35	16:24	
23	05:41	06:29	07:01 (WEA_Heid7)	07:19		08:10			08:04	08:38	
	21:37	20:41	18	07:19 (WEA_Heid7)	19:31	18:24			16:34	16:25	
24	05:42	06:30	07:02 (WEA_Heid7)	07:21		08:11			08:06	08:39	
	21:35	20:39	17	07:19 (WEA_Heid7)	19:29	18:22			16:33	16:25	
25	05:44	06:32	07:02 (WEA_Heid7)	07:22		07:13			08:07	08:39	
	21:34	20:37	15	07:17 (WEA_Heid7)	19:26	17:20			16:32	16:26	
26	05:45	06:34	07:03 (WEA_Heid7)	07:24		07:15			08:09	08:39	
	21:33	20:35	22	07:47 (WEA-HS4)	19:24	17:18			16:31	16:27	
27	05:46	06:35	07:05 (WEA_Heid7)	07:25		07:17			08:10	08:40	
	21:31	20:33	26	07:51 (WEA-HS4)	19:22	17:16			16:30	16:27	
28	05:48	06:37	07:07 (WEA_Heid7)	07:27		07:18			08:12	08:40	
	21:30	20:31	24	07:52 (WEA-HS4)	19:19	17:14			16:29	16:28	
29	05:49	06:38	07:05 (WEA_Heid3)	07:29		07:20			08:13	08:40	
	21:28	20:28	30	07:54 (WEA-HS4)	19:17	17:12			16:28	16:29	
30	05:51	06:40	07:06 (WEA_Heid3)	07:30		07:22			08:15	08:40	
	21:27	20:26	31	07:54 (WEA-HS4)	19:15	17:10			16:27	16:30	
31	05:52	06:42	07:08 (WEA_Heid3)			07:24				08:40	
	21:25	20:24	32	07:55 (WEA-HS4)		17:08				16:31	
Sonnenscheinstunden	501	453		381		332		267		244	
astr.max.mögl.Beschattung	103		315		418		501				
Red.Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32				
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84				
Reduktion Windrichtung	0,72		0,69		0,68		0,71				
Gesamte Reduktion	0,25		0,25		0,21		0,19				
Met.wahrsch.Beschattung	26		78		87		94				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 79 - IP 79 Buschhausen 12

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni			
1	08:40	08:14	07:20	16:48 (WEA-5 E-160)	07:10	07:47 (WEA-HS4)	06:06	05:20	
	16:32	17:20	18:11	29 17:17 (WEA-5 E-160)	20:05	28 08:15 (WEA-HS4)	20:56	21:41	
2	08:40	08:12	07:18	16:48 (WEA-5 E-160)	07:08	07:47 (WEA-HS4)	06:04	05:20	
	16:33	17:22	18:13	28 17:16 (WEA-5 E-160)	20:07	26 08:13 (WEA-HS4)	20:57	21:42	
3	08:40	08:10	07:16	16:49 (WEA-5 E-160)	07:05	07:47 (WEA-HS4)	06:02	05:19	
	16:34	17:23	18:15	25 17:14 (WEA-5 E-160)	20:08	25 08:12 (WEA-HS4)	20:59	21:43	
4	08:40	08:09	07:14	16:50 (WEA-5 E-160)	07:03	07:49 (WEA-HS4)	06:00	05:18	
	16:36	17:25	18:17	23 17:13 (WEA-5 E-160)	20:10	22 08:11 (WEA-HS4)	21:01	21:44	
5	08:39	08:07	07:12	16:52 (WEA-5 E-160)	07:01	07:25 (WEA_Heid7)	05:58	05:17	
	16:37	17:27	18:18	19 17:11 (WEA-5 E-160)	20:12	27 08:08 (WEA-HS4)	21:02	21:45	
6	08:39	08:05	07:09	16:55 (WEA-5 E-160)	06:59	07:21 (WEA_Heid3)	05:56	05:17	
	16:38	17:29	18:20	13 17:08 (WEA-5 E-160)	20:13	28 08:06 (WEA-HS4)	21:04	21:46	
7	08:39	08:04	07:07	06:56	07:19 (WEA_Heid3)	05:54	05:16	05:16	
	16:39	17:31	18:22	24 20:15	24 08:02 (WEA-HS4)	21:05	21:47	21:47	
8	08:38	08:02	07:05	06:54	07:17 (WEA_Heid3)	05:53	05:16	05:16	
	16:41	17:33	18:24	20 20:17	20 07:37 (WEA_Heid7)	21:07	21:48	21:48	
9	08:38	08:00	07:03	06:52	07:15 (WEA_Heid3)	05:51	05:15	05:15	
	16:42	17:35	18:25	22 20:18	22 07:37 (WEA_Heid7)	21:09	21:49	21:49	
10	08:37	07:58	07:00	06:50	07:16 (WEA_Heid3)	05:49	05:15	05:15	
	16:43	17:36	18:27	20 20:20	20 07:36 (WEA_Heid7)	21:10	21:50	21:50	
11	08:37	07:57	06:58	06:47	07:19 (WEA_Heid7)	05:48	05:14	05:14	
	16:45	17:38	18:29	17 20:22	17 07:36 (WEA_Heid7)	21:12	21:50	21:50	
12	08:36	07:55	06:56	06:45	07:20 (WEA_Heid7)	05:46	05:14	05:14	
	16:46	17:40	18:31	15 20:24	15 07:35 (WEA_Heid7)	21:13	21:51	21:51	
13	08:35	07:53	06:54	06:43	07:20 (WEA_Heid7)	05:44	05:14	05:14	
	16:48	17:42	18:32	14 20:25	14 07:34 (WEA_Heid7)	21:15	21:52	21:52	
14	08:35	07:51	16:58 (WEA-5 E-160)	06:51	07:21 (WEA_Heid7)	05:43	05:14	05:14	
	16:49	17:44	11 17:09 (WEA-5 E-160)	18:34	12 07:33 (WEA_Heid7)	21:17	21:52	21:52	
15	08:34	07:49	16:55 (WEA-5 E-160)	06:49	06:39	07:23 (WEA_Heid7)	05:41	05:13	05:13
	16:51	17:46	17 17:12 (WEA-5 E-160)	18:36	8 07:31 (WEA_Heid7)	21:18	21:53	21:53	
16	08:33	07:47	16:53 (WEA-5 E-160)	06:47	06:36	05:40	05:13	05:13	
	16:52	17:48	21 17:14 (WEA-5 E-160)	18:38	20 20:30	21:20	21:54	21:54	
17	08:32	07:45	16:52 (WEA-5 E-160)	06:45	06:34	05:38	05:13	05:13	
	16:54	17:49	23 17:15 (WEA-5 E-160)	18:39	20 20:32	21:21	21:54	21:54	
18	08:31	07:43	16:50 (WEA-5 E-160)	06:42	06:32	05:37	05:13	05:13	
	16:55	17:51	25 17:15 (WEA-5 E-160)	18:41	20 20:34	21:23	1 06:03 (WEA_Heid2)	21:54	
19	08:30	07:41	16:49 (WEA-5 E-160)	06:40	06:30	05:35	1 06:04 (WEA_Heid2)	21:54	
	16:57	17:53	27 17:16 (WEA-5 E-160)	18:43	20 20:35	21:24	3 06:05 (WEA_Heid2)	21:55	
20	08:29	07:39	16:48 (WEA-5 E-160)	06:38	06:28	05:34	3 06:06 (WEA_Heid2)	21:55	
	16:59	17:55	29 17:17 (WEA-5 E-160)	18:44	11 07:00 (WEA-HS4)	21:26	5 06:07 (WEA_Heid2)	21:55	
21	08:28	07:37	16:47 (WEA-5 E-160)	06:35	06:58 (WEA-HS4)	06:26	5 06:08 (WEA_Heid2)	21:55	
	17:00	17:57	31 17:18 (WEA-5 E-160)	18:46	15 07:13 (WEA-HS4)	20:39	6 06:09 (WEA_Heid2)	21:55	
22	08:27	07:35	16:47 (WEA-5 E-160)	06:33	06:56 (WEA-HS4)	06:24	6 06:10 (WEA_Heid2)	21:55	
	17:02	17:59	31 17:18 (WEA-5 E-160)	18:48	19 07:15 (WEA-HS4)	20:40	7 06:11 (WEA_Heid2)	21:56	
23	08:26	07:33	16:47 (WEA-5 E-160)	06:31	06:53 (WEA-HS4)	06:22	7 06:12 (WEA_Heid2)	21:56	
	17:04	18:00	32 17:19 (WEA-5 E-160)	18:50	22 07:15 (WEA-HS4)	20:42	8 06:13 (WEA_Heid2)	21:56	
24	08:25	07:31	16:47 (WEA-5 E-160)	06:28	06:51 (WEA-HS4)	06:19	8 06:14 (WEA_Heid2)	21:56	
	17:05	18:02	32 17:19 (WEA-5 E-160)	18:51	25 07:16 (WEA-HS4)	20:44	9 06:15 (WEA_Heid2)	21:56	
25	08:23	07:29	16:47 (WEA-5 E-160)	06:26	06:49 (WEA-HS4)	06:17	9 06:16 (WEA_Heid2)	21:56	
	17:07	18:04	32 17:19 (WEA-5 E-160)	18:53	28 07:17 (WEA-HS4)	20:46	8 06:17 (WEA_Heid2)	21:56	
26	08:22	07:27	16:46 (WEA-5 E-160)	06:24	06:48 (WEA-HS4)	06:15	8 06:18 (WEA_Heid2)	21:56	
	17:09	18:06	32 17:18 (WEA-5 E-160)	18:55	29 07:17 (WEA-HS4)	20:47	8 06:19 (WEA_Heid2)	21:56	
27	08:21	07:25	16:46 (WEA-5 E-160)	06:22	06:47 (WEA-HS4)	06:13	6 06:20 (WEA_Heid2)	21:56	
	17:11	18:08	32 17:18 (WEA-5 E-160)	18:56	30 07:17 (WEA-HS4)	20:49	6 06:21 (WEA_Heid2)	21:56	
28	08:19	07:23	16:47 (WEA-5 E-160)	06:19	06:47 (WEA-HS4)	06:11	2 06:22 (WEA_Heid2)	21:56	
	17:13	18:09	30 17:17 (WEA-5 E-160)	18:58	30 07:17 (WEA-HS4)	20:51	2 06:23 (WEA_Heid2)	21:56	
29	08:18			07:17	07:46 (WEA-HS4)	06:09	05:23	05:16	
	17:14			20:00	08:16 (WEA-HS4)	20:52	21:38	21:56	
30	08:17			07:15	07:46 (WEA-HS4)	06:07	05:22	05:17	
	17:16			20:02	08:16 (WEA-HS4)	20:54	21:39	21:55	
31	08:15			07:12	07:46 (WEA-HS4)		05:21		
	17:18			20:03	08:16 (WEA-HS4)		21:40		
Sonnenscheinstunden	259	278	367	416	485	63	498		
astr.max.mögl.Beschattung		405	436	308	63	0,46			
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41	0,46	0,84			
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	0,72			
Reduktion Windrichtung		0,72	0,68	0,68	0,72	0,28			
Gesamte Reduktion		0,18	0,17	0,23	0,28	18			
Met.wahrsch.Beschattung		74	75	72	18				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 79 - IP 79 Buschhausen 12

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember			
1	05:18		05:54		06:43		07:18 (WEA_Heid7)		07:32		07:26	08:16	
	21:55		21:23		20:22	17	07:35 (WEA_Heid7)		19:12		17:07	16:26	
2	05:18		05:55		06:45		07:15 (WEA_Heid3)		07:34		07:27	08:18	
	21:55		21:22		20:19	20	07:35 (WEA_Heid7)		19:10		17:05	16:26	
3	05:19		05:57		06:47		07:12 (WEA_Heid3)		07:35		07:29	08:19	
	21:54		21:20		20:17	22	07:34 (WEA_Heid7)		19:08		17:03	16:25	
4	05:20		05:58		06:48		07:14 (WEA_Heid3)		07:37		07:31	08:20	
	21:54		21:18		20:15	20	07:34 (WEA_Heid7)		19:06		17:01	16:25	
5	05:20		06:00		06:50		07:15 (WEA_Heid3)		07:39		07:33	08:22	
	21:54		21:17		20:13	24	07:58 (WEA-HS4)		19:03		16:59	16:24	
6	05:21		06:02		06:51		07:17 (WEA_Heid3)		07:40		07:34	08:23	
	21:53		21:15		20:10	28	08:02 (WEA-HS4)		19:01		16:58	16:24	
7	05:22		06:03		06:53		07:21 (WEA_Heid7)		07:42		17:32 (WEA-5 E-160)	07:36	08:24
	21:52		21:13		20:08	27	08:04 (WEA-HS4)		18:59	9	17:41 (WEA-5 E-160)	16:56	16:23
8	05:23		06:05		06:55		07:43 (WEA-HS4)		07:44		17:28 (WEA-5 E-160)	07:38	08:26
	21:52		21:11		20:06	22	08:05 (WEA-HS4)		18:57	17	17:45 (WEA-5 E-160)	16:54	16:23
9	05:24		06:06		06:56		07:42 (WEA-HS4)		07:45		17:26 (WEA-5 E-160)	07:40	08:27
	21:51		21:09		20:03	24	08:06 (WEA-HS4)		18:54	21	17:47 (WEA-5 E-160)	16:53	16:23
10	05:25		06:08		06:58		07:40 (WEA-HS4)		07:47		17:23 (WEA-5 E-160)	07:42	08:28
	21:50		21:08		20:01	26	08:06 (WEA-HS4)		18:52	24	17:47 (WEA-5 E-160)	16:51	16:22
11	05:26		06:09		06:59		07:39 (WEA-HS4)		07:49		17:22 (WEA-5 E-160)	07:43	08:29
	21:50		21:06		19:59	28	08:07 (WEA-HS4)		18:50	27	17:49 (WEA-5 E-160)	16:50	16:22
12	05:27		06:11		07:01		07:38 (WEA-HS4)		07:50		17:21 (WEA-5 E-160)	07:45	08:30
	21:49		21:04		19:57	29	08:07 (WEA-HS4)		18:48	28	17:49 (WEA-5 E-160)	16:48	16:22
13	05:28		06:13		07:03		07:38 (WEA-HS4)		07:52		17:20 (WEA-5 E-160)	07:47	08:31
	21:48		21:02		19:54	29	08:07 (WEA-HS4)		18:45	30	17:50 (WEA-5 E-160)	16:46	16:22
14	05:29		06:14		07:04		07:37 (WEA-HS4)		07:54		17:20 (WEA-5 E-160)	07:49	08:32
	21:47		21:00		19:52	30	08:07 (WEA-HS4)		18:43	31	17:51 (WEA-5 E-160)	16:45	16:22
15	05:31		06:16		07:06		07:36 (WEA-HS4)		07:56		17:18 (WEA-5 E-160)	07:50	08:33
	21:46		20:58		19:50	30	08:06 (WEA-HS4)		18:41	32	17:50 (WEA-5 E-160)	16:44	16:22
16	05:32		06:17		07:07		07:37 (WEA-HS4)		07:57		17:18 (WEA-5 E-160)	07:52	08:34
	21:45	5	06:13 (WEA_Heid2)		19:48	29	08:06 (WEA-HS4)		18:39	32	17:50 (WEA-5 E-160)	16:42	16:22
17	05:33		06:19		07:09		07:36 (WEA-HS4)		07:59		17:18 (WEA-5 E-160)	07:54	08:34
	21:44	7	06:14 (WEA_Heid2)		19:45	29	08:05 (WEA-HS4)		18:37	32	17:50 (WEA-5 E-160)	16:41	16:23
18	05:34		06:21		07:11		07:37 (WEA-HS4)		08:01		17:18 (WEA-5 E-160)	07:56	08:35
	21:43	7	06:14 (WEA_Heid2)		19:43	28	08:05 (WEA-HS4)		18:35	32	17:50 (WEA-5 E-160)	16:40	16:23
19	05:35		06:22		07:12		07:37 (WEA-HS4)		08:03		17:18 (WEA-5 E-160)	07:57	08:36
	21:42	9	06:15 (WEA_Heid2)		19:40	26	08:03 (WEA-HS4)		18:32	32	17:50 (WEA-5 E-160)	16:38	16:23
20	05:37		06:24		07:14		07:39 (WEA-HS4)		08:04		17:18 (WEA-5 E-160)	07:59	08:37
	21:41	9	06:15 (WEA_Heid2)		19:38	23	08:02 (WEA-HS4)		18:30	32	17:50 (WEA-5 E-160)	16:37	16:23
21	05:38		06:25		07:16		07:41 (WEA-HS4)		08:06		17:18 (WEA-5 E-160)	08:01	08:37
	21:39	8	06:16 (WEA_Heid2)		19:36	20	08:01 (WEA-HS4)		18:28	30	17:48 (WEA-5 E-160)	16:36	16:24
22	05:39		06:27		07:17		07:42 (WEA-HS4)		08:08		17:18 (WEA-5 E-160)	08:02	08:38
	21:38	7	06:16 (WEA_Heid2)		19:33	16	07:58 (WEA-HS4)		18:26	29	17:47 (WEA-5 E-160)	16:35	16:24
23	05:41		06:29		07:19		07:44 (WEA-HS4)		08:10		17:19 (WEA-5 E-160)	08:04	08:38
	21:37	5	06:15 (WEA_Heid2)		19:31	12	07:56 (WEA-HS4)		18:24	28	17:47 (WEA-5 E-160)	16:34	16:25
24	05:42		06:30		07:21		07:46 (WEA-HS4)		08:11		17:20 (WEA-5 E-160)	08:06	08:39
	21:35	4	06:16 (WEA_Heid2)		19:29	6	07:52 (WEA-HS4)		18:22	26	17:46 (WEA-5 E-160)	16:33	16:25
25	05:44		06:32		07:22				07:13		16:22 (WEA-5 E-160)	08:07	08:39
	21:34	2	06:15 (WEA_Heid2)		19:26				17:20	22	16:44 (WEA-5 E-160)	16:32	16:26
26	05:45		06:34		07:24				07:15		16:23 (WEA-5 E-160)	08:09	08:39
	21:33		20:35		19:24				17:18	20	16:43 (WEA-5 E-160)	16:31	16:27
27	05:46		06:35		07:25				07:17		16:25 (WEA-5 E-160)	08:10	08:40
	21:31		20:33		19:22				17:16	16	16:41 (WEA-5 E-160)	16:30	16:27
28	05:48		06:37		07:27				07:18		16:29 (WEA-5 E-160)	08:12	08:40
	21:30		20:31	8	07:32 (WEA_Heid7)				17:14	8	16:37 (WEA-5 E-160)	16:29	16:28
29	05:49		06:38		07:29				07:20			08:13	08:40
	21:28		20:28	12	07:34 (WEA_Heid7)				17:12			16:28	16:29
30	05:51		06:40		07:30				07:22			08:15	08:40
	21:27		20:26	14	07:34 (WEA_Heid7)				17:10			16:27	16:30
31	05:52		06:42		07:19 (WEA_Heid7)				07:24			08:40	08:40
	21:25		20:24	16	07:35 (WEA_Heid7)				17:08			16:31	16:31
Sonnenscheinstunden	501		453		381				332		267	244	
astr.max.mögl.Beschattung		63		50	565				558				
Red.Sonnenscheinwahrsch.		0,41		0,43	0,36				0,32				
Reduktion Betriebsdauer		0,84		0,84	0,84				0,84				
Reduktion Windrichtung		0,72		0,69	0,67				0,72				
Gesamte Reduktion		0,25		0,25	0,20				0,19				
Met.wahrsch.Beschattung		16		12	115				106				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 80 - IP 80 Buschhausen 12a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember			
1	05:18		05:54		06:43		07:22 (WEA_Heid7)		07:32		07:26	08:16	
	21:55		21:23		20:22	15	07:37 (WEA_Heid7)		19:12		17:07	16:26	
2	05:18		05:55		06:45		07:21 (WEA_Heid7)		07:34		07:27	08:18	
	21:55		21:22		20:19	17	07:38 (WEA_Heid7)		19:10		17:05	16:26	
3	05:19		05:57		06:47		07:14 (WEA_Heid3)		07:35		07:29	08:19	
	21:54		21:20		20:17	22	07:37 (WEA_Heid7)		19:08		17:03	16:25	
4	05:20		05:58		06:48		07:14 (WEA_Heid3)		07:37		07:31	08:20	
	21:54		21:18		20:15	23	07:37 (WEA_Heid7)		19:06		17:01	16:25	
5	05:20		06:00		06:50		07:15 (WEA_Heid3)		07:39		07:33	08:22	
	21:54		21:17		20:13	21	07:36 (WEA_Heid7)		19:03		16:59	16:24	
6	05:21		06:02		06:51		07:17 (WEA_Heid3)		07:40		07:34	08:23	
	21:53		21:15		20:10	22	07:59 (WEA-HS4)		19:01		16:58	16:24	
7	05:22		06:03		06:53		07:19 (WEA_Heid3)		07:42		07:36	08:24	
	21:52		21:13		20:08	29	08:05 (WEA-HS4)		18:59		16:56	16:23	
8	05:23		06:05		06:55		07:22 (WEA_Heid7)		07:44		17:31 (WEA-5 E-160)	07:38	08:26
	21:52		21:11		20:06	28	08:06 (WEA-HS4)		18:57	9	17:40 (WEA-5 E-160)	16:54	16:23
9	05:24		06:06		06:56		07:26 (WEA_Heid7)		07:45		17:28 (WEA-5 E-160)	07:40	08:27
	21:51		21:09		20:03	25	08:08 (WEA-HS4)		18:54	15	17:43 (WEA-5 E-160)	16:53	16:23
10	05:25		06:08		06:58		07:44 (WEA-HS4)		07:47		17:24 (WEA-5 E-160)	07:42	08:28
	21:50		21:08		20:01	24	08:08 (WEA-HS4)		18:52	21	17:45 (WEA-5 E-160)	16:51	16:22
11	05:26		06:09		06:59		07:43 (WEA-HS4)		07:49		17:23 (WEA-5 E-160)	07:43	08:29
	21:50		21:06		19:59	27	08:10 (WEA-HS4)		18:50	23	17:46 (WEA-5 E-160)	16:50	16:22
12	05:27		06:11		07:01		07:41 (WEA-HS4)		07:50		17:21 (WEA-5 E-160)	07:45	08:30
	21:49		21:04		19:57	28	08:09 (WEA-HS4)		18:48	26	17:47 (WEA-5 E-160)	16:48	16:22
13	05:28		06:13		07:03		07:41 (WEA-HS4)		07:52		17:20 (WEA-5 E-160)	07:47	08:31
	21:48		21:02		19:54	29	08:10 (WEA-HS4)		18:45	28	17:48 (WEA-5 E-160)	16:46	16:22
14	05:29		06:14		07:04		07:41 (WEA-HS4)		07:54		17:20 (WEA-5 E-160)	07:49	08:32
	21:47		21:00		19:52	29	08:10 (WEA-HS4)		18:43	29	17:49 (WEA-5 E-160)	16:45	16:22
15	05:31		06:16		07:06		07:39 (WEA-HS4)		07:56		17:18 (WEA-5 E-160)	07:50	08:33
	21:46		20:58		19:50	31	08:10 (WEA-HS4)		18:41	30	17:48 (WEA-5 E-160)	16:44	16:22
16	05:32		06:17		07:07		07:39 (WEA-HS4)		07:57		17:18 (WEA-5 E-160)	07:52	08:34
	21:45	2	06:12 (WEA_Heid2)		19:48	31	08:10 (WEA-HS4)		18:39	31	17:49 (WEA-5 E-160)	16:42	16:22
17	05:33		06:09 (WEA_Heid2)		07:09		07:39 (WEA-HS4)		07:59		17:17 (WEA-5 E-160)	07:54	08:34
	21:44	5	06:14 (WEA_Heid2)		19:45	30	08:09 (WEA-HS4)		18:37	32	17:49 (WEA-5 E-160)	16:41	16:23
18	05:34		06:08 (WEA_Heid2)		07:11		07:39 (WEA-HS4)		08:01		17:17 (WEA-5 E-160)	07:56	08:35
	21:43	7	06:15 (WEA_Heid2)		19:43	30	08:09 (WEA-HS4)		18:35	32	17:49 (WEA-5 E-160)	16:40	16:23
19	05:35		06:07 (WEA_Heid2)		07:12		07:38 (WEA-HS4)		08:03		17:17 (WEA-5 E-160)	07:57	08:36
	21:42	8	06:15 (WEA_Heid2)		19:40	29	08:07 (WEA-HS4)		18:32	32	17:49 (WEA-5 E-160)	16:38	16:23
20	05:37		06:06 (WEA_Heid2)		07:14		07:39 (WEA-HS4)		08:04		17:17 (WEA-5 E-160)	07:59	08:37
	21:41	10	06:16 (WEA_Heid2)		19:38	28	08:07 (WEA-HS4)		18:30	32	17:49 (WEA-5 E-160)	16:37	16:23
21	05:38		06:08 (WEA_Heid2)		07:16		07:41 (WEA-HS4)		08:06		17:17 (WEA-5 E-160)	08:01	08:37
	21:39	9	06:17 (WEA_Heid2)		19:36	25	08:06 (WEA-HS4)		18:28	30	17:47 (WEA-5 E-160)	16:36	16:24
22	05:39		06:09 (WEA_Heid2)		07:17		07:42 (WEA-HS4)		08:08		17:17 (WEA-5 E-160)	08:02	08:38
	21:38	8	06:17 (WEA_Heid2)		19:33	22	08:04 (WEA-HS4)		18:26	30	17:47 (WEA-5 E-160)	16:35	16:24
23	05:41		06:10 (WEA_Heid2)		07:19		07:44 (WEA-HS4)		08:10		17:18 (WEA-5 E-160)	08:04	08:38
	21:37	6	06:16 (WEA_Heid2)		19:31	18	08:02 (WEA-HS4)		18:24	28	17:46 (WEA-5 E-160)	16:34	16:25
24	05:42		06:12 (WEA_Heid2)		07:21		07:46 (WEA-HS4)		08:11		17:19 (WEA-5 E-160)	08:06	08:39
	21:35	5	06:17 (WEA_Heid2)		19:29	14	08:00 (WEA-HS4)		18:22	26	17:45 (WEA-5 E-160)	16:33	16:25
25	05:44		06:13 (WEA_Heid2)		07:22		07:47 (WEA-HS4)		07:13		16:20 (WEA-5 E-160)	08:07	08:39
	21:34	3	06:16 (WEA_Heid2)		19:26	10	07:57 (WEA-HS4)		17:20	24	16:44 (WEA-5 E-160)	16:32	16:26
26	05:45		06:14 (WEA_Heid2)		07:24				07:15		16:21 (WEA-5 E-160)	08:09	08:39
	21:33	1	06:15 (WEA_Heid2)		19:24				17:18	22	16:43 (WEA-5 E-160)	16:31	16:27
27	05:46		06:35		07:25				07:17		16:23 (WEA-5 E-160)	08:10	08:40
	21:31		20:33		19:22				17:16	18	16:41 (WEA-5 E-160)	16:30	16:27
28	05:48		06:37		07:27				07:18		16:25 (WEA-5 E-160)	08:12	08:40
	21:30		20:31		19:19				17:14	14	16:39 (WEA-5 E-160)	16:29	16:28
29	05:49		06:38		07:29				07:20		16:28 (WEA-5 E-160)	08:13	08:40
	21:28		20:28	6	07:34 (WEA_Heid7)				17:12	6	16:34 (WEA-5 E-160)	16:28	16:29
30	05:51		06:40		07:30				07:22			08:15	08:40
	21:27		20:26	11	07:36 (WEA_Heid7)				17:10			16:27	16:30
31	05:52		06:42		07:30				07:24				08:40
	21:25		20:24	14	07:37 (WEA_Heid7)				17:08				16:31
Sonneneinstunden	501		453		381				332			267	244
astr.max.mögl.Beschattung	64		31		607				538				
Red.Sonnenscheinwahrsch.	0,41		0,43		0,36				0,32				
Reduktion Betriebsdauer	0,84		0,84		0,84				0,84				
Reduktion Windrichtung	0,72		0,69		0,67				0,72				
Gesamte Reduktion	0,25		0,25		0,20				0,19				
Met.wahrsch.Beschattung	16		8		123				103				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 88 - IP 88 Buschhausen 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	08:14	07:20	17:10 (WEA-5 E-160)	07:10	07:33 (WEA-HS4)	06:06
	16:32	17:20	18:11	27 17:37 (WEA-5 E-160)	20:05	9 07:42 (WEA-HS4)	20:56
2	08:40	08:12	07:18	17:09 (WEA-5 E-160)	07:08	07:30 (WEA-HS4)	06:04
	16:33	17:22	18:13	29 17:38 (WEA-5 E-160)	20:07	14 07:44 (WEA-HS4)	20:57
3	08:40	08:10	07:16	17:07 (WEA-5 E-160)	07:05	07:28 (WEA-HS4)	06:02
	16:34	17:23	18:15	31 17:38 (WEA-5 E-160)	20:08	18 07:46 (WEA-HS4)	20:59
4	08:40	08:09	07:14	17:07 (WEA-5 E-160)	07:03	07:26 (WEA-HS4)	06:00
	16:36	17:25	18:17	31 17:38 (WEA-5 E-160)	20:10	21 07:47 (WEA-HS4)	21:01
5	08:39	08:07	07:12	17:06 (WEA-5 E-160)	07:01	07:23 (WEA-HS4)	05:58
	16:37	17:27	18:18	33 17:39 (WEA-5 E-160)	20:12	24 07:47 (WEA-HS4)	21:02
6	08:39	08:05	07:09	17:06 (WEA-5 E-160)	06:59	07:21 (WEA-HS4)	05:56
	16:38	17:29	18:20	33 17:39 (WEA-5 E-160)	20:13	27 07:48 (WEA-HS4)	21:04
7	08:39	08:04	07:07	17:05 (WEA-5 E-160)	06:56	07:20 (WEA-HS4)	05:54
	16:39	17:31	18:22	33 17:38 (WEA-5 E-160)	20:15	29 07:49 (WEA-HS4)	21:05
8	08:38	08:02	07:05	17:05 (WEA-5 E-160)	06:54	07:20 (WEA-HS4)	05:53
	16:41	17:33	18:24	33 17:38 (WEA-5 E-160)	20:17	29 07:49 (WEA-HS4)	21:07
9	08:38	08:00	07:03	17:05 (WEA-5 E-160)	06:52	07:19 (WEA-HS4)	05:51
	16:42	17:35	18:25	33 17:38 (WEA-5 E-160)	20:18	30 07:49 (WEA-HS4)	21:09
10	08:37	07:58	07:00	17:05 (WEA-5 E-160)	06:50	07:18 (WEA-HS4)	05:49
	16:43	17:36	18:27	32 17:37 (WEA-5 E-160)	20:20	30 07:48 (WEA-HS4)	21:10
11	08:37	07:57	06:58	17:05 (WEA-5 E-160)	06:47	07:18 (WEA-HS4)	05:48
	16:45	17:38	18:29	32 17:37 (WEA-5 E-160)	20:22	30 07:48 (WEA-HS4)	21:12
12	08:36	07:55	06:56	17:06 (WEA-5 E-160)	06:45	07:18 (WEA-HS4)	05:46
	16:46	17:40	18:31	30 17:36 (WEA-5 E-160)	20:24	30 07:48 (WEA-HS4)	21:13
13	08:35	07:53	06:54	17:06 (WEA-5 E-160)	06:43	07:06 (WEA-Heid3)	05:44
	16:48	17:42	18:32	28 17:34 (WEA-5 E-160)	20:25	32 07:47 (WEA-HS4)	21:15
14	08:35	07:51	06:51	17:07 (WEA-5 E-160)	06:41	07:04 (WEA-Heid3)	05:43
	16:49	17:44	18:34	26 17:33 (WEA-5 E-160)	20:27	33 07:47 (WEA-HS4)	21:17
15	08:34	07:49	06:49	17:08 (WEA-5 E-160)	06:39	07:02 (WEA-Heid3)	05:41
	16:51	17:46	18:36	24 17:32 (WEA-5 E-160)	20:29	33 07:46 (WEA-HS4)	21:18
16	08:33	07:47	06:47	17:10 (WEA-5 E-160)	06:36	07:00 (WEA-Heid3)	05:40
	16:52	17:48	18:38	20 17:30 (WEA-5 E-160)	20:30	31 07:44 (WEA-HS4)	21:20
17	08:32	07:45	06:45	17:12 (WEA-5 E-160)	06:34	07:20 (WEA-HS4)	05:38
	16:54	17:49	18:39	15 17:27 (WEA-5 E-160)	20:32	23 07:43 (WEA-HS4)	21:21
18	08:31	07:43	06:42	17:17 (WEA-5 E-160)	06:32	07:21 (WEA-HS4)	05:37
	16:55	17:51	18:41	5 17:22 (WEA-5 E-160)	20:34	20 07:41 (WEA-HS4)	21:23
19	08:30	07:41	06:40		06:30	06:55 (WEA-Heid7)	05:35
	16:57	17:53	18:43		20:35	24 07:39 (WEA-HS4)	21:24
20	08:29	07:39	06:38		06:28	06:53 (WEA-Heid7)	05:34
	16:59	17:55	18:44		20:37	22 07:36 (WEA-HS4)	21:26
21	08:28	07:37	06:35		06:26	06:51 (WEA-Heid7)	05:33
	17:00	17:57	18:46		20:39	14 07:05 (WEA-Heid7)	21:27
22	08:27	07:35	06:33		06:24	06:50 (WEA-Heid7)	05:31
	17:02	17:59	18:48		20:40	16 07:06 (WEA-Heid7)	21:28
23	08:26	07:33	06:31		06:22	06:50 (WEA-Heid7)	05:30
	17:04	18:00	18:50		20:42	16 07:06 (WEA-Heid7)	21:30
24	08:25	07:31	06:28		06:19	06:49 (WEA-Heid7)	05:29
	17:06	18:02	18:51		20:44	17 07:06 (WEA-Heid7)	21:31
25	08:23	07:29	17:20 (WEA-5 E-160)	06:26	06:17	06:49 (WEA-Heid7)	05:28
	17:07	18:04	8 17:28 (WEA-5 E-160)	18:53	20:46	17 07:06 (WEA-Heid7)	21:33
26	08:22	07:27	17:15 (WEA-5 E-160)	06:24	06:15	06:49 (WEA-Heid7)	05:26
	17:09	18:06	16 17:31 (WEA-5 E-160)	18:55	20:47	16 07:05 (WEA-Heid7)	21:34
27	08:21	07:25	17:13 (WEA-5 E-160)	06:22	06:13	06:49 (WEA-Heid7)	05:25
	17:11	18:08	20 17:33 (WEA-5 E-160)	18:56	20:49	15 07:04 (WEA-Heid7)	21:35
28	08:19	07:23	17:11 (WEA-5 E-160)	06:19	06:11	06:50 (WEA-Heid7)	05:24
	17:13	18:09	24 17:35 (WEA-5 E-160)	18:58	20:51	13 07:03 (WEA-Heid7)	21:36
29	08:18		07:17		06:09	06:51 (WEA-Heid7)	05:23
	17:14		20:00		20:52	11 07:02 (WEA-Heid7)	21:38
30	08:17		07:15		06:07	06:54 (WEA-Heid7)	05:22
	17:16		20:02		20:54	6 07:00 (WEA-Heid7)	21:39
31	08:15		07:12				05:21
	17:18		20:03				3 05:53 (WEA-Heid2)
Sonnenscheinstunden	259	278	367	416	485		498
astr.max.mögl.Beschattung		68	495	650	6		124
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41	0,46		0,36
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84		0,84
Reduktion Windrichtung		0,70	0,70	0,69	0,72		0,72
Gesamte Reduktion		0,18	0,18	0,24	0,28		0,22
Met.wahrsch.Beschattung		12	87	154	2		27

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP 88 - IP 88 Buschhausen 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember			
1	05:18				06:43								
	21:55	7	05:51 (WEA_Heid2)	05:54		07:17 (WEA-HS4)	07:32		17:45 (WEA-5 E-160)	07:26	08:16		
2	05:18		05:58 (WEA_Heid2)	21:23		20:22	30	07:47 (WEA-HS4)	19:12	30	18:15 (WEA-5 E-160)	17:07	16:26
	21:55	7	05:52 (WEA_Heid2)	05:55		06:45		07:17 (WEA-HS4)	07:34		17:44 (WEA-5 E-160)	07:27	08:18
3	05:19		05:59 (WEA_Heid2)	21:22		20:19	30	07:47 (WEA-HS4)	19:10	31	18:15 (WEA-5 E-160)	17:05	16:26
	21:54	7	05:51 (WEA_Heid2)	05:57		06:47		07:16 (WEA-HS4)	07:35		17:43 (WEA-5 E-160)	07:29	08:19
4	05:20		05:58 (WEA_Heid2)	21:20		20:17	30	07:46 (WEA-HS4)	19:08	32	18:15 (WEA-5 E-160)	17:03	16:25
	21:54	8	05:51 (WEA_Heid2)	05:58		06:48		07:17 (WEA-HS4)	07:37		17:42 (WEA-5 E-160)	07:31	08:20
5	05:20		05:59 (WEA_Heid2)	21:18		20:15	29	07:46 (WEA-HS4)	19:06	33	18:15 (WEA-5 E-160)	17:01	16:25
	21:53	9	05:51 (WEA_Heid2)	06:00		06:50		07:16 (WEA-HS4)	07:39		17:42 (WEA-5 E-160)	07:33	08:22
6	05:21		05:52 (WEA_Heid2)	21:17		20:13	29	07:45 (WEA-HS4)	19:03	33	18:15 (WEA-5 E-160)	16:59	16:24
	21:53	8	06:00 (WEA_Heid2)	21:15		06:51		07:17 (WEA-HS4)	07:40		17:42 (WEA-5 E-160)	07:34	08:23
7	05:22		05:53 (WEA_Heid2)	21:13		20:10	27	07:44 (WEA-HS4)	19:01	33	18:15 (WEA-5 E-160)	16:58	16:24
	21:52	8	06:01 (WEA_Heid2)	21:11		06:53		07:19 (WEA-HS4)	07:42		17:41 (WEA-5 E-160)	07:36	08:24
8	05:23		05:54 (WEA_Heid2)	21:11		20:08	24	07:43 (WEA-HS4)	18:59	33	18:14 (WEA-5 E-160)	16:56	16:23
	21:52	7	06:01 (WEA_Heid2)	21:11		06:55		07:20 (WEA-HS4)	07:44		17:41 (WEA-5 E-160)	07:38	08:26
9	05:24		05:54 (WEA_Heid2)	21:09		20:06	22	07:42 (WEA-HS4)	18:57	33	18:14 (WEA-5 E-160)	16:54	16:23
	21:51	7	06:01 (WEA_Heid2)	21:09		06:56		07:22 (WEA-HS4)	07:45		17:41 (WEA-5 E-160)	07:40	08:27
10	05:25		05:55 (WEA_Heid2)	21:08		20:03	18	07:40 (WEA-HS4)	18:54	33	18:14 (WEA-5 E-160)	16:53	16:23
	21:50	6	06:01 (WEA_Heid2)	21:08		06:58		07:23 (WEA-HS4)	07:47		17:41 (WEA-5 E-160)	07:42	08:28
11	05:26		05:56 (WEA_Heid2)	21:09		20:01	14	07:37 (WEA-HS4)	18:52	31	18:12 (WEA-5 E-160)	16:51	16:22
	21:50	5	06:01 (WEA_Heid2)	21:06		06:59		07:25 (WEA-HS4)	07:49		17:42 (WEA-5 E-160)	07:43	08:29
12	05:27		05:57 (WEA_Heid2)	21:06		19:59	10	07:35 (WEA-HS4)	18:50	29	18:11 (WEA-5 E-160)	16:50	16:22
	21:49	4	06:01 (WEA_Heid2)	21:04		07:01			07:50		17:42 (WEA-5 E-160)	07:45	08:30
13	05:28		05:58 (WEA_Heid2)	21:03		19:57			18:48	28	18:10 (WEA-5 E-160)	16:48	16:22
	21:48	3	06:01 (WEA_Heid2)	21:02	8	07:03		07:52	18:45	25	18:09 (WEA-5 E-160)	16:46	16:22
14	05:29		05:59 (WEA_Heid2)	21:04		19:54		18:45	18:45	25	18:09 (WEA-5 E-160)	16:46	16:22
	21:47	2	06:01 (WEA_Heid2)	21:00	12	07:04		07:54	18:43	23	18:08 (WEA-5 E-160)	16:45	16:22
15	05:31		06:16	20:58		19:52		18:43	18:43	23	18:08 (WEA-5 E-160)	16:45	16:22
	21:46		06:16	20:58		19:52		18:43	18:43	23	18:08 (WEA-5 E-160)	16:45	16:22
16	05:32		06:17	20:57	14	07:06		18:41	18:41	19	18:05 (WEA-5 E-160)	16:44	16:22
	21:45		06:17	20:57	14	07:06		18:41	18:41	19	18:05 (WEA-5 E-160)	16:44	16:22
17	05:33		06:19	20:56	15	07:08		18:39	18:39	13	18:02 (WEA-5 E-160)	16:42	16:22
	21:44		06:19	20:56	15	07:08		18:39	18:39	13	18:02 (WEA-5 E-160)	16:42	16:22
18	05:34		06:21	20:54	16	07:09		18:37	18:37		17:59 (WEA-5 E-160)	16:42	16:22
	21:43		06:21	20:54	16	07:09		18:37	18:37		17:59 (WEA-5 E-160)	16:42	16:22
19	05:35		06:22	20:52	16	07:11		18:35	18:35		17:57 (WEA-5 E-160)	16:41	16:23
	21:42		06:22	20:52	16	07:11		18:35	18:35		17:57 (WEA-5 E-160)	16:41	16:23
20	05:37		06:24	20:50	17	07:12		18:32	18:32		17:56 (WEA-5 E-160)	16:41	16:23
	21:41		06:24	20:50	17	07:12		18:32	18:32		17:56 (WEA-5 E-160)	16:41	16:23
21	05:38		06:25	20:48	16	07:14		18:30	18:30		17:55 (WEA-5 E-160)	16:41	16:23
	21:39		06:25	20:48	16	07:14		18:30	18:30		17:55 (WEA-5 E-160)	16:41	16:23
22	05:39		06:26	20:46	16	07:16		18:28	18:28		17:54 (WEA-5 E-160)	16:41	16:23
	21:38		06:26	20:46	16	07:16		18:28	18:28		17:54 (WEA-5 E-160)	16:41	16:23
23	05:41		06:27	20:43	14	07:17		18:26	18:26		17:53 (WEA-5 E-160)	16:41	16:23
	21:37		06:27	20:43	14	07:17		18:26	18:26		17:53 (WEA-5 E-160)	16:41	16:23
24	05:42		06:29	20:41	23	07:19		18:24	18:24		17:52 (WEA-5 E-160)	16:41	16:23
	21:35		06:29	20:41	23	07:19		18:24	18:24		17:52 (WEA-5 E-160)	16:41	16:23
25	05:44		06:30	20:39	24	07:21		18:22	18:22		17:51 (WEA-5 E-160)	16:41	16:23
	21:34		06:30	20:39	24	07:21		18:22	18:22		17:51 (WEA-5 E-160)	16:41	16:23
26	05:45		06:32	20:37	21	07:22		18:20	18:20		17:50 (WEA-5 E-160)	16:41	16:23
	21:33		06:32	20:37	21	07:22		18:20	18:20		17:50 (WEA-5 E-160)	16:41	16:23
27	05:46		06:34	20:35	23	07:23		18:18	18:18		17:49 (WEA-5 E-160)	16:41	16:23
	21:31		06:34	20:35	23	07:23		18:18	18:18		17:49 (WEA-5 E-160)	16:41	16:23
28	05:48		06:35	20:33	32	07:24		18:16	18:16		17:48 (WEA-5 E-160)	16:41	16:23
	21:30		06:35	20:33	32	07:24		18:16	18:16		17:48 (WEA-5 E-160)	16:41	16:23
29	05:49		06:37	20:33	32	07:25		18:14	18:14		17:47 (WEA-5 E-160)	16:41	16:23
	21:28		06:37	20:33	32	07:25		18:14	18:14		17:47 (WEA-5 E-160)	16:41	16:23
30	05:51		06:38	20:31	33	07:26		18:12	18:12		17:46 (WEA-5 E-160)	16:41	16:23
	21:27		06:38	20:31	33	07:26		18:12	18:12		17:46 (WEA-5 E-160)	16:41	16:23
31	05:52		06:40	20:28	33	07:27		18:10	18:10		17:45 (WEA-5 E-160)	16:41	16:23
	21:25		06:40	20:28	33	07:27		18:10	18:10		17:45 (WEA-5 E-160)	16:41	16:23
			20:24	30	07:48 (WEA-HS4)	19:15	28	18:14 (WEA-5 E-160)	17:10		17:10	16:27	16:30
			06:42		07:18 (WEA-HS4)			17:46 (WEA-5 E-160)	07:24		07:24	16:27	16:30
			20:24	30	07:48 (WEA-HS4)			17:46 (WEA-5 E-160)	17:08		17:08	16:27	16:31
			453			381		332			267		244
			Sonneneinstunden	501									
			astr.max.mögl.Beschattung	88					459				
			Red.Sonneneinstrahlung	0,41		370			0,32				
			Reduktion Betriebsdauer	0,84		0,36			0,84				
			Reduktion Windrichtung	0,72		0,84			0,70				
			Gesamte Reduktion	0,25		0,69			0,19				
			Met.wahrsch.Beschattung	22		0,21			86				
					98		78						

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP105 - IP105 Leblicher Straße 13

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	14:13 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:20
16:32	29 14:42 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2 08:40	14:14 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	28 14:42 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	14:16 (WEA-5 E-160)	08:10	07:16	07:05	06:02	05:19
16:34	26 14:42 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	14:17 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	26 14:43 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	14:17 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:17
16:37	25 14:42 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	14:19 (WEA-5 E-160)	08:06	07:09	06:59	05:56	05:17
16:38	23 14:42 (WEA-5 E-160)	17:29	18:20	20:13	21:04	21:46
7 08:39	14:20 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
16:39	21 14:41 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	14:20 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	21 14:41 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	14:23 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	18 14:41 (WEA-5 E-160)	17:35	18:25	20:19	21:09	21:49
10 08:37	14:24 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	15 14:39 (WEA-5 E-160)	17:36	18:27	20:20	21:10	21:50
11 08:37	14:26 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
16:45	12 14:38 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	14:30 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	6 14:36 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:35		07:53	06:54	06:43	05:44	05:14
16:48		17:42	18:32	20:25	21:15	21:52
14 08:35		07:51	06:51	06:41	05:43	05:14
16:49		17:44	18:34	20:27	21:17	21:53
15 08:34		07:49	06:49	06:39	05:41	05:13
16:51		17:46	18:36	20:29	21:18	21:53
16 08:33		07:47	06:47	06:36	05:40	05:13
16:52		17:48	18:38	20:30	21:20	21:54
17 08:32		07:45	06:45	06:34	05:38	05:13
16:54		17:49	18:39	20:32	21:21	21:54
18 08:31		07:43	06:42	06:32	05:37	05:13
16:55		17:51	18:41	20:34	21:23	21:54
19 08:30		07:41	06:40	06:30	05:35	05:13
16:57		17:53	18:43	20:35	21:24	21:55
20 08:29		07:39	06:38	06:28	05:34	05:13
16:59		17:55	18:45	20:37	21:26	21:55
21 08:28		07:37	06:35	06:26	05:33	05:13
17:00		17:57	18:46	20:39	21:27	21:55
22 08:27		07:35	06:33	06:24	05:31	05:14
17:02		17:59	18:48	20:41	21:28	21:56
23 08:26		07:33	06:31	06:22	05:30	05:14
17:04		18:00	18:50	20:42	21:30	21:56
24 08:25		07:31	06:28	06:19	05:29	05:14
17:06		18:02	18:51	20:44	21:31	21:56
25 08:23		07:29	06:26	06:17	05:28	05:14
17:07		18:04	18:53	20:46	21:33	21:56
26 08:22		07:27	06:24	06:15	05:26	05:15
17:09		18:06	18:55	20:47	21:34	21:56
27 08:21		07:25	06:22	06:13	05:25	05:15
17:11		18:08	18:56	20:49	21:35	21:56
28 08:19		07:23	06:19	06:11	05:24	05:16
17:13		18:09	18:58	20:51	21:36	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:07	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	250			14		
Red.Sonnenscheinwahrsch.	0,20			0,41		
Reduktion Betriebsdauer	0,84			0,84		
Reduktion Windrichtung	0,67			0,70		
Gesamte Reduktion	0,11			0,24		
Met.wahrsch.Beschattung	28			3		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP105 - IP105 Leblicher Straße 13

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18	21:55	05:54	21:23	06:43	20:22	07:32	19:12	07:26	17:07	08:16	14:08 (WEA-5 E-160)
2	05:18	21:55	05:55	21:22	06:45	20:19	07:34	19:10	07:27	17:05	08:18	12 14:20 (WEA-5 E-160)
3	05:19	21:54	05:57	21:20	06:47	20:17	07:35	19:08	07:29	17:03	08:19	15 14:22 (WEA-5 E-160)
4	05:20	21:54	05:58	21:18	06:48	20:15	07:37	19:06	07:31	17:01	08:21	18 14:24 (WEA-5 E-160)
5	05:20	21:54	06:00	21:17	06:50	20:13	07:39	19:03	07:33	16:59	08:22	20 14:26 (WEA-5 E-160)
6	05:21	21:53	06:02	21:15	06:51	20:10	07:40	19:01	07:35	16:58	08:23	21 14:26 (WEA-5 E-160)
7	05:22	21:52	06:03	21:13	06:53	20:08	07:42	18:59	07:36	16:56	08:24	23 14:28 (WEA-5 E-160)
8	05:23	21:49	06:05	21:11	06:55	20:06	07:44	18:57	07:38	16:54	08:26	25 14:04 (WEA-5 E-160)
9	05:24	21:51	06:06	21:09	06:56	20:04	07:45	18:54	07:40	16:53	08:27	26 14:29 (WEA-5 E-160)
10	05:25	21:50	06:08	21:08	06:58	20:01	07:47	18:52	07:42	16:51	08:28	28 14:05 (WEA-5 E-160)
11	05:26	21:49	06:09	21:06	06:59	19:59	07:49	18:51	07:43	16:50	08:29	27 14:32 (WEA-5 E-160)
12	05:27	21:48	06:11	21:04	07:01	19:57	07:51	18:48	07:45	16:48	08:30	28 14:05 (WEA-5 E-160)
13	05:28	21:47	06:13	21:02	07:03	19:54	07:52	18:45	07:47	16:46	08:31	28 14:33 (WEA-5 E-160)
14	05:29	21:46	06:14	21:00	07:04	19:52	07:54	18:43	07:49	16:45	08:32	29 14:05 (WEA-5 E-160)
15	05:31	21:45	06:16	20:58	07:06	19:50	07:56	18:41	07:50	16:44	08:33	30 14:35 (WEA-5 E-160)
16	05:32	21:44	06:17	20:56	07:08	19:47	07:57	18:39	07:52	16:42	08:34	30 14:05 (WEA-5 E-160)
17	05:33	21:43	06:19	20:54	07:09	19:45	07:59	18:37	07:54	16:41	08:35	30 14:35 (WEA-5 E-160)
18	05:34	21:42	06:21	20:52	07:11	19:43	08:01	18:35	07:56	16:40	08:36	31 14:05 (WEA-5 E-160)
19	05:35	21:41	06:22	20:50	07:12	19:41	08:03	18:33	07:57	16:38	08:37	31 14:36 (WEA-5 E-160)
20	05:37	21:40	06:24	20:48	07:14	19:38	08:04	18:31	07:59	16:37	08:38	31 14:06 (WEA-5 E-160)
21	05:38	21:39	06:26	20:46	07:16	19:36	08:06	18:29	08:01	16:36	08:39	32 14:38 (WEA-5 E-160)
22	05:39	21:38	06:27	20:44	07:17	19:34	08:08	18:27	08:02	16:35	08:40	32 14:07 (WEA-5 E-160)
23	05:41	21:37	06:29	20:41	07:19	19:31	08:10	18:24	08:04	16:34	08:41	31 14:38 (WEA-5 E-160)
24	05:42	21:36	06:30	20:39	07:21	19:29	08:11	18:22	08:06	16:33	08:42	32 14:08 (WEA-5 E-160)
25	05:44	21:35	06:32	20:37	07:22	19:27	07:13	18:20	08:07	16:32	08:43	31 14:40 (WEA-5 E-160)
26	05:45	21:34	06:34	20:35	07:24	19:24	07:15	18:18	08:09	16:31	08:44	31 14:09 (WEA-5 E-160)
27	05:46	21:33	06:35	20:33	07:25	19:22	07:17	18:16	08:10	16:30	08:45	31 14:40 (WEA-5 E-160)
28	05:48	21:32	06:37	20:31	07:27	19:19	07:18	18:14	08:12	16:29	08:46	30 14:11 (WEA-5 E-160)
29	05:49	21:31	06:38	20:29	07:29	19:17	07:20	18:12	08:13	16:28	08:47	30 14:41 (WEA-5 E-160)
30	05:51	21:30	06:40	20:27	07:30	19:15	07:22	18:10	08:15	16:27	08:48	2 14:12 (WEA-5 E-160)
31	05:52	21:29	06:42	20:25	07:32	19:13	07:24	18:08	08:17	16:26	08:49	6 14:42 (WEA-5 E-160)
	21:25	20:24			17:08						16:31	29 14:42 (WEA-5 E-160)
Sonnenscheinstunden	501	453			381	332	267	6			244	850
astr.max.mögl.Beschattung			14					6				850
Red.Sonnenscheinwahrsch.			0,43					0,23				0,15
Reduktion Betriebsdauer			0,84					0,84				0,84
Reduktion Windrichtung			0,70					0,67				0,67
Gesamte Reduktion			0,25					0,13				0,08
Met.wahrsch.Beschattung			3					1				71

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP106 - IP106 Leblicher Straße 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1	08:40	14:18 (WEA-5 E-160)	08:14	07:20	06:06	05:20		
16:32	33	14:51 (WEA-5 E-160)	17:20	18:11	14	07:58 (WEA-HS4) 20:05	20:56	21:41
2	08:40	14:19 (WEA-5 E-160)	08:12	07:18	07:42 (WEA-HS4) 07:08	06:04	05:20	
16:33	33	14:52 (WEA-5 E-160)	17:22	18:13	16	07:58 (WEA-HS4) 20:07	20:57	21:42
3	08:40	14:20 (WEA-5 E-160)	08:10	07:16	07:39 (WEA-HS4) 07:05	06:02	05:19	
16:34	32	14:52 (WEA-5 E-160)	17:24	18:15	18	07:57 (WEA-HS4) 20:08	20:59	21:43
4	08:40	14:21 (WEA-5 E-160)	08:09	07:14	07:39 (WEA-HS4) 07:03	06:00	05:18	
16:36	32	14:53 (WEA-5 E-160)	17:25	18:17	18	07:57 (WEA-HS4) 20:10	21:01	21:44
5	08:40	14:22 (WEA-5 E-160)	08:07	07:12	07:39 (WEA-HS4) 07:01	05:58	05:17	
16:37	30	14:52 (WEA-5 E-160)	17:27	18:18	17	07:56 (WEA-HS4) 20:12	21:02	21:45
6	08:39	14:23 (WEA-5 E-160)	08:06	07:09	07:40 (WEA-HS4) 06:59	05:56	05:17	
16:38	30	14:53 (WEA-5 E-160)	17:29	18:20	15	07:55 (WEA-HS4) 20:13	21:04	21:46
7	08:39	14:23 (WEA-5 E-160)	08:04	07:07	07:41 (WEA-HS4) 06:56	05:54	05:16	
16:39	29	14:52 (WEA-5 E-160)	17:31	18:22	12	07:53 (WEA-HS4) 20:15	21:06	21:47
8	08:38	14:24 (WEA-5 E-160)	08:02	07:05	07:44 (WEA-HS4) 06:54	05:53	05:16	
16:41	28	14:52 (WEA-5 E-160)	17:33	18:24	6	07:50 (WEA-HS4) 20:17	21:07	21:48
9	08:38	14:26 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15	
16:42	26	14:52 (WEA-5 E-160)	17:35	18:25	20:19	21:09	21:49	
10	08:37	14:26 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15	
16:43	26	14:52 (WEA-5 E-160)	17:36	18:27	20:20	21:10	21:50	
11	08:37	14:27 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14	
16:45	24	14:51 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51	
12	08:36	14:29 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14	
16:46	23	14:52 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51	
13	08:35	14:31 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14	
16:48	20	14:51 (WEA-5 E-160)	17:42	18:32	20:25	21:15	21:52	
14	08:35	14:32 (WEA-5 E-160)	07:51	06:51	06:41	05:43	05:14	
16:49	18	14:50 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53	
15	08:34	14:35 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13	
16:51	13	14:48 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53	
16	08:33	14:38 (WEA-5 E-160)	07:47	06:47	06:36	1	07:03 (WEA_Heid2) 21:18	21:53
16:52	8	14:46 (WEA-5 E-160)	17:48	18:38	20:30	3	07:02 (WEA_Heid2) 21:20	21:54
17	08:32	14:40 (WEA-5 E-160)	07:45	06:45	06:34	06:57 (WEA_Heid2) 05:38	05:13	
16:54	17:49	17:49	18:39	20:32	4	07:01 (WEA_Heid2) 21:21	21:54	
18	08:31	07:43	06:42	06:32	06:55 (WEA_Heid2) 05:37	05:13		
16:55	17:51	18:41	18:41	20:34	5	07:00 (WEA_Heid2) 21:23	21:54	
19	08:30	07:41	06:40	06:30	05:35	05:13		
16:57	17:53	18:43	20:35	21:24	21:55			
20	08:29	07:39	06:38	06:28	05:34	05:13		
16:59	17:55	18:45	20:37	21:26	21:55			
21	08:28	07:37	06:35	06:26	05:33	05:13		
17:00	17:57	18:46	20:39	21:27	21:55			
22	08:27	07:35	06:33	06:24	05:31	05:14		
17:02	17:59	18:48	20:41	21:28	21:56			
23	08:26	07:33	06:31	06:22	05:30	05:14		
17:04	18:00	18:50	20:42	21:30	21:56			
24	08:25	07:31	06:28	06:19	05:29	05:14		
17:06	18:02	18:51	20:44	21:31	21:56			
25	08:23	07:29	06:26	06:17	05:28	05:14		
17:07	18:04	2	07:53 (WEA-HS4) 18:53	20:46	21:33	21:56		
26	08:22	07:27	06:24	06:15	05:26	05:15		
17:09	18:06	6	07:56 (WEA-HS4) 18:55	20:47	21:34	21:56		
27	08:21	07:25	06:22	06:13	05:25	05:15		
17:11	18:08	9	07:57 (WEA-HS4) 18:56	20:49	21:35	21:56		
28	08:19	07:23	06:19	06:11	05:24	05:16		
17:13	18:09	12	07:58 (WEA-HS4) 18:58	20:51	21:36	21:56		
29	08:18	07:17	06:09	06:09	05:23	05:16		
17:14	20:00	20:52	21:38	21:56				
30	08:17	07:15	06:07	05:22	05:17			
17:16	20:02	20:54	21:39	21:55				
31	08:15	07:12	05:21	05:16				
17:18	20:03	21:40	21:55					
Sonneneinstrahlung	259	278	367	416	485	498		
astr.max.mögl.Beschattung	405	29	116	13				
Red.Sonneneinstrahlung	0,20	0,30	0,30	0,41				
Reduktion Betriebsdauer	0,84	0,84	0,84	0,84				
Reduktion Windrichtung	0,68	0,62	0,62	0,70				
Gesamte Reduktion	0,11	0,16	0,16	0,24				
Met.wahrsch.Beschattung	46	5	18	3				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP106 - IP106 Leblicher Straße 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18	05:54	06:43	07:32					07:26		08:16	14:09 (WEA-5 E-160)
	21:55	21:23	20:22	19:12					17:07		16:26	24 14:33 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34					07:27		08:18	14:09 (WEA-5 E-160)
	21:55	21:22	20:19	19:10					17:05		16:26	26 14:35 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35					07:29		08:19	14:09 (WEA-5 E-160)
	21:54	21:20	20:17	19:08					17:03		16:25	27 14:36 (WEA-5 E-160)
4	05:20	05:58	06:48	07:37					07:31		08:21	14:09 (WEA-5 E-160)
	21:54	21:18	20:15	19:06					17:01		16:25	28 14:37 (WEA-5 E-160)
5	05:20	06:00	06:50	07:39					07:33		08:22	14:08 (WEA-5 E-160)
	21:54	21:17	20:13	19:03					16:59		16:24	30 14:40 (WEA-5 E-160)
6	05:21	06:02	06:51	07:40				08:19 (WEA-HS4)	07:35		08:23	14:09 (WEA-5 E-160)
	21:53	21:15	20:10	19:01	10	08:29 (WEA-HS4)	16:58		16:58		16:24	30 14:40 (WEA-5 E-160)
7	05:22	06:03	06:53	07:42				08:16 (WEA-HS4)	07:36		08:24	14:09 (WEA-5 E-160)
	21:52	21:13	20:08	18:59	14	08:30 (WEA-HS4)	16:56		16:56		16:23	30 14:39 (WEA-5 E-160)
8	05:23	06:05	06:55	07:44				08:15 (WEA-HS4)	07:38		08:26	14:09 (WEA-5 E-160)
	21:52	21:11	20:06	18:57	16	08:31 (WEA-HS4)	16:54		16:54		16:23	31 14:40 (WEA-5 E-160)
9	05:24	06:06	06:56	07:45				08:14 (WEA-HS4)	07:40		08:27	14:08 (WEA-5 E-160)
	21:51	21:09	20:04	18:54	18	08:32 (WEA-HS4)	16:53		16:53		16:23	32 14:40 (WEA-5 E-160)
10	05:25	06:08	06:58	07:47				08:13 (WEA-HS4)	07:42		08:28	14:09 (WEA-5 E-160)
	21:50	21:08	20:01	18:52	19	08:32 (WEA-HS4)	16:51		16:51		16:22	33 14:42 (WEA-5 E-160)
11	05:26	06:09	06:59	07:49				08:14 (WEA-HS4)	07:43		08:29	14:09 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	17	08:31 (WEA-HS4)	16:50		16:50		16:22	33 14:42 (WEA-5 E-160)
12	05:27	06:11	07:01	07:51				08:16 (WEA-HS4)	07:45		08:30	14:10 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	15	08:31 (WEA-HS4)	16:48		16:48		16:22	33 14:43 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52				08:18 (WEA-HS4)	07:47		08:31	14:10 (WEA-5 E-160)
	21:48	21:02	19:54	18:45	13	08:31 (WEA-HS4)	16:46		16:46		16:22	34 14:44 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54				08:20 (WEA-HS4)	07:49		08:32	14:10 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	11	08:31 (WEA-HS4)	16:45		16:45		16:22	34 14:44 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56				08:21 (WEA-HS4)	07:50		08:33	14:11 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	8	08:29 (WEA-HS4)	16:44		16:44		16:22	34 14:45 (WEA-5 E-160)
16	05:32	06:17	07:08	07:57				08:23 (WEA-HS4)	07:52		08:34	14:10 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	4	08:27 (WEA-HS4)	16:42		16:42		16:22	35 14:45 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59					07:54		08:35	14:11 (WEA-5 E-160)
	21:44	20:54	19:45	18:37					16:41		16:23	34 14:45 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01					07:56		08:35	14:11 (WEA-5 E-160)
	21:43	20:52	19:43	18:35					16:40		16:23	35 14:46 (WEA-5 E-160)
19	05:35	06:22	07:12	08:03					07:57		08:36	14:12 (WEA-5 E-160)
	21:42	20:50	19:40	18:32					16:38		16:23	35 14:47 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04					07:59		08:37	14:12 (WEA-5 E-160)
	21:41	20:48	19:38	18:30					16:37		16:23	35 14:47 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06					08:01		08:37	14:13 (WEA-5 E-160)
	21:39	20:46	19:36	18:28					16:36		16:24	35 14:48 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08					08:02		08:38	14:13 (WEA-5 E-160)
	21:38	20:44	19:33	18:26					16:35		16:24	35 14:48 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10					08:04		08:38	14:14 (WEA-5 E-160)
	21:37	20:41	19:31	18:24					16:34		16:25	35 14:49 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11					08:06		08:39	14:14 (WEA-5 E-160)
	21:35	20:39	19:29	18:22					16:33		16:25	35 14:49 (WEA-5 E-160)
25	05:44	06:32	07:22	07:13					08:07		08:39	14:14 (WEA-5 E-160)
	21:34	20:37	5 07:04 (WEA_Heid2)	19:26	17:20				16:32		16:26	35 14:49 (WEA-5 E-160)
26	05:45	06:34	07:00 (WEA_Heid2)	07:24	07:15				08:09		14:16 (WEA-5 E-160)	08:39
	21:33	20:35	4 07:04 (WEA_Heid2)	19:24	17:18				16:31	8 14:24 (WEA-5 E-160)	16:27	34 14:49 (WEA-5 E-160)
27	05:46	06:35	07:02 (WEA_Heid2)	07:25	07:17				08:10		14:14 (WEA-5 E-160)	08:40
	21:31	20:33	3 07:05 (WEA_Heid2)	19:22	17:16				16:30	13 14:27 (WEA-5 E-160)	16:27	35 14:51 (WEA-5 E-160)
28	05:48	06:37		19:22	07:18				08:12		14:13 (WEA-5 E-160)	08:40
	21:30	20:31		19:19	17:14				16:29	17 14:30 (WEA-5 E-160)	16:28	35 14:51 (WEA-5 E-160)
29	05:49	06:38		07:29	07:20				08:13		14:11 (WEA-5 E-160)	08:40
	21:28	20:28		19:17	17:12				16:28	20 14:31 (WEA-5 E-160)	16:29	34 14:51 (WEA-5 E-160)
30	05:51	06:40		07:30	07:22				08:15		14:11 (WEA-5 E-160)	08:40
	21:27	20:26		19:15	17:10				16:27	22 14:33 (WEA-5 E-160)	16:30	33 14:51 (WEA-5 E-160)
31	05:52	06:42		07:24	07:18						08:40	14:18 (WEA-5 E-160)
	21:25	20:24									16:31	34 14:52 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267						244	
astr.max.mögl.Beschattung				145	80						1013	
Red.Sonnenscheinwahrsch.		0,43		0,32	0,23						0,15	
Reduktion Betriebsdauer		0,84		0,84	0,84						0,84	
Reduktion Windrichtung		0,70		0,62	0,68						0,68	
Gesamte Reduktion		0,25		0,17	0,13						0,08	
Met.wahrsch.Beschattung		3		24	11						86	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP107 - IP107 Bahnhofstr. 71

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1	08:40	09:55 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	37 10:32 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2	08:40	09:56 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	36 10:32 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	09:57 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
	16:34	36 10:33 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	09:58 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	36 10:34 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	09:58 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	35 10:33 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	09:59 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	35 10:34 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7	08:39	09:59 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
	16:39	35 10:34 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	10:00 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	35 10:35 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	10:00 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	35 10:35 (WEA-5 E-160)	17:35	18:25	20:19	21:09	21:49
10	08:37	10:01 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	33 10:34 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	10:01 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
	16:45	33 10:34 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	10:03 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	32 10:35 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	10:03 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	32 10:35 (WEA-5 E-160)	17:42	18:32	20:25	21:15	21:52
14	08:35	10:04 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
	16:49	31 10:35 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34	10:05 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	30 10:35 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16	08:33	10:06 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
	16:52	28 10:34 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17	08:32	10:07 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
	16:54	27 10:34 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18	08:31	10:08 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
	16:55	26 10:34 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19	08:30	10:09 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
	16:57	23 10:32 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20	08:29	10:10 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
	16:59	21 10:31 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21	08:28	10:12 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:13
	17:00	18 10:30 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22	08:27	10:15 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
	17:02	14 10:29 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23	08:26	10:18 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
	17:04	7 10:25 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24	08:25		07:31	06:29	06:20	05:29	05:14
	17:06		18:02	18:51	20:44	21:31	21:56
25	08:23		07:29	06:26	06:17	05:28	05:15
	17:07		18:04	18:53	20:46	21:33	21:56
26	08:22		07:27	06:24	06:15	05:26	05:15
	17:09		18:06	18:55	20:47	21:34	21:56
27	08:21		07:25	06:22	06:13	05:25	05:15
	17:11		18:08	18:57	20:49	21:35	21:56
28	08:19		07:23	06:19	06:11	05:24	05:16
	17:13		18:09	18:58	20:51	21:37	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	675						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,57						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	63						

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

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

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP107 - IP107 Bahnhofstr. 71

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					289	1113
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					32	78

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP108 - IP108 Bahnhofstr. 73

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1 08:40	10:01 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	36	10:37 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	10:02 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	36	10:38 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	10:03 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	36	10:39 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	10:04 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	35	10:39 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	10:04 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	35	10:39 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	10:05 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	35	10:40 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	10:05 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
16:39	34	10:39 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	10:06 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	34	10:40 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	10:07 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	33	10:40 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10 08:37	10:07 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	33	10:40 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	10:08 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
16:45	31	10:39 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	10:09 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	31	10:40 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	10:10 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	30	10:40 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14 08:35	10:11 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	28	10:39 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34	10:12 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	27	10:39 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16 08:33	10:13 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
16:52	26	10:39 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17 08:32	10:14 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	24	10:38 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18 08:31	10:16 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	21	10:37 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19 08:30	10:17 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	18	10:35 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20 08:29	10:19 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	15	10:34 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21 08:28	10:23 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:13
17:00	9	10:32 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22 08:27		07:35	06:33	06:24	05:31	05:14
17:02		17:59	18:48	20:41	21:29	21:56
23 08:26		07:33	06:31	06:22	05:30	05:14
17:04		18:00	18:50	20:42	21:30	21:56
24 08:25		07:31	06:29	06:20	05:29	05:14
17:06		18:02	18:51	20:44	21:31	21:56
25 08:23		07:29	06:26	06:17	05:28	05:15
17:07		18:04	18:53	20:46	21:33	21:56
26 08:22		07:27	06:24	06:15	05:26	05:15
17:09		18:06	18:55	20:47	21:34	21:56
27 08:21		07:25	06:22	06:13	05:25	05:15
17:11		18:08	18:57	20:49	21:35	21:56
28 08:19		07:23	06:19	06:11	05:24	05:16
17:13		18:09	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259		278		416	
astr.max.mögl.Beschattung	607		367		485	
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,57					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	57					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP108 - IP108 Bahnhofstr. 73

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					228	1102
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					25	78

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP119 - IP119 Bahnhofstr. 92

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1 08:40	10:26 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	30	10:56 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	10:27 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	30	10:57 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	10:28 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
16:34	29	10:57 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	10:29 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	28	10:57 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	10:29 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	28	10:57 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	10:31 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	26	10:57 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	10:31 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
16:39	25	10:56 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	10:33 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	24	10:57 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	10:34 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	22	10:56 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10 08:37	10:35 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	20	10:55 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	10:36 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
16:45	18	10:54 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	10:39 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	15	10:54 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	10:41 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	11	10:52 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14 08:35	10:46 (WEA-5 E-160)	07:51	06:51	06:41	05:43	05:14
16:49	2	10:48 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34		07:49	06:49	06:39	05:41	05:13
16:51		17:46	18:36	20:29	21:18	21:53
16 08:33		07:47	06:47	06:36	05:40	05:13
16:52		17:48	18:38	20:30	21:20	21:54
17 08:32		07:45	06:45	06:34	05:38	05:13
16:54		17:49	18:39	20:32	21:21	21:54
18 08:31		07:43	06:42	06:32	05:37	05:13
16:55		17:51	18:41	20:34	21:23	21:55
19 08:30		07:41	06:40	06:30	05:35	05:13
16:57		17:53	18:43	20:36	21:24	21:55
20 08:29		07:39	06:38	06:28	05:34	05:13
16:59		17:55	18:45	20:37	21:26	21:55
21 08:28		07:37	06:35	06:26	05:33	05:13
17:00		17:57	18:46	20:39	21:27	21:55
22 08:27		07:35	06:33	06:24	05:31	05:14
17:02		17:59	18:48	20:41	21:29	21:56
23 08:26		07:33	06:31	06:22	05:30	05:14
17:04		18:00	18:50	20:42	21:30	21:56
24 08:25		07:31	06:29	06:20	05:29	05:14
17:06		18:02	18:51	20:44	21:31	21:56
25 08:23		07:29	06:26	06:17	05:28	05:15
17:07		18:04	18:53	20:46	21:33	21:56
26 08:22		07:27	06:24	06:15	05:26	05:15
17:09		18:06	18:55	20:47	21:34	21:56
27 08:21		07:25	06:22	06:13	05:25	05:15
17:11		18:08	18:57	20:49	21:35	21:56
28 08:19		07:23	06:19	06:11	05:24	05:16
17:13		18:09	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	308					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,57					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	29					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP119 - IP119 Bahnhofstr. 92

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:09	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					26	921
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					3	64

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP121 - IP121 Bahnhofstr. 94

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1 08:40	10:18 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	33	10:51 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	10:19 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	32	10:51 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	10:20 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
16:34	32	10:52 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	10:21 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	31	10:52 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	10:21 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	31	10:52 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	10:22 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	30	10:52 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	10:23 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
16:39	29	10:52 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	10:24 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28	10:52 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	10:25 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	27	10:52 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10 08:37	10:25 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	26	10:51 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	10:26 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
16:45	24	10:50 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	10:28 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	23	10:51 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	10:30 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	20	10:50 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14 08:35	10:31 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	18	10:49 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34	10:33 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	14	10:47 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16 08:33	10:36 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
16:52	9	10:45 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17 08:32		07:45	06:45	06:34	05:38	05:13
16:54		17:49	18:39	20:32	21:21	21:54
18 08:31		07:43	06:42	06:32	05:37	05:13
16:55		17:51	18:41	20:34	21:23	21:55
19 08:30		07:41	06:40	06:30	05:35	05:13
16:57		17:53	18:43	20:36	21:24	21:55
20 08:29		07:39	06:38	06:28	05:34	05:13
16:59		17:55	18:45	20:37	21:26	21:55
21 08:28		07:37	06:35	06:26	05:33	05:13
17:00		17:57	18:46	20:39	21:27	21:55
22 08:27		07:35	06:33	06:24	05:31	05:14
17:02		17:59	18:48	20:41	21:29	21:56
23 08:26		07:33	06:31	06:22	05:30	05:14
17:04		18:00	18:50	20:42	21:30	21:56
24 08:25		07:31	06:29	06:20	05:29	05:14
17:06		18:02	18:51	20:44	21:31	21:56
25 08:23		07:29	06:26	06:17	05:28	05:15
17:07		18:04	18:53	20:46	21:33	21:56
26 08:22		07:27	06:24	06:15	05:26	05:15
17:09		18:06	18:55	20:47	21:34	21:56
27 08:21		07:25	06:22	06:13	05:25	05:15
17:11		18:08	18:57	20:49	21:35	21:56
28 08:19		07:23	06:19	06:11	05:24	05:16
17:13		18:09	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259					
astr.max.mögl.Beschattung	407					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,57					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	38					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP121 - IP121 Bahnhofstr. 94

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					80	1004
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					9	70

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP122 - IP122 Bahnhofstr. 96

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1	08:40	10:13 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	34	10:47 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	10:14 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	33	10:47 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	10:15 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
	16:34	33	10:48 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	10:16 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	33	10:49 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	10:16 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	32	10:48 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	10:17 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	32	10:49 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7	08:39	10:18 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
	16:39	30	10:48 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	10:19 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	30	10:49 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	10:20 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	28	10:48 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10	08:37	10:20 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	28	10:48 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11	08:37	10:21 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
	16:45	26	10:47 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	10:23 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	25	10:48 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:36	10:24 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	23	10:47 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14	08:35	10:25 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
	16:49	21	10:46 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	10:27 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	19	10:46 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	10:29 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
	16:52	15	10:44 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32	10:31 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
	16:54	11	10:42 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18	08:31		07:43	06:42	06:32	05:37	05:13
	16:55		17:51	18:41	20:34	21:23	21:55
19	08:30		07:41	06:40	06:30	05:35	05:13
	16:57		17:53	18:43	20:36	21:24	21:55
20	08:29		07:39	06:38	06:28	05:34	05:13
	16:59		17:55	18:45	20:37	21:26	21:55
21	08:28		07:37	06:35	06:26	05:33	05:13
	17:00		17:57	18:46	20:39	21:27	21:55
22	08:27		07:35	06:33	06:24	05:31	05:14
	17:02		17:59	18:48	20:41	21:29	21:56
23	08:26		07:33	06:31	06:22	05:30	05:14
	17:04		18:00	18:50	20:42	21:30	21:56
24	08:25		07:31	06:29	06:20	05:29	05:14
	17:06		18:02	18:51	20:44	21:31	21:56
25	08:23		07:29	06:26	06:17	05:28	05:15
	17:07		18:04	18:53	20:46	21:33	21:56
26	08:22		07:27	06:24	06:15	05:26	05:15
	17:09		18:06	18:55	20:47	21:34	21:56
27	08:21		07:25	06:22	06:13	05:25	05:15
	17:11		18:08	18:57	20:49	21:35	21:56
28	08:19		07:23	06:19	06:11	05:24	05:16
	17:13		18:09	18:58	20:51	21:37	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	453						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,57						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	42						

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP122 - IP122 Bahnhofstr. 96

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	10:10 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	10:20 (WEA-5 E-160)
26	05:45	06:34	07:24	07:15	08:09	10:07 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	10:22 (WEA-5 E-160)
27	05:46	06:35	07:26	07:17	08:10	10:06 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	10:25 (WEA-5 E-160)
28	05:48	06:37	07:27	07:18	08:12	10:05 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	10:26 (WEA-5 E-160)
29	05:49	06:39	07:29	07:20	08:13	10:04 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	10:27 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	10:04 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	10:29 (WEA-5 E-160)
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					113	1039
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					12	73

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP124 - IP124 Bahnhofstr. 98

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	10:08 (WEA-5 E-160)	08:14	07:20	07:10	06:06
	16:32	35 10:43 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	10:09 (WEA-5 E-160)	08:12	07:18	07:08	06:04
	16:33	35 10:44 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	10:10 (WEA-5 E-160)	08:10	07:16	07:06	06:02
	16:34	34 10:44 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	10:11 (WEA-5 E-160)	08:09	07:14	07:03	06:00
	16:36	34 10:45 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	10:11 (WEA-5 E-160)	08:07	07:12	07:01	05:58
	16:37	34 10:45 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	10:12 (WEA-5 E-160)	08:06	07:10	06:59	05:56
	16:38	33 10:45 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7	08:39	10:13 (WEA-5 E-160)	08:04	07:07	06:56	05:54
	16:39	32 10:45 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	10:14 (WEA-5 E-160)	08:02	07:05	06:54	05:53
	16:41	32 10:46 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	10:14 (WEA-5 E-160)	08:00	07:03	06:52	05:51
	16:42	31 10:45 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10	08:37	10:15 (WEA-5 E-160)	07:59	07:01	06:50	05:49
	16:43	30 10:45 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11	08:37	10:16 (WEA-5 E-160)	07:57	06:58	06:47	05:48
	16:45	28 10:44 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	10:17 (WEA-5 E-160)	07:55	06:56	06:45	05:46
	16:46	28 10:45 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:36	10:18 (WEA-5 E-160)	07:53	06:54	06:43	05:44
	16:48	27 10:45 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14	08:35	10:20 (WEA-5 E-160)	07:51	06:52	06:41	05:43
	16:49	24 10:44 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	10:21 (WEA-5 E-160)	07:49	06:49	06:39	05:41
	16:51	22 10:43 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	10:22 (WEA-5 E-160)	07:47	06:47	06:36	05:40
	16:52	21 10:43 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32	10:24 (WEA-5 E-160)	07:45	06:45	06:34	05:38
	16:54	17 10:41 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18	08:31	10:26 (WEA-5 E-160)	07:43	06:42	06:32	05:37
	16:55	14 10:40 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19	08:30	10:29 (WEA-5 E-160)	07:41	06:40	06:30	05:35
	16:57	7 10:36 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20	08:29		07:39	06:38	06:28	05:34
	16:59		17:55	18:45	20:37	21:26
21	08:28		07:37	06:35	06:26	05:33
	17:00		17:57	18:46	20:39	21:27
22	08:27		07:35	06:33	06:24	05:31
	17:02		17:59	18:48	20:41	21:29
23	08:26		07:33	06:31	06:22	05:30
	17:04		18:00	18:50	20:42	21:30
24	08:25		07:31	06:29	06:20	05:29
	17:06		18:02	18:51	20:44	21:31
25	08:23		07:29	06:26	06:17	05:28
	17:07		18:04	18:53	20:46	21:33
26	08:22		07:27	06:24	06:15	05:26
	17:09		18:06	18:55	20:47	21:34
27	08:21		07:25	06:22	06:13	05:25
	17:11		18:08	18:57	20:49	21:35
28	08:19		07:23	06:19	06:11	05:24
	17:13		18:09	18:58	20:51	21:37
29	08:18			07:17	06:09	05:23
	17:14			20:00	20:52	21:38
30	08:17			07:15	06:08	05:22
	17:16			20:02	20:54	21:39
31	08:15			07:12		05:21
	17:18			20:03		21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	518					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,57					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	49					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP124 - IP124 Bahnhofstr. 98

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	10:06 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	08:38
24	05:42	06:30	07:21	08:11	08:06	10:13 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	08:39
25	05:44	06:32	07:22	07:13	08:07	10:04 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	08:39
26	05:45	06:34	07:24	07:15	08:09	10:17 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	08:39
27	05:46	06:35	07:26	07:17	08:10	10:02 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	08:40
28	05:48	06:37	07:27	07:18	08:12	10:00 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	08:40
29	05:49	06:39	07:29	07:20	08:13	10:24 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	08:40
30	05:51	06:40	07:30	07:22	08:15	09:59 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	08:40
31	05:52	06:42	07:32	07:24	08:16	10:26 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:26	08:40
Sonnenscheinstunden	501	453	381	332	267	16:31
astr.max.mögl.Beschattung						35
Red.Sonnenscheinwahrsch.						1071
Reduktion Betriebsdauer						0,15
Reduktion Windrichtung						0,84
Gesamte Reduktion						0,57
Met.wahrsch.Beschattung						0,07
						17
						75

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP129 - IP129 Bahnhofstr. 107

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1	08:40	10:30 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	32 11:02 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2	08:40	10:31 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	32 11:03 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	10:32 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
	16:34	31 11:03 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	10:34 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	30 11:04 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	10:34 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	29 11:03 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	10:35 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	29 11:04 (WEA-5 E-160)	17:29	18:20	20:13	21:04	21:46
7	08:39	10:36 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
	16:39	27 11:03 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	10:37 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	26 11:03 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	10:38 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	25 11:03 (WEA-5 E-160)	17:35	18:25	20:19	21:09	21:49
10	08:37	10:39 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	23 11:02 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	10:40 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
	16:45	21 11:01 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	10:43 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	18 11:01 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	10:44 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	15 10:59 (WEA-5 E-160)	17:42	18:32	20:25	21:15	21:52
14	08:35	10:47 (WEA-5 E-160)	07:51	06:51	06:41	05:43	05:14
	16:49	10 10:57 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34		07:49	06:49	06:39	05:41	05:13
	16:51		17:46	18:36	20:29	21:18	21:53
16	08:33		07:47	06:47	06:36	05:40	05:13
	16:52		17:48	18:38	20:30	21:20	21:54
17	08:32		07:45	06:45	06:34	05:38	05:13
	16:54		17:49	18:39	20:32	21:21	21:54
18	08:31		07:43	06:42	06:32	05:37	05:13
	16:55		17:51	18:41	20:34	21:23	21:55
19	08:30		07:41	06:40	06:30	05:35	05:13
	16:57		17:53	18:43	20:36	21:24	21:55
20	08:29		07:39	06:38	06:28	05:34	05:13
	16:59		17:55	18:45	20:37	21:26	21:55
21	08:28		07:37	06:35	06:26	05:33	05:13
	17:00		17:57	18:46	20:39	21:27	21:55
22	08:27		07:35	06:33	06:24	05:31	05:14
	17:02		17:59	18:48	20:41	21:29	21:56
23	08:26		07:33	06:31	06:22	05:30	05:14
	17:04		18:00	18:50	20:42	21:30	21:56
24	08:25		07:31	06:29	06:20	05:29	05:14
	17:06		18:02	18:51	20:44	21:31	21:56
25	08:23		07:29	06:26	06:17	05:28	05:15
	17:07		18:04	18:53	20:46	21:33	21:56
26	08:22		07:27	06:24	06:15	05:26	05:15
	17:09		18:06	18:55	20:47	21:34	21:56
27	08:21		07:25	06:22	06:13	05:25	05:15
	17:11		18:08	18:57	20:49	21:35	21:56
28	08:19		07:23	06:19	06:11	05:24	05:16
	17:13		18:09	18:58	20:51	21:36	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	348						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,56						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	32						

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP129 - IP129 Bahnhofstr. 107

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:54	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:09	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:17	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	10:27 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	10:25 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	10:39 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	10:42 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:27	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					42	978
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					5	68

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP130 - IP130 Bahnhofstr. 109

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1	08:40	10:25 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	34	10:59 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	10:26 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	33	10:59 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	10:27 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
	16:34	33	11:00 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	10:29 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	31	11:00 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	10:29 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	31	11:00 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	10:30 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	30	11:00 (WEA-5 E-160)	17:29	18:20	20:13	21:04
7	08:39	10:30 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
	16:39	30	11:00 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	10:32 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	28	11:00 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	10:33 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	27	11:00 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10	08:37	10:33 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	26	10:59 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11	08:37	10:34 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
	16:45	24	10:58 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	10:37 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	22	10:59 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:36	10:38 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	20	10:58 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14	08:35	10:40 (WEA-5 E-160)	07:51	06:51	06:41	05:43	05:14
	16:49	16	10:56 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	10:42 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	13	10:55 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	10:45 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
	16:52	7	10:52 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32		07:45	06:45	06:34	05:38	05:13
	16:54		17:49	18:39	20:32	21:21	21:54
18	08:31		07:43	06:42	06:32	05:37	05:13
	16:55		17:51	18:41	20:34	21:23	21:55
19	08:30		07:41	06:40	06:30	05:35	05:13
	16:57		17:53	18:43	20:36	21:24	21:55
20	08:29		07:39	06:38	06:28	05:34	05:13
	16:59		17:55	18:45	20:37	21:26	21:55
21	08:28		07:37	06:35	06:26	05:33	05:13
	17:00		17:57	18:46	20:39	21:27	21:55
22	08:27		07:35	06:33	06:24	05:31	05:14
	17:02		17:59	18:48	20:41	21:29	21:56
23	08:26		07:33	06:31	06:22	05:30	05:14
	17:04		18:00	18:50	20:42	21:30	21:56
24	08:25		07:31	06:29	06:20	05:29	05:14
	17:06		18:02	18:51	20:44	21:31	21:56
25	08:23		07:29	06:26	06:17	05:28	05:15
	17:07		18:04	18:53	20:46	21:33	21:56
26	08:22		07:27	06:24	06:15	05:26	05:15
	17:09		18:06	18:55	20:47	21:34	21:56
27	08:21		07:25	06:22	06:13	05:25	05:15
	17:11		18:08	18:57	20:49	21:35	21:56
28	08:19		07:23	06:19	06:11	05:24	05:16
	17:13		18:09	18:58	20:51	21:37	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259		278	367	416	485	498
astr.max.mögl.Beschattung	405						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,57						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	38						

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP130 - IP130 Bahnhofstr. 109

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:09	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	10:24 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	6 10:30 (WEA-5 E-160)
27	05:46	06:35	07:26	07:17	08:10	10:21 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	13 10:34 (WEA-5 E-160)
28	05:48	06:37	07:27	07:18	08:12	10:20 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	16 10:36 (WEA-5 E-160)
29	05:49	06:39	07:29	07:20	08:13	10:18 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	20 10:38 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	10:18 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	22 10:40 (WEA-5 E-160)
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					77	1023
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					8	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) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
--------------	-----------------------	-------------------------	----------------------	----------------------------------	--------------------------------	---------------------------	----------------------------

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP131 - IP131 Bahnhofstr. 113

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1	08:40	10:15 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	36 10:51 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2	08:40	10:16 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	36 10:52 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	10:17 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
	16:34	35 10:52 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	10:18 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	35 10:53 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	10:18 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	34 10:52 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	10:19 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	34 10:53 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7	08:39	10:19 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
	16:39	34 10:53 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	10:21 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	32 10:53 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	10:21 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	32 10:53 (WEA-5 E-160)	17:35	18:25	20:19	21:09	21:49
10	08:37	10:22 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	31 10:53 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	10:22 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
	16:45	30 10:52 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	10:24 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	29 10:53 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	10:25 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	27 10:52 (WEA-5 E-160)	17:42	18:32	20:25	21:15	21:52
14	08:35	10:26 (WEA-5 E-160)	07:51	06:51	06:41	05:43	05:14
	16:49	26 10:52 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34	10:28 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	23 10:51 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16	08:33	10:29 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
	16:52	21 10:50 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17	08:32	10:31 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
	16:54	18 10:49 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18	08:31	10:33 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
	16:55	15 10:48 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19	08:30	10:36 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
	16:57	8 10:44 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20	08:29		07:39	06:38	06:28	05:34	05:13
	16:59		17:55	18:45	20:37	21:26	21:55
21	08:28		07:37	06:35	06:26	05:33	05:13
	17:00		17:57	18:46	20:39	21:27	21:55
22	08:27		07:35	06:33	06:24	05:31	05:14
	17:02		17:59	18:48	20:41	21:29	21:56
23	08:26		07:33	06:31	06:22	05:30	05:14
	17:04		18:00	18:50	20:42	21:30	21:56
24	08:25		07:31	06:29	06:20	05:29	05:14
	17:06		18:02	18:51	20:44	21:31	21:56
25	08:23		07:29	06:26	06:17	05:28	05:15
	17:07		18:04	18:53	20:46	21:33	21:56
26	08:22		07:27	06:24	06:15	05:26	05:15
	17:09		18:06	18:55	20:47	21:34	21:56
27	08:21		07:25	06:22	06:13	05:25	05:15
	17:11		18:08	18:57	20:49	21:35	21:56
28	08:19		07:23	06:19	06:11	05:24	05:16
	17:13		18:09	18:58	20:51	21:37	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	536						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,57						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	50						

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP131 - IP131 Bahnhofstr. 113

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	10:13 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	08:38
24	05:42	06:30	07:21	08:11	08:06	10:21 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	10:11 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	08:39
26	05:45	06:34	07:24	07:15	08:09	10:09 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	16:26
27	05:46	06:35	07:26	07:17	08:10	10:07 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	16:27
28	05:48	06:37	07:27	07:18	08:12	10:27 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	08:39
29	05:49	06:39	07:29	07:20	08:13	10:05 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	16:28
30	05:51	06:40	07:30	07:22	08:15	10:32 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	16:29
31	05:52	06:42	07:32	07:24	08:16	10:05 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:26	16:30
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					165	1110
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					18	78

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP132 - IP132 Bahnhofstr. 115

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1 08:40	10:10 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	37	10:47 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	10:10 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	37	10:47 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	10:11 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
16:34	37	10:48 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	10:12 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	36	10:48 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	10:12 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	36	10:48 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	10:13 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	36	10:49 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	10:14 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
16:39	35	10:49 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	10:15 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	34	10:49 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	10:15 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	34	10:49 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10 08:37	10:16 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	33	10:49 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	10:16 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
16:45	32	10:48 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	10:18 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	31	10:49 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	10:19 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	30	10:49 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14 08:35	10:20 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	28	10:48 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34	10:21 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	27	10:48 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16 08:33	10:22 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
16:52	25	10:47 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17 08:32	10:23 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	24	10:47 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18 08:31	10:25 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	21	10:46 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19 08:30	10:26 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	18	10:44 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20 08:29	10:29 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	13	10:42 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21 08:28	10:33 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:13
17:00	6	10:39 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22 08:27		07:35	06:33	06:24	05:31	05:14
17:02		17:59	18:48	20:41	21:29	21:56
23 08:26		07:33	06:31	06:22	05:30	05:14
17:04		18:00	18:50	20:42	21:30	21:56
24 08:25		07:31	06:29	06:20	05:29	05:14
17:06		18:02	18:51	20:44	21:31	21:56
25 08:23		07:29	06:26	06:17	05:28	05:15
17:07		18:04	18:53	20:46	21:33	21:56
26 08:22		07:27	06:24	06:15	05:26	05:15
17:09		18:06	18:55	20:47	21:34	21:56
27 08:21		07:25	06:22	06:13	05:25	05:15
17:11		18:08	18:57	20:49	21:35	21:56
28 08:19		07:23	06:19	06:11	05:24	05:16
17:13		18:09	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	610					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,57					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	57					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP132 - IP132 Bahnhofstr. 115

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					221	1143
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					24	80

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP133 - IP133 Bahnhofstr. 117

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1 08:40	10:04 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	38	10:42 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	10:05 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	38	10:43 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	10:06 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19
16:34	37	10:43 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	10:07 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	37	10:44 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	10:07 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	37	10:44 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	10:08 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	36	10:44 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	10:08 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
16:39	36	10:44 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	10:09 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	36	10:45 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	10:10 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	35	10:45 (WEA-5 E-160)	17:35	18:25	20:19	21:09
10 08:37	10:10 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	35	10:45 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	10:11 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14
16:45	33	10:44 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	10:12 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	33	10:45 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	10:13 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	32	10:45 (WEA-5 E-160)	17:42	18:32	20:25	21:15
14 08:35	10:14 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	31	10:45 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34	10:15 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	29	10:44 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16 08:33	10:16 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13
16:52	28	10:44 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17 08:32	10:17 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	27	10:44 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18 08:31	10:18 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	25	10:43 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19 08:30	10:19 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	22	10:41 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20 08:29	10:21 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	19	10:40 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21 08:28	10:23 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:13
17:00	16	10:39 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22 08:27	10:26 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	11	10:37 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23 08:26		07:33	06:31	06:22	05:30	05:14
17:04		18:00	18:50	20:42	21:30	21:56
24 08:25		07:31	06:29	06:20	05:29	05:14
17:06		18:02	18:51	20:44	21:31	21:56
25 08:23		07:29	06:26	06:17	05:28	05:15
17:07		18:04	18:53	20:46	21:33	21:56
26 08:22		07:27	06:24	06:15	05:26	05:15
17:09		18:06	18:55	20:47	21:34	21:56
27 08:21		07:25	06:22	06:13	05:25	05:15
17:11		18:08	18:57	20:49	21:35	21:56
28 08:19		07:23	06:19	06:11	05:24	05:16
17:13		18:09	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	671					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,57					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	63					

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP133 - IP133 Bahnhofstr. 117

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:58	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	09:59 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	09:57 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	09:56 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	09:55 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	09:55 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	09:54 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	09:54 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	09:54 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	09:53 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	09:53 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	09:53 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					273	1160
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					30	82

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP134 - IP134 Bahnhofstr. 119

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

| Januar | Februar | März | April | Mai | Juni

1	08:40	10:00 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21	
	16:32	38	10:38 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2	08:40	10:00 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20	
	16:33	38	10:38 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	10:01 (WEA-5 E-160)	08:10	07:16	07:06	06:02	05:19	
	16:34	38	10:39 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	10:02 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18	
	16:36	38	10:40 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	10:02 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18	
	16:37	37	10:39 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	10:03 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17	
	16:38	37	10:40 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7	08:39	10:03 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16	
	16:39	37	10:40 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	10:04 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16	
	16:41	37	10:41 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	10:05 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15	
	16:42	36	10:41 (WEA-5 E-160)	17:35	18:25	20:19	21:09	21:49
10	08:37	10:05 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15	
	16:43	36	10:41 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	10:05 (WEA-5 E-160)	07:57	06:58	06:47	05:48	05:14	
	16:45	35	10:40 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	10:07 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14	
	16:46	34	10:41 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	10:07 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14	
	16:48	34	10:41 (WEA-5 E-160)	17:42	18:32	20:25	21:15	21:52
14	08:35	10:08 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14	
	16:49	33	10:41 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34	10:09 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13	
	16:51	32	10:41 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16	08:33	10:10 (WEA-5 E-160)	07:47	06:47	06:36	05:40	05:13	
	16:52	31	10:41 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17	08:32	10:11 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13	
	16:54	29	10:40 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18	08:31	10:12 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13	
	16:55	28	10:40 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19	08:30	10:12 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13	
	16:57	27	10:39 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20	08:29	10:14 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13	
	16:59	24	10:38 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21	08:28	10:16 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:13	
	17:00	21	10:37 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22	08:27	10:18 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14	
	17:02	18	10:36 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23	08:26	10:20 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14	
	17:04	13	10:33 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24	08:25	10:24 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14	
	17:06	6	10:30 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25	08:23		07:29	06:26	06:17	05:28	05:15	
	17:07		18:04	18:53	20:46	21:33	21:56	
26	08:22		07:27	06:24	06:15	05:26	05:15	
	17:09		18:06	18:55	20:47	21:34	21:56	
27	08:21		07:25	06:22	06:13	05:25	05:15	
	17:11		18:08	18:57	20:49	21:35	21:56	
28	08:19		07:23	06:19	06:11	05:24	05:16	
	17:13		18:09	18:58	20:51	21:37	21:56	
29	08:18			07:17	06:09	05:23	05:16	
	17:14			20:00	20:52	21:38	21:56	
30	08:17			07:15	06:08	05:22	05:17	
	17:16			20:02	20:54	21:39	21:55	
31	08:15			07:12		05:21		
	17:18			20:03		21:40		
Sonnenscheinstunden	259		278	367	416	485	498	
astr.max.mögl.Beschattung	737							
Red.Sonnenscheinwahrsch.	0,20							
Reduktion Betriebsdauer	0,84							
Reduktion Windrichtung	0,57							
Gesamte Reduktion	0,09							
Met.wahrsch.Beschattung	69							

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP134 - IP134 Bahnhofstr. 119

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	16:59	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:45	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:50	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:45	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:50	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					328	1176
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,57	0,57
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					36	83

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP135 - IP135 Engelradingweg 1

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
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1	08:40	09:24 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	27	09:51 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	09:24 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	28	09:52 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	09:25 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
	16:34	27	09:52 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	09:26 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	27	09:53 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	09:25 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	29	09:54 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	09:26 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	29	09:55 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7	08:39	09:26 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
	16:39	29	09:55 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	09:27 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	29	09:56 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	09:26 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	30	09:56 (WEA-5 E-160)	17:35	18:26	20:19	21:09
10	08:37	09:26 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	30	09:56 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11	08:37	09:26 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
	16:45	31	09:57 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	09:28 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	30	09:58 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:36	09:28 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	30	09:58 (WEA-5 E-160)	17:42	18:33	20:25	21:15
14	08:35	09:28 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
	16:49	30	09:58 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	09:28 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	31	09:59 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	09:29 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
	16:52	30	09:59 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32	09:29 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
	16:54	30	09:59 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18	08:31	09:30 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
	16:55	30	10:00 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19	08:30	09:31 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
	16:57	29	10:00 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20	08:29	09:30 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
	16:59	29	09:59 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21	08:28	09:31 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
	17:00	28	09:59 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22	08:27	09:32 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
	17:02	27	09:59 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23	08:26	09:33 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
	17:04	25	09:58 (WEA-5 E-160)	18:00	18:50	20:42	21:30
24	08:25	09:34 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
	17:06	24	09:58 (WEA-5 E-160)	18:02	18:51	20:44	21:31
25	08:23	09:35 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
	17:07	23	09:58 (WEA-5 E-160)	18:04	18:53	20:46	21:33
26	08:22	09:36 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
	17:09	21	09:57 (WEA-5 E-160)	18:06	18:55	20:47	21:34
27	08:21	09:38 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
	17:11	18	09:56 (WEA-5 E-160)	18:08	18:57	20:49	21:35
28	08:19	09:40 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
	17:13	14	09:54 (WEA-5 E-160)	18:10	18:58	20:51	21:37
29	08:18	09:43 (WEA-5 E-160)		07:17	06:09	05:23	05:16
	17:14	9	09:52 (WEA-5 E-160)		20:00	20:52	21:38
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259		278	367	416	485	498
astr.max.mögl.Beschattung	774						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,56						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	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) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP135 - IP135 Engleradingweg 1

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					460	817
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					50	57

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP136 - IP136 Engleradingweg 2

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:23 (WEA-5 E-160)	08:14	09:34 (WEA-5 E-160)	07:20	07:10	06:06	05:21			
	16:32	22 09:45 (WEA-5 E-160)	17:20	09:56 (WEA-5 E-160)	18:11	20:05	20:56	21:41			
2	08:40	09:23 (WEA-5 E-160)	08:12	09:35 (WEA-5 E-160)	07:18	07:08	06:04	05:20			
	16:33	23 09:46 (WEA-5 E-160)	17:22	09:54 (WEA-5 E-160)	18:13	20:07	20:57	21:42			
3	08:40	09:24 (WEA-5 E-160)	08:11	09:37 (WEA-5 E-160)	07:16	07:06	06:02	05:19			
	16:34	24 09:48 (WEA-5 E-160)	17:24	09:52 (WEA-5 E-160)	18:15	20:08	20:59	21:43			
4	08:40	09:24 (WEA-5 E-160)	08:09	09:42 (WEA-5 E-160)	07:14	07:03	06:00	05:18			
	16:36	25 09:49 (WEA-5 E-160)	17:25	09:49 (WEA-5 E-160)	18:17	20:10	21:01	21:44			
5	08:40	09:24 (WEA-5 E-160)	08:07		07:12	07:01	05:58	05:18			
	16:37	25 09:49 (WEA-5 E-160)	17:27		18:18	20:12	21:02	21:45			
6	08:39	09:24 (WEA-5 E-160)	08:06		07:10	06:59	05:56	05:17			
	16:38	26 09:50 (WEA-5 E-160)	17:29		18:20	20:14	21:04	21:46			
7	08:39	09:24 (WEA-5 E-160)	08:04		07:07	06:56	05:55	05:16			
	16:39	27 09:51 (WEA-5 E-160)	17:31		18:22	20:15	21:06	21:47			
8	08:38	09:24 (WEA-5 E-160)	08:02		07:05	06:54	05:53	05:16			
	16:41	28 09:52 (WEA-5 E-160)	17:33		18:24	20:17	21:07	21:48			
9	08:38	09:24 (WEA-5 E-160)	08:00		07:03	06:52	05:51	05:15			
	16:42	29 09:53 (WEA-5 E-160)	17:35		18:26	20:19	21:09	21:49			
10	08:37	09:24 (WEA-5 E-160)	07:59		07:01	06:50	05:49	05:15			
	16:43	29 09:53 (WEA-5 E-160)	17:37		18:27	20:20	21:10	21:50			
11	08:37	09:24 (WEA-5 E-160)	07:57		06:58	06:48	05:48	05:14			
	16:45	30 09:54 (WEA-5 E-160)	17:38		18:29	20:22	21:12	21:51			
12	08:36	09:24 (WEA-5 E-160)	07:55		06:56	06:45	05:46	05:14			
	16:46	31 09:55 (WEA-5 E-160)	17:40		18:31	20:24	21:14	21:51			
13	08:36	09:24 (WEA-5 E-160)	07:53		06:54	06:43	05:44	05:14			
	16:48	32 09:56 (WEA-5 E-160)	17:42		18:33	20:25	21:15	21:52			
14	08:35	09:24 (WEA-5 E-160)	07:51		06:52	06:41	05:43	05:14			
	16:49	32 09:56 (WEA-5 E-160)	17:44		18:34	20:27	21:17	21:53			
15	08:34	09:24 (WEA-5 E-160)	07:49		06:49	06:39	05:41	05:13			
	16:51	33 09:57 (WEA-5 E-160)	17:46		18:36	20:29	21:18	21:53			
16	08:33	09:25 (WEA-5 E-160)	07:47		06:47	06:37	05:40	05:13			
	16:52	32 09:57 (WEA-5 E-160)	17:48		18:38	20:30	21:20	21:54			
17	08:32	09:25 (WEA-5 E-160)	07:45		06:45	06:34	05:38	05:13			
	16:54	33 09:58 (WEA-5 E-160)	17:49		18:39	20:32	21:21	21:54			
18	08:31	09:25 (WEA-5 E-160)	07:43		06:42	06:32	05:37	05:13			
	16:55	34 09:59 (WEA-5 E-160)	17:51		18:41	20:34	21:23	21:55			
19	08:30	09:25 (WEA-5 E-160)	07:41		06:40	06:30	05:35	05:13			
	16:57	33 09:58 (WEA-5 E-160)	17:53		18:43	20:36	21:24	21:55			
20	08:29	09:25 (WEA-5 E-160)	07:39		06:38	06:28	05:34	05:13			
	16:59	34 09:59 (WEA-5 E-160)	17:55		18:45	20:37	21:26	21:55			
21	08:28	09:26 (WEA-5 E-160)	07:37		06:35	06:26	05:33	05:14			
	17:00	33 09:59 (WEA-5 E-160)	17:57		18:46	20:39	21:27	21:55			
22	08:27	09:26 (WEA-5 E-160)	07:35		06:33	06:24	05:31	05:14			
	17:02	34 10:00 (WEA-5 E-160)	17:59		18:48	20:41	21:29	21:56			
23	08:26	09:26 (WEA-5 E-160)	07:33		06:31	06:22	05:30	05:14			
	17:04	33 09:59 (WEA-5 E-160)	18:00		18:50	20:42	21:30	21:56			
24	08:25	09:27 (WEA-5 E-160)	07:31		06:29	06:20	05:29	05:14			
	17:06	33 10:00 (WEA-5 E-160)	18:02		18:51	20:44	21:31	21:56			
25	08:23	09:28 (WEA-5 E-160)	07:29		06:26	06:17	05:28	05:15			
	17:07	32 10:00 (WEA-5 E-160)	18:04		18:53	20:46	21:33	21:56			
26	08:22	09:28 (WEA-5 E-160)	07:27		06:24	06:15	05:26	05:15			
	17:09	31 09:59 (WEA-5 E-160)	18:06		18:55	20:47	21:34	21:56			
27	08:21	09:29 (WEA-5 E-160)	07:25		06:22	06:13	05:25	05:15			
	17:11	31 10:00 (WEA-5 E-160)	18:08		18:57	20:49	21:35	21:56			
28	08:19	09:29 (WEA-5 E-160)	07:23		06:19	06:11	05:24	05:16			
	17:13	30 09:59 (WEA-5 E-160)	18:10		18:58	20:51	21:37	21:56			
29	08:18	09:31 (WEA-5 E-160)			07:17	06:09	05:23	05:16			
	17:14	28 09:59 (WEA-5 E-160)			20:00	20:52	21:38	21:56			
30	08:17	09:31 (WEA-5 E-160)			07:15	06:08	05:22	05:17			
	17:16	27 09:58 (WEA-5 E-160)			20:02	20:54	21:39	21:55			
31	08:15	09:32 (WEA-5 E-160)			07:12		05:21				
	17:18	24 09:56 (WEA-5 E-160)			20:03		21:40				
Sonnenscheinstunden	259		278		367	416	485	498			
astr.max.mögl.Beschattung	918		63								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,56		0,56								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	85		9								

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

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

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP136 - IP136 Engelradingweg 2

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	08:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	08:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	08:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	08:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	08:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	08:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	08:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					694	662
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					75	46

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP137 - IP137 Engleradingweg 6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:24 (WEA-5 E-160)	08:14	09:41 (WEA-5 E-160)	07:20	07:10	06:06	05:21			
	16:32	25	09:49 (WEA-5 E-160)	17:20	12	09:53 (WEA-5 E-160)	18:11	20:05	20:56	21:41	
2	08:40	09:24 (WEA-5 E-160)	08:12				07:18	07:08	06:04	05:20	
	16:33	26	09:50 (WEA-5 E-160)	17:22			18:13	20:07	20:57	21:42	
3	08:40	09:24 (WEA-5 E-160)	08:11				07:16	07:06	06:02	05:19	
	16:34	27	09:51 (WEA-5 E-160)	17:24			18:15	20:08	20:59	21:43	
4	08:40	09:25 (WEA-5 E-160)	08:09				07:14	07:03	06:00	05:18	
	16:36	27	09:52 (WEA-5 E-160)	17:25			18:17	20:10	21:01	21:44	
5	08:40	09:24 (WEA-5 E-160)	08:07				07:12	07:01	05:58	05:18	
	16:37	28	09:52 (WEA-5 E-160)	17:27			18:18	20:12	21:02	21:45	
6	08:39	09:25 (WEA-5 E-160)	08:06				07:10	06:59	05:56	05:17	
	16:38	28	09:53 (WEA-5 E-160)	17:29			18:20	20:14	21:04	21:46	
7	08:39	09:25 (WEA-5 E-160)	08:04				07:07	06:56	05:55	05:16	
	16:39	28	09:53 (WEA-5 E-160)	17:31			18:22	20:15	21:06	21:47	
8	08:38	09:25 (WEA-5 E-160)	08:02				07:05	06:54	05:53	05:16	
	16:41	30	09:55 (WEA-5 E-160)	17:33			18:24	20:17	21:07	21:48	
9	08:38	09:25 (WEA-5 E-160)	08:00				07:03	06:52	05:51	05:15	
	16:42	30	09:55 (WEA-5 E-160)	17:35			18:26	20:19	21:09	21:49	
10	08:37	09:25 (WEA-5 E-160)	07:59				07:01	06:50	05:49	05:15	
	16:43	30	09:55 (WEA-5 E-160)	17:37			18:27	20:20	21:10	21:50	
11	08:37	09:25 (WEA-5 E-160)	07:57				06:58	06:48	05:48	05:14	
	16:45	31	09:56 (WEA-5 E-160)	17:38			18:29	20:22	21:12	21:51	
12	08:36	09:26 (WEA-5 E-160)	07:55				06:56	06:45	05:46	05:14	
	16:46	31	09:57 (WEA-5 E-160)	17:40			18:31	20:24	21:14	21:51	
13	08:36	09:26 (WEA-5 E-160)	07:53				06:54	06:43	05:44	05:14	
	16:48	32	09:58 (WEA-5 E-160)	17:42			18:33	20:25	21:15	21:52	
14	08:35	09:26 (WEA-5 E-160)	07:51				06:52	06:41	05:43	05:14	
	16:49	32	09:58 (WEA-5 E-160)	17:44			18:34	20:27	21:17	21:53	
15	08:34	09:26 (WEA-5 E-160)	07:49				06:49	06:39	05:41	05:13	
	16:51	33	09:59 (WEA-5 E-160)	17:46			18:36	20:29	21:18	21:53	
16	08:33	09:27 (WEA-5 E-160)	07:47				06:47	06:37	05:40	05:13	
	16:52	32	09:59 (WEA-5 E-160)	17:48			18:38	20:30	21:20	21:54	
17	08:32	09:27 (WEA-5 E-160)	07:45				06:45	06:34	05:38	05:13	
	16:54	32	09:59 (WEA-5 E-160)	17:49			18:39	20:32	21:21	21:54	
18	08:31	09:27 (WEA-5 E-160)	07:43				06:42	06:32	05:37	05:13	
	16:55	33	10:00 (WEA-5 E-160)	17:51			18:41	20:34	21:23	21:55	
19	08:30	09:28 (WEA-5 E-160)	07:41				06:40	06:30	05:35	05:13	
	16:57	32	10:00 (WEA-5 E-160)	17:53			18:43	20:36	21:24	21:55	
20	08:29	09:28 (WEA-5 E-160)	07:39				06:38	06:28	05:34	05:13	
	16:59	32	10:00 (WEA-5 E-160)	17:55			18:45	20:37	21:26	21:55	
21	08:28	09:28 (WEA-5 E-160)	07:37				06:35	06:26	05:33	05:14	
	17:00	32	10:00 (WEA-5 E-160)	17:57			18:46	20:39	21:27	21:55	
22	08:27	09:29 (WEA-5 E-160)	07:35				06:33	06:24	05:31	05:14	
	17:02	31	10:00 (WEA-5 E-160)	17:59			18:48	20:41	21:29	21:56	
23	08:26	09:29 (WEA-5 E-160)	07:33				06:31	06:22	05:30	05:14	
	17:04	31	10:00 (WEA-5 E-160)	18:00			18:50	20:42	21:30	21:56	
24	08:25	09:30 (WEA-5 E-160)	07:31				06:29	06:20	05:29	05:14	
	17:06	30	10:00 (WEA-5 E-160)	18:02			18:51	20:44	21:31	21:56	
25	08:23	09:31 (WEA-5 E-160)	07:29				06:26	06:17	05:28	05:15	
	17:07	29	10:00 (WEA-5 E-160)	18:04			18:53	20:46	21:33	21:56	
26	08:22	09:31 (WEA-5 E-160)	07:27				06:24	06:15	05:26	05:15	
	17:09	28	09:59 (WEA-5 E-160)	18:06			18:55	20:47	21:34	21:56	
27	08:21	09:33 (WEA-5 E-160)	07:25				06:22	06:13	05:25	05:15	
	17:11	26	09:59 (WEA-5 E-160)	18:08			18:57	20:49	21:35	21:56	
28	08:19	09:33 (WEA-5 E-160)	07:23				06:19	06:11	05:24	05:16	
	17:13	25	09:58 (WEA-5 E-160)	18:10			18:58	20:51	21:37	21:56	
29	08:18	09:35 (WEA-5 E-160)					07:17	06:09	05:23	05:16	
	17:14	23	09:58 (WEA-5 E-160)				20:00	20:52	21:38	21:56	
30	08:17	09:36 (WEA-5 E-160)					07:15	06:08	05:22	05:17	
	17:16	20	09:56 (WEA-5 E-160)				20:02	20:54	21:39	21:55	
31	08:15	09:38 (WEA-5 E-160)					07:12		05:21		
	17:18	16	09:54 (WEA-5 E-160)				20:03		21:40		
Sonnenscheinstunden	259		278				367	416	485	498	
astr.max.mögl.Beschattung	890		12								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,56		0,56								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	82		2								

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP137 - IP137 Engelradingweg 6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					597	764
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					64	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) Schattenende	(WEA mit erstem Schatten)	(WEA mit letztem Schatten)
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Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP137/1 - IP137/1 Engelradingweg 6a

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:24 (WEA-5 E-160)	08:14	09:42 (WEA-5 E-160)	07:20	07:10	06:06	05:21			
	16:32	25	09:49 (WEA-5 E-160)	17:20	10	18:11	20:05	20:56	21:41		
2	08:40	09:24 (WEA-5 E-160)	08:12		07:18	07:08	06:04	05:20			
	16:33	26	09:50 (WEA-5 E-160)	17:22		18:13	20:07	20:57	21:42		
3	08:40	09:25 (WEA-5 E-160)	08:11		07:16	07:06	06:02	05:19			
	16:34	26	09:51 (WEA-5 E-160)	17:24		18:15	20:08	20:59	21:43		
4	08:40	09:25 (WEA-5 E-160)	08:09		07:14	07:03	06:00	05:18			
	16:36	27	09:52 (WEA-5 E-160)	17:25		18:17	20:10	21:01	21:44		
5	08:40	09:25 (WEA-5 E-160)	08:07		07:12	07:01	05:58	05:18			
	16:37	27	09:52 (WEA-5 E-160)	17:27		18:18	20:12	21:02	21:45		
6	08:39	09:25 (WEA-5 E-160)	08:06		07:10	06:59	05:56	05:17			
	16:38	28	09:53 (WEA-5 E-160)	17:29		18:20	20:14	21:04	21:46		
7	08:39	09:25 (WEA-5 E-160)	08:04		07:07	06:56	05:55	05:16			
	16:39	29	09:54 (WEA-5 E-160)	17:31		18:22	20:15	21:06	21:47		
8	08:38	09:26 (WEA-5 E-160)	08:02		07:05	06:54	05:53	05:16			
	16:41	29	09:55 (WEA-5 E-160)	17:33		18:24	20:17	21:07	21:48		
9	08:38	09:25 (WEA-5 E-160)	08:00		07:03	06:52	05:51	05:15			
	16:42	30	09:55 (WEA-5 E-160)	17:35		18:26	20:19	21:09	21:49		
10	08:37	09:25 (WEA-5 E-160)	07:59		07:01	06:50	05:49	05:15			
	16:43	31	09:56 (WEA-5 E-160)	17:37		18:27	20:20	21:10	21:50		
11	08:37	09:25 (WEA-5 E-160)	07:57		06:58	06:48	05:48	05:14			
	16:45	31	09:56 (WEA-5 E-160)	17:38		18:29	20:22	21:12	21:51		
12	08:36	09:26 (WEA-5 E-160)	07:55		06:56	06:45	05:46	05:14			
	16:46	31	09:57 (WEA-5 E-160)	17:40		18:31	20:24	21:14	21:51		
13	08:36	09:26 (WEA-5 E-160)	07:53		06:54	06:43	05:44	05:14			
	16:48	32	09:58 (WEA-5 E-160)	17:42		18:33	20:25	21:15	21:52		
14	08:35	09:26 (WEA-5 E-160)	07:51		06:52	06:41	05:43	05:14			
	16:49	32	09:58 (WEA-5 E-160)	17:44		18:34	20:27	21:17	21:53		
15	08:34	09:27 (WEA-5 E-160)	07:49		06:49	06:39	05:41	05:13			
	16:51	32	09:59 (WEA-5 E-160)	17:46		18:36	20:29	21:18	21:53		
16	08:33	09:27 (WEA-5 E-160)	07:47		06:47	06:37	05:40	05:13			
	16:52	32	09:59 (WEA-5 E-160)	17:48		18:38	20:30	21:20	21:54		
17	08:32	09:27 (WEA-5 E-160)	07:45		06:45	06:34	05:38	05:13			
	16:54	33	10:00 (WEA-5 E-160)	17:49		18:39	20:32	21:21	21:54		
18	08:31	09:28 (WEA-5 E-160)	07:43		06:42	06:32	05:37	05:13			
	16:55	32	10:00 (WEA-5 E-160)	17:51		18:41	20:34	21:23	21:55		
19	08:30	09:28 (WEA-5 E-160)	07:41		06:40	06:30	05:35	05:13			
	16:57	32	10:00 (WEA-5 E-160)	17:53		18:43	20:36	21:24	21:55		
20	08:29	09:28 (WEA-5 E-160)	07:39		06:38	06:28	05:34	05:13			
	16:59	32	10:00 (WEA-5 E-160)	17:55		18:45	20:37	21:26	21:55		
21	08:28	09:29 (WEA-5 E-160)	07:37		06:35	06:26	05:33	05:14			
	17:00	31	10:00 (WEA-5 E-160)	17:57		18:46	20:39	21:27	21:55		
22	08:27	09:29 (WEA-5 E-160)	07:35		06:33	06:24	05:31	05:14			
	17:02	32	10:01 (WEA-5 E-160)	17:59		18:48	20:41	21:29	21:56		
23	08:26	09:29 (WEA-5 E-160)	07:33		06:31	06:22	05:30	05:14			
	17:04	31	10:00 (WEA-5 E-160)	18:00		18:50	20:42	21:30	21:56		
24	08:25	09:30 (WEA-5 E-160)	07:31		06:29	06:20	05:29	05:14			
	17:06	30	10:00 (WEA-5 E-160)	18:02		18:51	20:44	21:31	21:56		
25	08:23	09:31 (WEA-5 E-160)	07:29		06:26	06:17	05:28	05:15			
	17:07	29	10:00 (WEA-5 E-160)	18:04		18:53	20:46	21:33	21:56		
26	08:22	09:32 (WEA-5 E-160)	07:27		06:24	06:15	05:26	05:15			
	17:09	27	09:59 (WEA-5 E-160)	18:06		18:55	20:47	21:34	21:56		
27	08:21	09:33 (WEA-5 E-160)	07:25		06:22	06:13	05:25	05:15			
	17:11	26	09:59 (WEA-5 E-160)	18:08		18:57	20:49	21:35	21:56		
28	08:19	09:34 (WEA-5 E-160)	07:23		06:19	06:11	05:24	05:16			
	17:13	24	09:58 (WEA-5 E-160)	18:10		18:58	20:51	21:37	21:56		
29	08:18	09:36 (WEA-5 E-160)			07:17	06:09	05:23	05:16			
	17:14	22	09:58 (WEA-5 E-160)		20:00	20:52	21:38	21:56			
30	08:17	09:37 (WEA-5 E-160)			07:15	06:08	05:22	05:17			
	17:16	19	09:56 (WEA-5 E-160)		20:02	20:54	21:39	21:55			
31	08:15	09:38 (WEA-5 E-160)			07:12		05:21				
	17:18	16	09:54 (WEA-5 E-160)		20:03		21:40				
Sonnenscheinstunden	259		278		367	416	485	498			
astr.max.mögl.Beschattung	884		10								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,56		0,56								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	82		1								

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP137/1 - IP137/1 Engelradingweg 6a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	09:12 (WEA-5 E-160)
11	05:26	06:10	07:00	07:49	07:43	09:10 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	16:50	08:29
12	05:27	06:11	07:01	07:51	07:45	09:23 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	16:48	09:10 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52	07:47	09:26 (WEA-5 E-160)
	21:48	21:02	19:54	18:46	16:47	09:09 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	09:28 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	09:07 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56	07:51	09:30 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	09:06 (WEA-5 E-160)
16	05:32	06:18	07:08	07:57	07:52	09:31 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	09:05 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59	07:54	09:32 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	09:04 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01	07:56	09:33 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	09:04 (WEA-5 E-160)
19	05:36	06:22	07:12	08:03	07:57	09:34 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	09:04 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04	07:59	09:35 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	09:04 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06	08:01	09:36 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	09:05 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08	08:02	09:36 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	09:04 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10	08:04	09:37 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	09:04 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11	08:06	09:37 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	09:05 (WEA-5 E-160)
25	05:44	06:32	07:22	07:13	08:07	09:37 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	09:05 (WEA-5 E-160)
26	05:45	06:34	07:24	07:15	08:09	09:38 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	09:05 (WEA-5 E-160)
27	05:46	06:35	07:26	07:17	08:10	09:37 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	09:06 (WEA-5 E-160)
28	05:48	06:37	07:27	07:18	08:12	09:38 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	09:06 (WEA-5 E-160)
29	05:49	06:39	07:29	07:20	08:13	09:38 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	09:06 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	09:39 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	09:07 (WEA-5 E-160)
31	05:52	06:42	07:32	07:24	08:16	09:39 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:26	09:07 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					589	769
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					63	53

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP137/2 - IP137/2 Engelradingweg 6b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:24 (WEA-5 E-160)	08:14	09:43 (WEA-5 E-160)	07:20	07:10	06:06	05:21			
	16:32	25	09:49 (WEA-5 E-160)	17:20	9	18:11	20:05	20:56	21:41		
2	08:40	09:24 (WEA-5 E-160)	08:12	09:52 (WEA-5 E-160)	07:18	07:08	06:04	05:20			
	16:33	26	09:50 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42			
3	08:40	09:25 (WEA-5 E-160)	08:11	09:25 (WEA-5 E-160)	07:16	07:06	06:02	05:19			
	16:34	26	09:51 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43			
4	08:40	09:25 (WEA-5 E-160)	08:09	09:25 (WEA-5 E-160)	07:14	07:03	06:00	05:18			
	16:36	27	09:52 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44			
5	08:40	09:25 (WEA-5 E-160)	08:07	09:25 (WEA-5 E-160)	07:12	07:01	05:58	05:18			
	16:37	28	09:53 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45			
6	08:39	09:25 (WEA-5 E-160)	08:06	09:25 (WEA-5 E-160)	07:10	06:59	05:56	05:17			
	16:38	29	09:54 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46			
7	08:39	09:25 (WEA-5 E-160)	08:04	09:25 (WEA-5 E-160)	07:07	06:56	05:55	05:16			
	16:39	29	09:54 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47			
8	08:38	09:26 (WEA-5 E-160)	08:02	09:26 (WEA-5 E-160)	07:05	06:54	05:53	05:16			
	16:41	29	09:55 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48			
9	08:38	09:26 (WEA-5 E-160)	08:00	09:26 (WEA-5 E-160)	07:03	06:52	05:51	05:15			
	16:42	30	09:56 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49			
10	08:37	09:25 (WEA-5 E-160)	07:59	09:25 (WEA-5 E-160)	07:01	06:50	05:49	05:15			
	16:43	31	09:56 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50			
11	08:37	09:25 (WEA-5 E-160)	07:57	09:25 (WEA-5 E-160)	06:58	06:48	05:48	05:14			
	16:45	31	09:56 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51			
12	08:36	09:26 (WEA-5 E-160)	07:55	09:26 (WEA-5 E-160)	06:56	06:45	05:46	05:14			
	16:46	32	09:58 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51			
13	08:36	09:26 (WEA-5 E-160)	07:53	09:26 (WEA-5 E-160)	06:54	06:43	05:44	05:14			
	16:48	32	09:58 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52			
14	08:35	09:27 (WEA-5 E-160)	07:51	09:27 (WEA-5 E-160)	06:52	06:41	05:43	05:14			
	16:49	31	09:58 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53			
15	08:34	09:27 (WEA-5 E-160)	07:49	09:27 (WEA-5 E-160)	06:49	06:39	05:41	05:13			
	16:51	32	09:59 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53			
16	08:33	09:27 (WEA-5 E-160)	07:47	09:27 (WEA-5 E-160)	06:47	06:37	05:40	05:13			
	16:52	32	09:59 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54			
17	08:32	09:28 (WEA-5 E-160)	07:45	09:28 (WEA-5 E-160)	06:45	06:34	05:38	05:13			
	16:54	32	10:00 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54			
18	08:31	09:28 (WEA-5 E-160)	07:43	09:28 (WEA-5 E-160)	06:42	06:32	05:37	05:13			
	16:55	32	10:00 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55			
19	08:30	09:29 (WEA-5 E-160)	07:41	09:29 (WEA-5 E-160)	06:40	06:30	05:35	05:13			
	16:57	32	10:01 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55			
20	08:29	09:28 (WEA-5 E-160)	07:39	09:28 (WEA-5 E-160)	06:38	06:28	05:34	05:13			
	16:59	32	10:00 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55			
21	08:28	09:29 (WEA-5 E-160)	07:37	09:29 (WEA-5 E-160)	06:35	06:26	05:33	05:14			
	17:00	31	10:00 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55			
22	08:27	09:30 (WEA-5 E-160)	07:35	09:30 (WEA-5 E-160)	06:33	06:24	05:31	05:14			
	17:02	31	10:01 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56			
23	08:26	09:30 (WEA-5 E-160)	07:33	09:30 (WEA-5 E-160)	06:31	06:22	05:30	05:14			
	17:04	30	10:00 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56			
24	08:25	09:31 (WEA-5 E-160)	07:31	09:31 (WEA-5 E-160)	06:29	06:20	05:29	05:14			
	17:06	29	10:00 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56			
25	08:23	09:32 (WEA-5 E-160)	07:29	09:32 (WEA-5 E-160)	06:26	06:17	05:28	05:15			
	17:07	28	10:00 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56			
26	08:22	09:32 (WEA-5 E-160)	07:27	09:32 (WEA-5 E-160)	06:24	06:15	05:26	05:15			
	17:09	27	09:59 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56			
27	08:21	09:34 (WEA-5 E-160)	07:25	09:34 (WEA-5 E-160)	06:22	06:13	05:25	05:15			
	17:11	25	09:59 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56			
28	08:19	09:34 (WEA-5 E-160)	07:23	09:34 (WEA-5 E-160)	06:19	06:11	05:24	05:16			
	17:13	24	09:58 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56			
29	08:18	09:36 (WEA-5 E-160)	07:21	09:36 (WEA-5 E-160)	07:17	06:09	05:23	05:16			
	17:14	22	09:58 (WEA-5 E-160)	18:12	19:06	20:52	21:38	21:56			
30	08:17	09:37 (WEA-5 E-160)	07:19	09:37 (WEA-5 E-160)	07:15	06:08	05:22	05:17			
	17:16	19	09:56 (WEA-5 E-160)	18:14	19:02	20:54	21:39	21:55			
31	08:15	09:39 (WEA-5 E-160)	07:17	09:39 (WEA-5 E-160)	07:12	06:05	05:21	05:15			
	17:18	15	09:54 (WEA-5 E-160)	18:16	19:03	20:56	21:40	21:55			
	Sonnenscheinstunden	259	278	367	416	485	498				
	astr.max.mögl.Beschattung	879	9	1	1	1	1				
	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,30	0,30	0,30				
	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84				
	Reduktion Windrichtung	0,56	0,56	0,56	0,56	0,56	0,56				
	Gesamte Reduktion	0,09	0,14	0,14	0,14	0,14	0,14				
	Met.wahrsch.Beschattung	81	1	1	1	1	1				

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP137/2 - IP137/2 Engelradingweg 6b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:18	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					579	777
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					62	54

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP138 - IP138 Engelradingweg 8

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:25 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	27 09:52 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2 08:40	09:25 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	28 09:53 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:26 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	27 09:53 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:26 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	29 09:55 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:26 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	29 09:55 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:26 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	30 09:56 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:26 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	30 09:56 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:27 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	30 09:57 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:27 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	30 09:57 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:27 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	31 09:58 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:27 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	31 09:58 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:28 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	31 09:59 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:28 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	32 10:00 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:28 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	32 10:00 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:29 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	31 10:00 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:29 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	32 10:01 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:29 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	32 10:01 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:30 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	31 10:01 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:31 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	31 10:02 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:30 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	31 10:01 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:31 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	30 10:01 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:32 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	30 10:02 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:32 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	29 10:01 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:33 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	28 10:01 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:34 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	27 10:01 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:35 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	25 10:00 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21	09:37 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	23 10:00 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28 08:19	09:37 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	21 09:58 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56
29 08:18	09:40 (WEA-5 E-160)	07:17	06:09	06:09	05:23	05:16
17:14	17 09:57 (WEA-5 E-160)	18:12	19:00	20:52	21:38	21:56
30 08:17	09:41 (WEA-5 E-160)	07:15	06:08	06:08	05:22	05:17
17:16	14 09:55 (WEA-5 E-160)	18:14	19:02	20:54	21:39	21:55
31 08:15	09:45 (WEA-5 E-160)	07:12	06:05	06:05	05:21	05:16
17:18	6 09:51 (WEA-5 E-160)	18:16	19:03	20:56	21:40	21:56
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	855					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	79					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP138 - IP138 Engelradingweg 8

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					537	822
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					58	57

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP139 - IP139 Engelradingweg 10

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
--	--------	---------	------	-------	-----	------

1	08:40	09:26 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	29 09:55 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2	08:40	09:27 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	29 09:56 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	09:27 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
	16:34	29 09:56 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	09:28 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	29 09:57 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	09:28 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	29 09:57 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	09:29 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	29 09:58 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7	08:39	09:28 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
	16:39	30 09:58 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	09:29 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	31 10:00 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	09:29 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	31 10:00 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10	08:37	09:29 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	31 10:00 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	09:29 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
	16:45	31 10:00 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	09:31 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	30 10:01 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	09:31 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	31 10:02 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14	08:35	09:31 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
	16:49	31 10:02 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34	09:32 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	30 10:02 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16	08:33	09:32 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
	16:52	30 10:02 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17	08:32	09:33 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
	16:54	30 10:03 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18	08:31	09:33 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
	16:55	30 10:03 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19	08:30	09:34 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
	16:57	29 10:03 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20	08:29	09:34 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
	16:59	28 10:02 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21	08:28	09:35 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
	17:00	27 10:02 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22	08:27	09:36 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
	17:02	26 10:02 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23	08:26	09:36 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
	17:04	25 10:01 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24	08:25	09:38 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
	17:06	23 10:01 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25	08:23	09:39 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
	17:07	21 10:00 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26	08:22	09:40 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
	17:09	19 09:59 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27	08:21	09:43 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
	17:11	15 09:58 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28	08:19	09:45 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
	17:13	10 09:55 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	763						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,56						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	71						

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP139 - IP139 Engelradingweg 10

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					435	869
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					47	60

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP139/1 - IP139/1 Engelradingweg 10a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:26 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	28 09:54 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2 08:40	09:26 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	29 09:55 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:27 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	29 09:56 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:28 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	29 09:57 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:27 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	30 09:57 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:28 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	30 09:58 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:28 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	30 09:58 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:29 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	30 09:59 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:29 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	30 09:59 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:29 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	30 09:59 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:29 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	31 10:00 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:30 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	31 10:01 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:30 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	31 10:01 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:30 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	31 10:01 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:31 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	31 10:02 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:31 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	31 10:02 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:32 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	30 10:02 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:32 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	30 10:02 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:33 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	30 10:03 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:33 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	29 10:02 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:34 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	28 10:02 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:35 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	27 10:02 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:35 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	26 10:01 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:37 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	24 10:01 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:38 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	23 10:01 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:39 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	20 09:59 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21	09:41 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	17 09:58 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28 08:19	09:43 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	13 09:56 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56
29 08:18	09:47 (WEA-5 E-160)		07:17	06:09	05:23	05:16
17:14	7 09:54 (WEA-5 E-160)		20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	785					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	73					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP139/1 - IP139/1 Engelradingweg 10a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	09:18 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	8 09:26 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	09:14 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	14 09:28 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	17 09:30 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	16:22
18	05:34	06:21	07:11	08:01	07:56	20 09:32 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	16:22
19	05:36	06:22	07:12	08:03	07:57	23 09:34 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	24 09:35 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	26 09:37 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	16:23
22	05:39	06:27	07:17	08:08	08:02	28 09:38 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	29 09:38 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	16:24
24	05:42	06:30	07:21	08:11	08:06	30 09:39 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	30 09:39 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	30 09:40 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	16:26
27	05:46	06:35	07:26	07:17	08:10	31 09:40 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	16:27
28	05:48	06:37	07:27	07:19	08:12	31 09:41 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	31 09:41 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	27 09:41 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	27 09:42 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					461	858
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					50	60

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP140 - IP140 Engeldringweg 12

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
--	--------	---------	------	-------	-----	------

1	08:40	09:27 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	29 09:56 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2	08:40	09:28 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	29 09:57 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	09:29 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
	16:34	29 09:58 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	09:29 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	30 09:59 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	09:29 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	30 09:59 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	09:30 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	30 10:00 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7	08:39	09:30 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
	16:39	30 10:00 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	09:31 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	30 10:01 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	09:31 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	30 10:01 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10	08:37	09:31 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	30 10:01 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	09:31 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
	16:45	30 10:01 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	09:32 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	30 10:02 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	09:32 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	31 10:03 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14	08:35	09:33 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
	16:49	30 10:03 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34	09:33 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	30 10:03 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16	08:33	09:34 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
	16:52	29 10:03 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17	08:32	09:34 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
	16:54	29 10:03 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18	08:31	09:35 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
	16:55	28 10:03 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19	08:30	09:36 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
	16:57	27 10:03 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20	08:29	09:36 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
	16:59	27 10:03 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21	08:28	09:37 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
	17:00	25 10:02 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22	08:27	09:38 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
	17:02	24 10:02 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23	08:26	09:39 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
	17:04	22 10:01 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24	08:25	09:41 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
	17:06	20 10:01 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25	08:23	09:43 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
	17:07	17 10:00 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26	08:22	09:44 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
	17:09	14 09:58 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27	08:21	09:47 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
	17:11	9 09:56 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28	08:19		07:23	06:19	06:11	05:24	05:16
	17:13		18:10	18:58	20:51	21:37	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	719						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,56						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	67						

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP140 - IP140 Engelradingweg 12

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					393	880
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					42	61

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP140/1 - IP140/1 Engelradingweg 12a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	09:27 (WEA-5 E-160)	08:14	07:20	07:10	06:06
	16:32	29 09:56 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	09:28 (WEA-5 E-160)	08:12	07:18	07:08	06:04
	16:33	29 09:57 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	09:28 (WEA-5 E-160)	08:11	07:16	07:06	06:02
	16:34	29 09:57 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	09:29 (WEA-5 E-160)	08:09	07:14	07:03	06:00
	16:36	29 09:58 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	09:29 (WEA-5 E-160)	08:07	07:12	07:01	05:58
	16:37	29 09:58 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	09:29 (WEA-5 E-160)	08:06	07:10	06:59	05:56
	16:38	30 09:59 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7	08:39	09:29 (WEA-5 E-160)	08:04	07:07	06:56	05:54
	16:39	30 09:59 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	09:30 (WEA-5 E-160)	08:02	07:05	06:54	05:53
	16:41	31 10:01 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	09:30 (WEA-5 E-160)	08:00	07:03	06:52	05:51
	16:42	31 10:01 (WEA-5 E-160)	17:35	18:26	20:19	21:09
10	08:37	09:30 (WEA-5 E-160)	07:59	07:01	06:50	05:49
	16:43	31 10:01 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11	08:37	09:30 (WEA-5 E-160)	07:57	06:58	06:48	05:48
	16:45	31 10:01 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	09:32 (WEA-5 E-160)	07:55	06:56	06:45	05:46
	16:46	30 10:02 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:36	09:32 (WEA-5 E-160)	07:53	06:54	06:43	05:44
	16:48	30 10:02 (WEA-5 E-160)	17:42	18:33	20:25	21:15
14	08:35	09:32 (WEA-5 E-160)	07:51	06:52	06:41	05:43
	16:49	31 10:03 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	09:33 (WEA-5 E-160)	07:49	06:49	06:39	05:41
	16:51	30 10:03 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	09:33 (WEA-5 E-160)	07:47	06:47	06:37	05:40
	16:52	30 10:03 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32	09:34 (WEA-5 E-160)	07:45	06:45	06:34	05:38
	16:54	29 10:03 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18	08:31	09:35 (WEA-5 E-160)	07:43	06:42	06:32	05:37
	16:55	28 10:03 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19	08:30	09:35 (WEA-5 E-160)	07:41	06:40	06:30	05:35
	16:57	28 10:03 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20	08:29	09:35 (WEA-5 E-160)	07:39	06:38	06:28	05:34
	16:59	27 10:02 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21	08:28	09:37 (WEA-5 E-160)	07:37	06:35	06:26	05:33
	17:00	25 10:02 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22	08:27	09:38 (WEA-5 E-160)	07:35	06:33	06:24	05:31
	17:02	24 10:02 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23	08:26	09:38 (WEA-5 E-160)	07:33	06:31	06:22	05:30
	17:04	23 10:01 (WEA-5 E-160)	18:00	18:50	20:42	21:30
24	08:25	09:40 (WEA-5 E-160)	07:31	06:29	06:20	05:29
	17:06	21 10:01 (WEA-5 E-160)	18:02	18:51	20:44	21:31
25	08:23	09:42 (WEA-5 E-160)	07:29	06:26	06:17	05:28
	17:07	18 10:00 (WEA-5 E-160)	18:04	18:53	20:46	21:33
26	08:22	09:43 (WEA-5 E-160)	07:27	06:24	06:15	05:26
	17:09	15 09:58 (WEA-5 E-160)	18:06	18:55	20:47	21:34
27	08:21	09:46 (WEA-5 E-160)	07:25	06:22	06:13	05:25
	17:11	11 09:57 (WEA-5 E-160)	18:08	18:57	20:49	21:35
28	08:19		07:23	06:19	06:11	05:24
	17:13		18:10	18:58	20:51	21:37
29	08:18			07:17	06:09	05:23
	17:14			20:00	20:52	21:38
30	08:17			07:15	06:08	05:22
	17:16			20:02	20:54	21:39
31	08:15			07:12		05:21
	17:18			20:03		21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	729					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	68					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP140/1 - IP140/1 Engelradingweg 12a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	09:13 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34	07:27	16:27 30 09:43 (WEA-5 E-160)
	21:55	21:22	20:20	19:10	17:05	08:18 09:13 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35	07:29	16:26 31 09:44 (WEA-5 E-160)
	21:55	21:20	20:17	19:08	17:03	08:19 09:13 (WEA-5 E-160)
4	05:20	05:59	06:48	07:37	07:31	16:25 31 09:44 (WEA-5 E-160)
	21:54	21:19	20:15	19:06	17:01	08:21 09:14 (WEA-5 E-160)
5	05:21	06:00	06:50	07:39	07:33	16:25 31 09:45 (WEA-5 E-160)
	21:54	21:17	20:13	19:03	17:00	08:22 09:14 (WEA-5 E-160)
6	05:21	06:02	06:51	07:40	07:35	16:24 31 09:45 (WEA-5 E-160)
	21:53	21:15	20:10	19:01	16:58	08:23 09:16 (WEA-5 E-160)
7	05:22	06:03	06:53	07:42	07:36	16:24 30 09:46 (WEA-5 E-160)
	21:53	21:13	20:08	18:59	16:56	08:24 09:16 (WEA-5 E-160)
8	05:23	06:05	06:55	07:44	07:38	16:23 29 09:45 (WEA-5 E-160)
	21:52	21:11	20:06	18:57	16:54	08:26 09:16 (WEA-5 E-160)
9	05:24	06:06	06:56	07:46	07:40	16:23 30 09:46 (WEA-5 E-160)
	21:51	21:10	20:04	18:54	16:53	08:27 09:16 (WEA-5 E-160)
10	05:25	06:08	06:58	07:47	07:42	16:23 30 09:46 (WEA-5 E-160)
	21:51	21:08	20:01	18:52	16:51	08:28 09:18 (WEA-5 E-160)
11	05:26	06:10	07:00	07:49	07:43	16:23 29 09:47 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	16:50	08:29 09:18 (WEA-5 E-160)
12	05:27	06:11	07:01	07:51	07:45	16:22 29 09:47 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	16:48	08:30 09:19 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52	07:47	16:22 28 09:47 (WEA-5 E-160)
	21:48	21:02	19:54	18:46	16:47	08:31 09:19 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	16:22 28 09:47 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	08:32 09:20 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56	07:51	16:22 28 09:48 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	08:33 09:21 (WEA-5 E-160)
16	05:32	06:18	07:08	07:57	07:52	16:22 27 09:48 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	08:34 09:20 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59	07:54	16:22 28 09:48 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	08:35 09:21 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01	07:56	16:23 27 09:48 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	08:35 09:22 (WEA-5 E-160)
19	05:36	06:22	07:12	08:03	07:57	16:23 27 09:49 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	08:36 09:23 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04	07:59	16:23 27 09:50 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	08:37 09:23 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06	08:01	16:23 27 09:50 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	08:37 09:23 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08	08:02	16:24 27 09:50 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	08:38 09:23 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10	08:04	16:24 27 09:50 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	08:38 09:25 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11	08:06	16:25 27 09:52 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	08:39 09:25 (WEA-5 E-160)
25	05:44	06:32	07:22	07:13	08:07	16:25 27 09:52 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	08:39 09:25 (WEA-5 E-160)
26	05:45	06:34	07:24	07:15	08:09	16:26 27 09:52 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	08:39 09:26 (WEA-5 E-160)
27	05:46	06:35	07:26	07:17	08:10	16:27 27 09:53 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	08:40 09:26 (WEA-5 E-160)
28	05:48	06:37	07:27	07:19	08:12	16:28 28 09:54 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	08:40 09:26 (WEA-5 E-160)
29	05:49	06:39	07:29	07:20	08:13	16:28 28 09:54 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	08:40 09:27 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	16:29 28 09:55 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	08:40 09:27 (WEA-5 E-160)
31	05:52	06:42	07:32	07:24	08:16	16:30 28 09:55 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:26	08:40 09:28 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267	16:31 28 09:56 (WEA-5 E-160)
astr.max.mögl.Beschattung					399	244
Red.Sonnenscheinwahrsch.					0,23	880
Reduktion Betriebsdauer					0,84	0,15
Reduktion Windrichtung					0,56	0,84
Gesamte Reduktion					0,11	0,56
Met.wahrsch.Beschattung					43	0,07
						61

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP141 - IP141 Engeldringweg 14

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:28 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	29 09:57 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2 08:40	09:29 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	29 09:58 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:30 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	29 09:59 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:30 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	30 10:00 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:30 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	30 10:00 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:31 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	30 10:01 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:31 (WEA-5 E-160)	08:04	07:07	06:56	05:54	05:16
16:39	30 10:01 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:32 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	30 10:02 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:32 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	30 10:02 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:32 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	30 10:02 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:32 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	30 10:02 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:33 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	30 10:03 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:34 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	29 10:03 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:34 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	29 10:03 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:35 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	28 10:03 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:35 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	29 10:04 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:36 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	28 10:04 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:37 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	27 10:04 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:38 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	26 10:04 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:38 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	25 10:03 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:39 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	23 10:02 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:41 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	21 10:02 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:41 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	20 10:01 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:43 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	17 10:00 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:46 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	13 09:59 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:48 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	8 09:56 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21		07:25	06:22	06:13	05:25	05:15
17:11		18:08	18:57	20:49	21:35	21:56
28 08:19		07:23	06:19	06:11	05:24	05:16
17:13		18:10	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	680					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	63					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP141 - IP141 Engleradingweg 14

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					354	888
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					38	62

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP142 - IP142 Engelradingweg 16

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	09:29 (WEA-5 E-160)	08:14	07:20	07:10	06:06
	16:32	29 09:58 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	09:30 (WEA-5 E-160)	08:12	07:18	07:08	06:04
	16:33	29 09:59 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	09:31 (WEA-5 E-160)	08:11	07:16	07:06	06:02
	16:34	29 10:00 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	09:31 (WEA-5 E-160)	08:09	07:14	07:03	06:00
	16:36	30 10:01 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	09:31 (WEA-5 E-160)	08:07	07:12	07:01	05:58
	16:37	30 10:01 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	09:32 (WEA-5 E-160)	08:06	07:10	06:59	05:56
	16:38	30 10:02 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7	08:39	09:32 (WEA-5 E-160)	08:04	07:07	06:56	05:54
	16:39	30 10:02 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	09:33 (WEA-5 E-160)	08:02	07:05	06:54	05:53
	16:41	30 10:03 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	09:33 (WEA-5 E-160)	08:00	07:03	06:52	05:51
	16:42	30 10:03 (WEA-5 E-160)	17:35	18:26	20:19	21:09
10	08:37	09:33 (WEA-5 E-160)	07:59	07:01	06:50	05:49
	16:43	30 10:03 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11	08:37	09:33 (WEA-5 E-160)	07:57	06:58	06:48	05:48
	16:45	30 10:03 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	09:35 (WEA-5 E-160)	07:55	06:56	06:45	05:46
	16:46	29 10:04 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:36	09:35 (WEA-5 E-160)	07:53	06:54	06:43	05:44
	16:48	29 10:04 (WEA-5 E-160)	17:42	18:33	20:25	21:15
14	08:35	09:36 (WEA-5 E-160)	07:51	06:52	06:41	05:43
	16:49	28 10:04 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	09:36 (WEA-5 E-160)	07:49	06:49	06:39	05:41
	16:51	28 10:04 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	09:37 (WEA-5 E-160)	07:47	06:47	06:37	05:40
	16:52	27 10:04 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32	09:38 (WEA-5 E-160)	07:45	06:45	06:34	05:38
	16:54	26 10:04 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18	08:31	09:39 (WEA-5 E-160)	07:43	06:42	06:32	05:37
	16:55	25 10:04 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19	08:30	09:40 (WEA-5 E-160)	07:41	06:40	06:30	05:35
	16:57	24 10:04 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20	08:29	09:40 (WEA-5 E-160)	07:39	06:38	06:28	05:34
	16:59	23 10:03 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21	08:28	09:41 (WEA-5 E-160)	07:37	06:35	06:26	05:33
	17:00	21 10:02 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22	08:27	09:43 (WEA-5 E-160)	07:35	06:33	06:24	05:31
	17:02	19 10:02 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23	08:26	09:44 (WEA-5 E-160)	07:33	06:31	06:22	05:30
	17:04	16 10:00 (WEA-5 E-160)	18:00	18:50	20:42	21:30
24	08:25	09:46 (WEA-5 E-160)	07:31	06:29	06:20	05:29
	17:06	13 09:59 (WEA-5 E-160)	18:02	18:51	20:44	21:31
25	08:23	09:50 (WEA-5 E-160)	07:29	06:26	06:17	05:28
	17:07	6 09:56 (WEA-5 E-160)	18:04	18:53	20:46	21:33
26	08:22		07:27	06:24	06:15	05:26
	17:09		18:06	18:55	20:47	21:34
27	08:21		07:25	06:22	06:13	05:25
	17:11		18:08	18:57	20:49	21:35
28	08:19		07:23	06:19	06:11	05:24
	17:13		18:10	18:58	20:51	21:37
29	08:18			07:17	06:09	05:23
	17:14			20:00	20:52	21:38
30	08:17			07:15	06:08	05:22
	17:16			20:02	20:54	21:39
31	08:15			07:12		05:21
	17:18			20:03		21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	641					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	60					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP142 - IP142 Engelradingweg 16

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	09:16 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34	07:27	16:27 29 09:45 (WEA-5 E-160)
	21:55	21:22	20:20	19:10	17:05	08:18 09:16 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35	07:29	16:26 30 09:46 (WEA-5 E-160)
	21:55	21:20	20:17	19:08	17:03	08:19 09:16 (WEA-5 E-160)
4	05:20	05:59	06:48	07:37	07:31	16:25 30 09:46 (WEA-5 E-160)
	21:54	21:19	20:15	19:06	17:01	08:21 09:17 (WEA-5 E-160)
5	05:21	06:00	06:50	07:39	07:33	16:25 30 09:47 (WEA-5 E-160)
	21:54	21:17	20:13	19:03	17:00	08:22 09:17 (WEA-5 E-160)
6	05:21	06:02	06:51	07:40	07:35	16:24 30 09:47 (WEA-5 E-160)
	21:53	21:15	20:10	19:01	16:58	08:23 09:18 (WEA-5 E-160)
7	05:22	06:03	06:53	07:42	07:36	16:24 30 09:48 (WEA-5 E-160)
	21:53	21:13	20:08	18:59	16:56	08:24 09:18 (WEA-5 E-160)
8	05:23	06:05	06:55	07:44	07:38	16:23 30 09:48 (WEA-5 E-160)
	21:52	21:11	20:06	18:57	16:54	08:26 09:18 (WEA-5 E-160)
9	05:24	06:06	06:56	07:46	07:40	16:23 30 09:48 (WEA-5 E-160)
	21:51	21:10	20:04	18:54	16:53	08:27 09:19 (WEA-5 E-160)
10	05:25	06:08	06:58	07:47	07:42	16:23 29 09:48 (WEA-5 E-160)
	21:51	21:08	20:01	18:52	16:51	08:28 09:20 (WEA-5 E-160)
11	05:26	06:10	07:00	07:49	07:43	16:23 29 09:49 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	16:50	08:29 09:20 (WEA-5 E-160)
12	05:27	06:11	07:01	07:51	07:45	16:22 29 09:49 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	16:48	08:30 09:21 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52	07:47	16:22 29 09:50 (WEA-5 E-160)
	21:48	21:02	19:54	18:46	16:47	08:31 09:21 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	16:22 29 09:50 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	08:32 09:22 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56	07:51	16:22 29 09:51 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	08:33 09:23 (WEA-5 E-160)
16	05:32	06:18	07:08	07:57	07:52	16:22 28 09:51 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	08:34 09:22 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59	07:54	16:22 29 09:51 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	08:35 09:23 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01	07:56	6 09:23 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	16:23 28 09:51 (WEA-5 E-160)
19	05:36	06:22	07:12	08:03	07:57	13 09:20 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	16:23 28 09:24 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04	07:59	16 09:33 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	19 09:19 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06	08:01	16 09:18 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	19 09:37 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08	08:02	21 09:17 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	21 09:38 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10	08:04	23 09:16 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	21 09:39 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11	08:06	24 09:16 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	25 09:41 (WEA-5 E-160)
25	05:44	06:32	07:22	07:13	08:07	25 09:16 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	26 09:42 (WEA-5 E-160)
26	05:45	06:34	07:24	07:15	08:09	26 09:15 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	27 09:42 (WEA-5 E-160)
27	05:46	06:35	07:26	07:17	08:10	27 09:15 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	28 09:42 (WEA-5 E-160)
28	05:48	06:37	07:27	07:19	08:12	28 09:16 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	28 09:43 (WEA-5 E-160)
29	05:49	06:39	07:29	07:20	08:13	28 09:16 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	29 09:44 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	29 09:15 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	29 09:45 (WEA-5 E-160)
31	05:52	06:42	07:32	07:24	08:16	16:30 29 09:58 (WEA-5 E-160)
	21:25	20:24	19:09	17:09	16:27	08:40 09:30 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267	16:31 29 09:59 (WEA-5 E-160)
astr.max.mögl.Beschattung					314	244
Red.Sonnenscheinwahrsch.					0,23	893
Reduktion Betriebsdauer					0,84	0,15
Reduktion Windrichtung					0,56	0,84
Gesamte Reduktion					0,11	0,56
Met.wahrsch.Beschattung					34	0,07
						62

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP143 - IP143 Engelradingweg 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
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1	08:40	09:26 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
	16:32	28 09:54 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
2	08:40	09:26 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
	16:33	28 09:54 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3	08:40	09:27 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
	16:34	28 09:55 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4	08:40	09:28 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
	16:36	28 09:56 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5	08:40	09:27 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
	16:37	29 09:56 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6	08:39	09:28 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
	16:38	29 09:57 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7	08:39	09:28 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
	16:39	29 09:57 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8	08:38	09:29 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
	16:41	29 09:58 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9	08:38	09:29 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
	16:42	29 09:58 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10	08:37	09:29 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
	16:43	30 09:59 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11	08:37	09:29 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
	16:45	30 09:59 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12	08:36	09:30 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
	16:46	30 10:00 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13	08:36	09:31 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
	16:48	29 10:00 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14	08:35	09:31 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
	16:49	29 10:00 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15	08:34	09:32 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
	16:51	28 10:00 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16	08:33	09:32 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
	16:52	29 10:01 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17	08:32	09:33 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
	16:54	28 10:01 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18	08:31	09:34 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
	16:55	27 10:01 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19	08:30	09:34 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
	16:57	27 10:01 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20	08:29	09:34 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
	16:59	26 10:00 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21	08:28	09:36 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
	17:00	24 10:00 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22	08:27	09:37 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
	17:02	23 10:00 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23	08:26	09:37 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
	17:04	21 09:58 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24	08:25	09:39 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
	17:06	19 09:58 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25	08:23	09:41 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
	17:07	16 09:57 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26	08:22	09:43 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
	17:09	12 09:55 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27	08:21	09:47 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
	17:11	5 09:52 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28	08:19		07:23	06:19	06:11	05:24	05:16
	17:13		18:10	18:58	20:51	21:37	21:56
29	08:18			07:17	06:09	05:23	05:16
	17:14			20:00	20:52	21:38	21:56
30	08:17			07:15	06:08	05:22	05:17
	17:16			20:02	20:54	21:39	21:55
31	08:15			07:12		05:21	
	17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498	
astr.max.mögl.Beschattung	690						
Red.Sonnenscheinwahrsch.	0,20						
Reduktion Betriebsdauer	0,84						
Reduktion Windrichtung	0,56						
Gesamte Reduktion	0,09						
Met.wahrsch.Beschattung	64						

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

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

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP143 - IP143 Engelradingweg 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	08:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	08:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	08:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	08:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	08:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	08:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	08:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					374	855
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					40	60

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP145 - IP145 Engelradingweg 19

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	09:27 (WEA-5 E-160)	08:14	07:20	07:10	06:06
	16:32	28 09:55 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2	08:40	09:28 (WEA-5 E-160)	08:12	07:18	07:08	06:04
	16:33	28 09:56 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3	08:40	09:28 (WEA-5 E-160)	08:11	07:16	07:06	06:02
	16:34	29 09:57 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4	08:40	09:29 (WEA-5 E-160)	08:09	07:14	07:03	06:00
	16:36	29 09:58 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5	08:40	09:29 (WEA-5 E-160)	08:07	07:12	07:01	05:58
	16:37	29 09:58 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6	08:39	09:30 (WEA-5 E-160)	08:06	07:10	06:59	05:56
	16:38	29 09:59 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7	08:39	09:30 (WEA-5 E-160)	08:04	07:07	06:56	05:55
	16:39	29 09:59 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8	08:38	09:31 (WEA-5 E-160)	08:02	07:05	06:54	05:53
	16:41	29 10:00 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9	08:38	09:31 (WEA-5 E-160)	08:00	07:03	06:52	05:51
	16:42	29 10:00 (WEA-5 E-160)	17:35	18:26	20:19	21:09
10	08:37	09:31 (WEA-5 E-160)	07:59	07:01	06:50	05:49
	16:43	29 10:00 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11	08:37	09:31 (WEA-5 E-160)	07:57	06:58	06:48	05:48
	16:45	29 10:00 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12	08:36	09:32 (WEA-5 E-160)	07:55	06:56	06:45	05:46
	16:46	29 10:01 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13	08:36	09:33 (WEA-5 E-160)	07:53	06:54	06:43	05:44
	16:48	28 10:01 (WEA-5 E-160)	17:42	18:33	20:25	21:15
14	08:35	09:33 (WEA-5 E-160)	07:51	06:52	06:41	05:43
	16:49	28 10:01 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15	08:34	09:34 (WEA-5 E-160)	07:49	06:49	06:39	05:41
	16:51	27 10:01 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16	08:33	09:34 (WEA-5 E-160)	07:47	06:47	06:37	05:40
	16:52	27 10:01 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17	08:32	09:35 (WEA-5 E-160)	07:45	06:45	06:34	05:38
	16:54	26 10:01 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18	08:31	09:36 (WEA-5 E-160)	07:43	06:42	06:32	05:37
	16:55	25 10:01 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19	08:30	09:37 (WEA-5 E-160)	07:41	06:40	06:30	05:35
	16:57	24 10:01 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20	08:29	09:37 (WEA-5 E-160)	07:39	06:38	06:28	05:34
	16:59	23 10:00 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21	08:28	09:39 (WEA-5 E-160)	07:37	06:35	06:26	05:33
	17:00	21 10:00 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22	08:27	09:40 (WEA-5 E-160)	07:35	06:33	06:24	05:31
	17:02	19 09:59 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23	08:26	09:41 (WEA-5 E-160)	07:33	06:31	06:22	05:30
	17:04	17 09:58 (WEA-5 E-160)	18:00	18:50	20:42	21:30
24	08:25	09:43 (WEA-5 E-160)	07:31	06:29	06:20	05:29
	17:06	14 09:57 (WEA-5 E-160)	18:02	18:51	20:44	21:31
25	08:23	09:46 (WEA-5 E-160)	07:29	06:26	06:17	05:28
	17:07	9 09:55 (WEA-5 E-160)	18:04	18:53	20:46	21:33
26	08:22		07:27	06:24	06:15	05:26
	17:09		18:06	18:55	20:47	21:34
27	08:21		07:25	06:22	06:13	05:25
	17:11		18:08	18:57	20:49	21:35
28	08:19		07:23	06:19	06:11	05:24
	17:13		18:10	18:58	20:51	21:37
29	08:18			07:17	06:09	05:23
	17:14			20:00	20:52	21:38
30	08:17			07:15	06:08	05:22
	17:16			20:02	20:54	21:39
31	08:15			07:12		05:21
	17:18			20:03		21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	634					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	59					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP145 - IP145 Engelradingweg 19

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:44	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:22
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					317	864
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					34	60

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP147 - IP147 Schulstr. 2a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:18 (WEA-5 E-160)	08:14	09:34 (WEA-5 E-160)	07:20	07:10	06:06	05:21			
	16:32	18	09:36 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41			
2	08:40	09:18 (WEA-5 E-160)	08:12	09:42 (WEA-5 E-160)	07:18	07:08	06:04	05:20			
	16:33	19	09:37 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42			
3	08:40	09:18 (WEA-5 E-160)	08:11	09:18 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19		
	16:34	21	09:39 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43			
4	08:40	09:18 (WEA-5 E-160)	08:09	09:18 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18		
	16:36	22	09:40 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44			
5	08:40	09:18 (WEA-5 E-160)	08:07	09:18 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18		
	16:37	22	09:40 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45			
6	08:39	09:18 (WEA-5 E-160)	08:06	09:18 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17		
	16:38	23	09:41 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46			
7	08:39	09:18 (WEA-5 E-160)	08:04	09:18 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16		
	16:39	24	09:42 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47			
8	08:38	09:19 (WEA-5 E-160)	08:02	09:19 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16		
	16:41	24	09:43 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48			
9	08:38	09:18 (WEA-5 E-160)	08:00	09:18 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15		
	16:42	26	09:44 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49			
10	08:37	09:18 (WEA-5 E-160)	07:59	09:18 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15		
	16:43	26	09:44 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50			
11	08:37	09:18 (WEA-5 E-160)	07:57	09:18 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14		
	16:45	27	09:45 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51			
12	08:36	09:19 (WEA-5 E-160)	07:55	09:19 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14		
	16:46	27	09:46 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51			
13	08:36	09:19 (WEA-5 E-160)	07:53	09:19 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14		
	16:48	28	09:47 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52			
14	08:35	09:19 (WEA-5 E-160)	07:51	09:19 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14		
	16:49	28	09:47 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53			
15	08:34	09:19 (WEA-5 E-160)	07:49	09:19 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13		
	16:51	29	09:48 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53			
16	08:33	09:19 (WEA-5 E-160)	07:47	09:19 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13		
	16:52	29	09:48 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54			
17	08:32	09:19 (WEA-5 E-160)	07:45	09:19 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13		
	16:54	30	09:49 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54			
18	08:31	09:20 (WEA-5 E-160)	07:43	09:20 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13		
	16:55	29	09:49 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55			
19	08:30	09:20 (WEA-5 E-160)	07:41	09:20 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13		
	16:57	30	09:50 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55			
20	08:29	09:20 (WEA-5 E-160)	07:39	09:20 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13		
	16:59	29	09:49 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55			
21	08:28	09:21 (WEA-5 E-160)	07:37	09:21 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14		
	17:00	28	09:49 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55			
22	08:27	09:21 (WEA-5 E-160)	07:35	09:21 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14		
	17:02	29	09:50 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56			
23	08:26	09:21 (WEA-5 E-160)	07:33	09:21 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14		
	17:04	28	09:49 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56			
24	08:25	09:22 (WEA-5 E-160)	07:31	09:22 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14		
	17:06	28	09:50 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56			
25	08:23	09:23 (WEA-5 E-160)	07:29	09:23 (WEA-5 E-160)	07:29	06:26	06:18	05:28	05:15		
	17:07	27	09:50 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56			
26	08:22	09:23 (WEA-5 E-160)	07:27	09:23 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15		
	17:09	26	09:49 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56			
27	08:21	09:25 (WEA-5 E-160)	07:25	09:25 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15		
	17:11	24	09:49 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56			
28	08:19	09:25 (WEA-5 E-160)	07:23	09:25 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16		
	17:13	23	09:48 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56			
29	08:18	09:27 (WEA-5 E-160)	07:21	09:27 (WEA-5 E-160)	07:21	07:17	06:09	05:23	05:16		
	17:14	20	09:47 (WEA-5 E-160)	18:12	19:00	20:52	21:38	21:56			
30	08:17	09:28 (WEA-5 E-160)	07:19	09:28 (WEA-5 E-160)	07:19	07:15	06:08	05:22	05:17		
	17:16	18	09:46 (WEA-5 E-160)	18:14	19:02	20:54	21:39	21:55			
31	08:15	09:30 (WEA-5 E-160)	07:17	09:30 (WEA-5 E-160)	07:17	07:12	06:05	05:21			
	17:18	14	09:44 (WEA-5 E-160)	18:16	19:03	20:54	21:39	21:55			
	Sonnenscheinstunden	259	278	367	416	485	498				
	astr.max.mögl.Beschattung	776	8	8	8	8	8				
	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,30	0,30	0,30				
	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84	0,84	0,84				
	Reduktion Windrichtung	0,56	0,56	0,56	0,56	0,56	0,56				
	Gesamte Reduktion	0,09	0,14	0,14	0,14	0,14	0,14				
	Met.wahrsch.Beschattung	71	1	1	1	1	1				

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP147 - IP147 Schulstr. 2a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	07:32 19:13	07:26 17:07	08:16 16:27
2	05:18 21:55	05:55 21:22	06:45 20:20	07:34 19:10	07:27 17:05	08:18 16:26
3	05:19 21:55	05:57 21:20	06:47 20:17	07:35 19:08	07:29 17:03	08:19 16:25
4	05:20 21:54	05:59 21:19	06:48 20:15	07:37 19:06	07:31 17:01	08:21 16:25
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	07:33 17:00	08:22 16:24
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	07:35 16:58	08:23 16:24
7	05:22 21:53	06:03 21:13	06:53 20:08	07:42 18:59	07:36 16:56	08:24 16:23
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57	07:38 16:54	08:26 16:23
9	05:24 21:51	06:06 21:10	06:56 20:04	07:46 18:54	07:40 16:53	08:27 16:23
10	05:25 21:51	06:08 21:08	06:58 20:01	07:47 18:52	07:42 16:51	08:28 16:23
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50	07:44 16:50	08:29 16:22
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48	07:45 16:48	08:30 16:22
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:46	07:47 16:47	08:31 16:22
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43	07:49 16:45	08:32 16:22
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41	07:51 16:44	08:33 16:22
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39	07:52 16:42	08:34 16:22
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37	07:54 16:41	08:35 16:23
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35	07:56 16:40	08:35 16:23
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33	07:57 16:38	08:36 16:23
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30	07:59 16:37	08:37 16:23
21	05:38 21:39	06:26 20:46	07:16 19:36	08:06 18:28	08:01 16:36	08:37 16:24
22	05:39 21:38	06:27 20:44	07:17 19:33	08:08 18:26	08:02 16:35	08:38 16:24
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24	08:04 16:34	08:38 16:25
24	05:42 21:36	06:30 20:39	07:21 19:29	08:11 18:22	08:06 16:33	08:39 16:25
25	05:44 21:34	06:32 20:37	07:22 19:26	08:13 18:20	08:07 16:32	08:39 16:26
26	05:45 21:33	06:34 20:35	07:24 19:24	08:15 18:18	08:09 16:31	08:39 16:27
27	05:47 21:31	06:35 20:33	07:26 19:22	08:17 18:16	08:10 16:30	08:40 16:28
28	05:48 21:30	06:37 20:31	07:27 19:19	08:19 18:14	08:12 16:29	08:40 16:28
29	05:49 21:28	06:39 20:28	07:29 19:17	08:20 18:12	08:13 16:28	08:40 16:29
30	05:51 21:27	06:40 20:26	07:30 19:15	08:22 18:10	08:15 16:27	08:40 16:30
31	05:52 21:25	06:42 20:24	07:32 19:13	08:24 18:09	08:17 16:26	08:40 16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					532	550
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					57	38

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP148 - IP148 Schulstr. 2b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:19 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	22	09:41 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	09:19 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	23	09:42 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	09:19 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	24	09:43 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	09:20 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	24	09:44 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	09:20 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	24	09:44 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	09:20 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	25	09:45 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	09:20 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	25	09:45 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	09:20 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	27	09:47 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	09:20 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	27	09:47 (WEA-5 E-160)	17:35	18:26	20:19	21:09
10 08:37	09:20 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	27	09:47 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	09:20 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	28	09:48 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	09:21 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	28	09:49 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	09:21 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	29	09:50 (WEA-5 E-160)	17:42	18:33	20:25	21:15
14 08:35	09:21 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	29	09:50 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34	09:22 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	28	09:50 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16 08:33	09:22 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	29	09:51 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17 08:32	09:22 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	29	09:51 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18 08:31	09:23 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	29	09:52 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19 08:30	09:23 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	29	09:52 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20 08:29	09:23 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	28	09:51 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21 08:28	09:24 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	28	09:52 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22 08:27	09:25 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	27	09:52 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23 08:26	09:25 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	26	09:51 (WEA-5 E-160)	18:00	18:50	20:42	21:30
24 08:25	09:26 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	25	09:51 (WEA-5 E-160)	18:02	18:51	20:44	21:31
25 08:23	09:27 (WEA-5 E-160)	07:29	06:26	06:18	05:28	05:15
17:07	24	09:51 (WEA-5 E-160)	18:04	18:53	20:46	21:33
26 08:22	09:27 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	23	09:50 (WEA-5 E-160)	18:06	18:55	20:47	21:34
27 08:21	09:29 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	21	09:50 (WEA-5 E-160)	18:08	18:57	20:49	21:35
28 08:19	09:30 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	19	09:49 (WEA-5 E-160)	18:10	18:58	20:51	21:37
29 08:18	09:32 (WEA-5 E-160)	07:17	06:09	06:09	05:23	05:16
17:14	16	09:48 (WEA-5 E-160)	18:12	19:00	20:52	21:38
30 08:17	09:34 (WEA-5 E-160)	07:15	06:08	06:08	05:22	05:17
17:16	11	09:45 (WEA-5 E-160)	18:14	19:02	20:54	21:39
31 08:15			07:12	06:05	05:21	
17:18			20:03	20:51	21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	754					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	69					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP148 - IP148 Schulstr. 2b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:44	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:47	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					479	663
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					51	46

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP149 - IP149 Schulstr. 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:20 (WEA-5 E-160)	08:14	07:21	07:10	06:06	05:21
16:32	24	09:44 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	09:20 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	25	09:45 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	09:21 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	25	09:46 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	09:21 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	26	09:47 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	09:21 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	26	09:47 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	09:22 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	26	09:48 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	09:22 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	26	09:48 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	09:22 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	27	09:49 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	09:22 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	28	09:50 (WEA-5 E-160)	17:35	18:26	20:19	21:09
10 08:37	09:22 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	28	09:50 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	09:22 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	28	09:50 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	09:23 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	28	09:51 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	09:24 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	28	09:52 (WEA-5 E-160)	17:42	18:33	20:25	21:15
14 08:35	09:24 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	28	09:52 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34	09:24 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	28	09:52 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16 08:33	09:25 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	27	09:52 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17 08:32	09:25 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	28	09:53 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18 08:31	09:26 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	27	09:53 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19 08:30	09:27 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	26	09:53 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20 08:29	09:27 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	25	09:52 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21 08:28	09:28 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	24	09:52 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22 08:27	09:29 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	23	09:52 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23 08:26	09:29 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	22	09:51 (WEA-5 E-160)	18:00	18:50	20:42	21:30
24 08:25	09:30 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	21	09:51 (WEA-5 E-160)	18:02	18:51	20:44	21:31
25 08:23	09:32 (WEA-5 E-160)	07:29	06:26	06:18	05:28	05:15
17:07	19	09:51 (WEA-5 E-160)	18:04	18:53	20:46	21:33
26 08:22	09:33 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	16	09:49 (WEA-5 E-160)	18:06	18:55	20:47	21:34
27 08:21	09:36 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	12	09:48 (WEA-5 E-160)	18:08	18:57	20:49	21:35
28 08:20	09:38 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	7	09:45 (WEA-5 E-160)	18:10	18:58	20:51	21:37
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12	05:21		
17:18			20:03	21:40		
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	678					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	62					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP149 - IP149 Schulstr. 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	09:04 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34	07:27	16:27 28 09:32 (WEA-5 E-160)
	21:55	21:22	20:20	19:10	17:05	08:18 09:05 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35	07:29	16:26 28 09:33 (WEA-5 E-160)
	21:55	21:20	20:17	19:08	17:03	08:19 09:05 (WEA-5 E-160)
4	05:20	05:59	06:48	07:37	07:31	16:25 28 09:33 (WEA-5 E-160)
	21:54	21:19	20:15	19:06	17:01	08:21 09:06 (WEA-5 E-160)
5	05:21	06:00	06:50	07:39	07:33	16:25 27 09:33 (WEA-5 E-160)
	21:54	21:17	20:13	19:03	17:00	08:22 09:07 (WEA-5 E-160)
6	05:21	06:02	06:51	07:40	07:35	16:24 26 09:33 (WEA-5 E-160)
	21:53	21:15	20:10	19:01	16:58	08:23 09:08 (WEA-5 E-160)
7	05:22	06:03	06:53	07:42	07:36	16:24 26 09:34 (WEA-5 E-160)
	21:53	21:13	20:08	18:59	16:56	08:24 09:08 (WEA-5 E-160)
8	05:23	06:05	06:55	07:44	07:38	16:23 26 09:34 (WEA-5 E-160)
	21:52	21:11	20:06	18:57	16:54	08:26 09:08 (WEA-5 E-160)
9	05:24	06:06	06:56	07:46	07:40	16:23 26 09:34 (WEA-5 E-160)
	21:51	21:10	20:04	18:54	16:53	08:27 09:09 (WEA-5 E-160)
10	05:25	06:08	06:58	07:47	07:42	16:23 25 09:34 (WEA-5 E-160)
	21:51	21:08	20:01	18:52	16:51	08:28 09:10 (WEA-5 E-160)
11	05:26	06:10	07:00	07:49	07:44	16:23 25 09:35 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	16:50	08:29 09:11 (WEA-5 E-160)
12	05:27	06:11	07:01	07:51	07:45	16:22 24 09:35 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	16:48	08:30 09:11 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52	07:47	16:22 24 09:35 (WEA-5 E-160)
	21:48	21:02	19:54	18:46	16:47	08:31 09:12 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	16:22 24 09:36 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	08:32 09:13 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56	07:51	7 09:11 (WEA-5 E-160) 08:32 09:13 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	09:18 (WEA-5 E-160) 16:22 23 09:36 (WEA-5 E-160)
16	05:32	06:18	07:08	07:57	07:52	13 09:07 (WEA-5 E-160) 08:33 09:13 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	09:20 (WEA-5 E-160) 16:22 23 09:36 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59	07:54	16 09:06 (WEA-5 E-160) 08:34 09:13 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	16 09:22 (WEA-5 E-160) 16:22 23 09:36 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01	07:56	19 09:05 (WEA-5 E-160) 08:35 09:14 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	19 09:24 (WEA-5 E-160) 16:23 22 09:36 (WEA-5 E-160)
19	05:36	06:22	07:12	08:03	07:57	21 09:04 (WEA-5 E-160) 08:35 09:15 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	21 09:25 (WEA-5 E-160) 16:23 22 09:37 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04	07:59	22 09:04 (WEA-5 E-160) 08:36 09:16 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	22 09:26 (WEA-5 E-160) 16:23 22 09:38 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06	08:01	23 09:04 (WEA-5 E-160) 08:37 09:16 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	23 09:27 (WEA-5 E-160) 16:23 21 09:37 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08	08:02	24 09:04 (WEA-5 E-160) 08:37 09:17 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	24 09:28 (WEA-5 E-160) 16:24 21 09:38 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10	08:04	25 09:03 (WEA-5 E-160) 08:38 09:18 (WEA-5 E-160)
	21:37	20:42	19:31	18:24	16:34	25 09:28 (WEA-5 E-160) 16:24 21 09:38 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11	08:06	26 09:03 (WEA-5 E-160) 08:38 09:18 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	26 09:29 (WEA-5 E-160) 16:25 21 09:39 (WEA-5 E-160)
25	05:44	06:32	07:22	07:13	08:07	27 09:03 (WEA-5 E-160) 08:39 09:18 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	27 09:30 (WEA-5 E-160) 16:25 21 09:39 (WEA-5 E-160)
26	05:45	06:34	07:24	07:15	08:09	28 09:03 (WEA-5 E-160) 08:39 09:18 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	28 09:31 (WEA-5 E-160) 16:26 22 09:40 (WEA-5 E-160)
27	05:46	06:35	07:26	07:17	08:10	28 09:03 (WEA-5 E-160) 08:39 09:19 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	28 09:31 (WEA-5 E-160) 16:27 22 09:41 (WEA-5 E-160)
28	05:48	06:37	07:27	07:19	08:12	28 09:04 (WEA-5 E-160) 08:40 09:19 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	28 09:32 (WEA-5 E-160) 16:28 23 09:42 (WEA-5 E-160)
29	05:49	06:39	07:29	07:20	08:13	28 09:04 (WEA-5 E-160) 08:40 09:20 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	28 09:32 (WEA-5 E-160) 16:29 23 09:43 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	28 09:05 (WEA-5 E-160) 08:40 09:20 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	27 09:32 (WEA-5 E-160) 16:30 23 09:43 (WEA-5 E-160)
31	05:52	06:42	07:32	07:24	08:16	27 09:06 (WEA-5 E-160) 08:40 09:20 (WEA-5 E-160)
	21:25	20:24	17:09	16:27	16:31	24 09:44 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					390	736
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					42	51

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP150 - IP150 Schulstr. 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:20 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	24	09:44 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	09:21 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	24	09:45 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	09:21 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	25	09:46 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	09:22 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	25	09:47 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	09:21 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	26	09:47 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	09:22 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	26	09:48 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	09:22 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	27	09:49 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	09:22 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28	09:50 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	09:22 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	28	09:50 (WEA-5 E-160)	17:35	18:26	20:19	21:09
10 08:37	09:22 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	28	09:50 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	09:22 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	29	09:51 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	09:23 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	29	09:52 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	09:23 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	29	09:52 (WEA-5 E-160)	17:42	18:33	20:25	21:15
14 08:35	09:23 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	30	09:53 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34	09:24 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	29	09:53 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16 08:33	09:24 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	30	09:54 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17 08:32	09:25 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	29	09:54 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18 08:31	09:25 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	29	09:54 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19 08:30	09:26 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	29	09:55 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20 08:29	09:25 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	29	09:54 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21 08:28	09:26 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	28	09:54 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22 08:27	09:27 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	27	09:54 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23 08:26	09:27 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	27	09:54 (WEA-5 E-160)	18:00	18:50	20:42	21:30
24 08:25	09:28 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	26	09:54 (WEA-5 E-160)	18:02	18:51	20:44	21:31
25 08:23	09:30 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	24	09:54 (WEA-5 E-160)	18:04	18:53	20:46	21:33
26 08:22	09:30 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	22	09:52 (WEA-5 E-160)	18:06	18:55	20:47	21:34
27 08:21	09:32 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	20	09:52 (WEA-5 E-160)	18:08	18:57	20:49	21:35
28 08:19	09:33 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	17	09:50 (WEA-5 E-160)	18:10	18:58	20:51	21:37
29 08:18	09:36 (WEA-5 E-160)		07:17	06:09	05:23	05:16
17:14	13	09:49 (WEA-5 E-160)		20:00	20:52	21:38
30 08:17	09:38 (WEA-5 E-160)		07:15	06:08	05:22	05:17
17:16	8	09:46 (WEA-5 E-160)		20:02	20:54	21:39
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	765					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	70					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP150 - IP150 Schulstr. 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					475	718
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					51	50

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP150/1 - IP150/1 Schulstr. 4a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:21 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	25 09:46 (WEA-5 E-160)	17:20	18:11	18:11	20:05	20:56
2 08:40	09:21 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	25 09:46 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:22 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	25 09:47 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:22 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	26 09:48 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:22 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	27 09:49 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:23 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	27 09:50 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:22 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	28 09:50 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:23 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28 09:51 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:23 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	28 09:51 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:23 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	29 09:52 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:23 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	29 09:52 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:24 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	29 09:53 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:24 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	30 09:54 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:25 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	29 09:54 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:25 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	29 09:54 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:25 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	30 09:55 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:26 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	29 09:55 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:26 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	29 09:55 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:27 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	29 09:56 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:27 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	28 09:55 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:28 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	27 09:55 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:28 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	27 09:55 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:29 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	25 09:54 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:30 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	24 09:54 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:31 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	23 09:54 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:32 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	21 09:53 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21	09:34 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	19 09:53 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28 08:19	09:35 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	16 09:51 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56
29 08:18	09:38 (WEA-5 E-160)	07:17	06:09	06:09	05:23	05:16
17:14	11 09:49 (WEA-5 E-160)	18:11	19:00	20:52	21:38	21:56
30 08:17	09:42 (WEA-5 E-160)	07:15	06:08	06:08	05:22	05:17
17:16	3 09:45 (WEA-5 E-160)	18:12	19:01	20:54	21:39	21:55
31 08:15		07:12	06:05	06:05	05:21	05:16
17:18		20:03	20:52	21:40	21:40	21:55
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	755					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	70					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP150/1 - IP150/1 Schulstr. 4a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	09:05 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34	07:27	16:27 29 09:34 (WEA-5 E-160)
	21:55	21:22	20:20	19:10	17:05	08:18 09:06 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35	07:29	16:26 29 09:35 (WEA-5 E-160)
	21:55	21:20	20:17	19:08	17:03	08:19 09:06 (WEA-5 E-160)
4	05:20	05:59	06:48	07:37	07:31	16:25 29 09:35 (WEA-5 E-160)
	21:54	21:19	20:15	19:06	17:01	08:21 09:07 (WEA-5 E-160)
5	05:21	06:00	06:50	07:39	07:33	16:25 28 09:35 (WEA-5 E-160)
	21:54	21:17	20:13	19:03	17:00	08:22 09:08 (WEA-5 E-160)
6	05:21	06:02	06:51	07:40	07:35	16:24 27 09:35 (WEA-5 E-160)
	21:53	21:15	20:10	19:01	16:58	08:23 09:09 (WEA-5 E-160)
7	05:22	06:03	06:53	07:42	07:36	16:24 27 09:36 (WEA-5 E-160)
	21:53	21:13	20:08	18:59	16:56	08:24 09:09 (WEA-5 E-160)
8	05:23	06:05	06:55	07:44	07:38	16:23 27 09:36 (WEA-5 E-160)
	21:52	21:11	20:06	18:57	16:54	08:26 09:10 (WEA-5 E-160)
9	05:24	06:06	06:56	07:46	07:40	16:23 26 09:36 (WEA-5 E-160)
	21:51	21:10	20:04	18:54	16:53	08:27 09:10 (WEA-5 E-160)
10	05:25	06:08	06:58	07:47	07:42	16:23 26 09:36 (WEA-5 E-160)
	21:51	21:08	20:01	18:52	16:51	08:28 09:11 (WEA-5 E-160)
11	05:26	06:10	07:00	07:49	07:43	16:23 26 09:37 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	16:50	08:29 09:12 (WEA-5 E-160)
12	05:27	06:11	07:01	07:51	07:45	16:22 25 09:37 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	16:48	08:30 09:13 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52	07:47	4 09:13 (WEA-5 E-160) 16:22 24 09:37 (WEA-5 E-160)
	21:48	21:02	19:54	18:46	16:47	09:10 (WEA-5 E-160) 08:31 09:13 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	11 09:21 (WEA-5 E-160) 16:22 24 09:37 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	09:07 (WEA-5 E-160) 08:32 09:14 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56	07:51	16 09:23 (WEA-5 E-160) 16:22 23 09:37 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	09:06 (WEA-5 E-160) 08:33 09:15 (WEA-5 E-160)
16	05:32	06:18	07:08	07:57	07:52	19 09:25 (WEA-5 E-160) 16:22 23 09:38 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	09:05 (WEA-5 E-160) 08:34 09:15 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59	07:54	21 09:26 (WEA-5 E-160) 16:22 22 09:37 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	09:04 (WEA-5 E-160) 08:35 09:15 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01	07:56	23 09:27 (WEA-5 E-160) 16:23 23 09:38 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	09:04 (WEA-5 E-160) 08:35 09:16 (WEA-5 E-160)
19	05:36	06:22	07:12	08:03	07:57	24 09:28 (WEA-5 E-160) 16:23 22 09:38 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	09:04 (WEA-5 E-160) 08:36 09:17 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04	07:59	25 09:29 (WEA-5 E-160) 16:23 22 09:39 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	09:03 (WEA-5 E-160) 08:37 09:17 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06	08:01	27 09:30 (WEA-5 E-160) 16:23 22 09:39 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	09:04 (WEA-5 E-160) 08:37 09:18 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08	08:02	27 09:31 (WEA-5 E-160) 16:24 22 09:40 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	09:03 (WEA-5 E-160) 08:38 09:18 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10	08:04	28 09:31 (WEA-5 E-160) 16:24 22 09:40 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	09:03 (WEA-5 E-160) 08:38 09:19 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11	08:06	29 09:32 (WEA-5 E-160) 16:25 22 09:41 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	09:03 (WEA-5 E-160) 08:39 09:19 (WEA-5 E-160)
25	05:44	06:32	07:22	07:13	08:07	29 09:32 (WEA-5 E-160) 16:25 22 09:41 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	09:04 (WEA-5 E-160) 08:39 09:19 (WEA-5 E-160)
26	05:45	06:34	07:24	07:15	08:09	29 09:33 (WEA-5 E-160) 16:26 22 09:41 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	09:03 (WEA-5 E-160) 08:39 09:20 (WEA-5 E-160)
27	05:46	06:35	07:26	07:17	08:10	30 09:33 (WEA-5 E-160) 16:27 22 09:42 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	09:04 (WEA-5 E-160) 08:40 09:20 (WEA-5 E-160)
28	05:48	06:37	07:27	07:19	08:12	29 09:33 (WEA-5 E-160) 16:28 23 09:43 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	09:05 (WEA-5 E-160) 08:40 09:21 (WEA-5 E-160)
29	05:49	06:39	07:29	07:20	08:13	29 09:34 (WEA-5 E-160) 16:28 22 09:43 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	09:04 (WEA-5 E-160) 08:40 09:21 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	30 09:34 (WEA-5 E-160) 16:29 23 09:44 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	09:05 (WEA-5 E-160) 08:40 09:21 (WEA-5 E-160)
31	05:52	06:42	07:32	07:24	08:16	29 09:34 (WEA-5 E-160) 16:30 24 09:45 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:26	08:40 09:22 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					459	751
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					49	52

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP150/2 - IP150/2 Schulstr. 4b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:22 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	25 09:47 (WEA-5 E-160)	17:20	18:11	18:11	20:05	20:56
2 08:40	09:22 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	26 09:48 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:23 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	26 09:49 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:23 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	27 09:50 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:23 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	27 09:50 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:24 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	27 09:51 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:23 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	28 09:51 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:24 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28 09:52 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:24 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	29 09:53 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:24 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	29 09:53 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:24 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	29 09:53 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:25 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	29 09:54 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:25 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	30 09:55 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:25 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	30 09:55 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:26 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	29 09:55 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:26 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	30 09:56 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:27 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	29 09:56 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:27 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	29 09:56 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:28 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	29 09:57 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:28 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	28 09:56 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:29 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	27 09:56 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:30 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	26 09:56 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:30 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	25 09:55 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:31 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	24 09:55 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:32 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	23 09:55 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:33 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	21 09:54 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21	09:35 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	18 09:53 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28 08:19	09:37 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	14 09:51 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56
29 08:18	09:40 (WEA-5 E-160)		07:17	06:09	05:23	05:16
17:14	9 09:49 (WEA-5 E-160)		20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	751					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	69					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP150/2 - IP150/2 Schulstr. 4b

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	07:32 19:13	07:26 17:07	08:16 09:06 (WEA-5 E-160) 16:27 29 09:35 (WEA-5 E-160)
2	05:18 21:55	05:55 21:22	06:45 20:20	07:34 19:10	07:27 17:05	08:18 09:07 (WEA-5 E-160) 16:26 29 09:36 (WEA-5 E-160)
3	05:19 21:55	05:57 21:20	06:47 20:17	07:35 19:08	07:29 17:03	08:19 09:07 (WEA-5 E-160) 16:25 29 09:36 (WEA-5 E-160)
4	05:20 21:54	05:59 21:19	06:48 20:15	07:37 19:06	07:31 17:01	08:21 09:08 (WEA-5 E-160) 16:25 28 09:36 (WEA-5 E-160)
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	07:33 17:00	08:22 09:08 (WEA-5 E-160) 16:24 28 09:36 (WEA-5 E-160)
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	07:35 16:58	08:23 09:10 (WEA-5 E-160) 16:24 27 09:37 (WEA-5 E-160)
7	05:22 21:53	06:03 21:13	06:53 20:08	07:42 18:59	07:36 16:56	08:24 09:10 (WEA-5 E-160) 16:23 27 09:37 (WEA-5 E-160)
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57	07:38 16:54	08:26 09:10 (WEA-5 E-160) 16:23 27 09:37 (WEA-5 E-160)
9	05:24 21:51	06:06 21:10	06:56 20:04	07:46 18:54	07:40 16:53	08:27 09:11 (WEA-5 E-160) 16:23 26 09:37 (WEA-5 E-160)
10	05:25 21:51	06:08 21:08	06:58 20:01	07:47 18:52	07:42 16:51	08:28 09:12 (WEA-5 E-160) 16:23 26 09:38 (WEA-5 E-160)
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50	07:43 16:50	08:29 09:13 (WEA-5 E-160) 16:22 25 09:38 (WEA-5 E-160)
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48	07:45 16:48	08:30 09:13 (WEA-5 E-160) 16:22 25 09:38 (WEA-5 E-160)
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:46	07:47 16:47	08:31 09:14 (WEA-5 E-160) 16:22 24 09:38 (WEA-5 E-160)
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43	07:49 16:45	08:32 09:15 (WEA-5 E-160) 16:22 24 09:39 (WEA-5 E-160)
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41	07:51 16:44	08:33 09:15 (WEA-5 E-160) 16:22 24 09:39 (WEA-5 E-160)
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39	07:52 16:42	08:34 09:15 (WEA-5 E-160) 16:22 23 09:38 (WEA-5 E-160)
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37	07:54 16:41	08:35 09:16 (WEA-5 E-160) 16:23 23 09:39 (WEA-5 E-160)
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35	07:56 16:40	08:35 09:17 (WEA-5 E-160) 16:23 23 09:40 (WEA-5 E-160)
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33	07:57 16:38	08:36 09:18 (WEA-5 E-160) 16:23 22 09:40 (WEA-5 E-160)
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30	07:59 16:37	08:37 09:18 (WEA-5 E-160) 16:23 22 09:40 (WEA-5 E-160)
21	05:38 21:39	06:26 20:46	07:16 19:36	08:05 18:28	08:01 16:36	08:37 09:19 (WEA-5 E-160) 16:24 22 09:41 (WEA-5 E-160)
22	05:39 21:38	06:27 20:44	07:17 19:33	08:08 18:26	08:02 16:35	08:38 09:19 (WEA-5 E-160) 16:24 22 09:41 (WEA-5 E-160)
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24	08:04 16:34	08:38 09:20 (WEA-5 E-160) 16:25 22 09:42 (WEA-5 E-160)
24	05:42 21:36	06:30 20:39	07:21 19:29	08:11 18:22	08:06 16:33	08:39 09:20 (WEA-5 E-160) 16:25 22 09:42 (WEA-5 E-160)
25	05:44 21:34	06:32 20:37	07:22 19:26	08:13 18:20	08:07 16:32	08:39 09:20 (WEA-5 E-160) 16:26 22 09:42 (WEA-5 E-160)
26	05:45 21:33	06:34 20:35	07:24 19:24	08:15 18:18	08:09 16:31	08:39 09:21 (WEA-5 E-160) 16:27 23 09:44 (WEA-5 E-160)
27	05:46 21:31	06:35 20:33	07:26 19:22	08:17 18:16	08:10 16:30	08:40 09:21 (WEA-5 E-160) 16:28 23 09:44 (WEA-5 E-160)
28	05:48 21:30	06:37 20:31	07:27 19:19	08:19 18:14	08:12 16:29	08:40 09:21 (WEA-5 E-160) 16:28 24 09:45 (WEA-5 E-160)
29	05:49 21:28	06:39 20:28	07:29 19:17	08:20 18:12	08:13 16:28	08:40 09:22 (WEA-5 E-160) 16:29 23 09:45 (WEA-5 E-160)
30	05:51 21:27	06:40 20:26	07:30 19:15	08:22 18:10	08:15 16:27	08:40 09:22 (WEA-5 E-160) 16:30 24 09:46 (WEA-5 E-160)
31	05:52 21:25	06:42 20:24	07:32 19:13	08:24 18:09	08:17 16:26	08:40 09:22 (WEA-5 E-160) 16:31 25 09:47 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					451	763
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					48	53

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP151 - IP151 Schulstr. 4c

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:21 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	25 09:46 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2 08:40	09:22 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	25 09:47 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:22 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	26 09:48 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:23 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	26 09:49 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:22 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	27 09:49 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:23 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	27 09:50 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:23 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	27 09:50 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:24 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28 09:52 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:24 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	28 09:52 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:24 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	28 09:52 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:24 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	28 09:52 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:25 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	29 09:54 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:25 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	29 09:54 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:25 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	29 09:54 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:26 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	29 09:55 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:26 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	29 09:55 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:26 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	29 09:55 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:27 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	28 09:55 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:28 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	28 09:56 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:28 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	27 09:55 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:28 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	27 09:55 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:30 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	25 09:55 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:30 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	24 09:54 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:31 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	23 09:54 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:33 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	21 09:54 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:33 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	19 09:52 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21	09:36 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	16 09:52 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28 08:19	09:37 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	12 09:49 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56
29 08:18	09:42 (WEA-5 E-160)		07:17	06:09	05:23	05:16
17:14	5 09:47 (WEA-5 E-160)		20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	724					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	67					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP151 - IP151 Schulstr. 4c

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	07:32 19:13	07:26 17:07	08:16 16:27
2	05:18 21:55	05:55 21:22	06:45 20:20	07:34 19:10	07:27 17:05	08:18 16:26
3	05:19 21:55	05:57 21:20	06:47 20:17	07:35 19:08	07:29 17:03	08:19 16:25
4	05:20 21:54	05:59 21:19	06:48 20:15	07:37 19:06	07:31 17:01	08:21 16:25
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	07:33 17:00	08:22 16:24
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	07:35 16:58	08:23 16:24
7	05:22 21:53	06:03 21:13	06:53 20:08	07:42 18:59	07:36 16:56	08:24 16:23
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57	07:38 16:54	08:26 16:23
9	05:24 21:51	06:06 21:10	06:56 20:04	07:46 18:54	07:40 16:53	08:27 16:23
10	05:25 21:51	06:08 21:08	06:58 20:01	07:47 18:52	07:42 16:51	08:28 16:23
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50	07:44 16:50	08:29 16:22
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48	07:45 16:48	08:30 16:22
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:46	07:47 16:47	08:31 16:22
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43	07:49 16:45	08:32 16:22
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41	07:51 16:44	08:33 16:22
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39	07:52 16:42	08:34 16:22
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37	07:54 16:41	08:35 16:23
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35	07:56 16:40	08:35 16:23
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33	07:57 16:38	08:36 16:23
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30	07:59 16:37	08:37 16:23
21	05:38 21:39	06:26 20:46	07:16 19:36	08:06 18:28	08:01 16:36	08:37 16:24
22	05:39 21:38	06:27 20:44	07:17 19:33	08:08 18:26	08:02 16:35	08:38 16:24
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24	08:04 16:34	08:38 16:25
24	05:42 21:36	06:30 20:39	07:21 19:29	08:11 18:22	08:06 16:33	08:39 16:25
25	05:44 21:34	06:32 20:37	07:22 19:26	08:13 18:20	08:07 16:32	08:39 16:26
26	05:45 21:33	06:34 20:35	07:24 19:24	08:15 18:18	08:09 16:31	08:39 16:27
27	05:46 21:31	06:35 20:33	07:26 19:22	08:17 18:16	08:10 16:30	08:40 16:28
28	05:48 21:30	06:37 20:31	07:27 19:19	08:19 18:14	08:12 16:29	08:40 16:28
29	05:49 21:28	06:39 20:28	07:29 19:17	08:20 18:12	08:13 16:28	08:40 16:29
30	05:51 21:27	06:40 20:26	07:30 19:15	08:22 18:10	08:15 16:27	08:40 16:30
31	05:52 21:25	06:42 20:24	07:32 19:13	08:24 18:09	08:17 16:26	08:40 16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					429	758
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					46	53

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP151/1 - IP151/1 Schulstr. 4d

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:21 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	26	09:47 (WEA-5 E-160)	17:20	18:11	20:05	20:56
2 08:40	09:22 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	26	09:48 (WEA-5 E-160)	17:22	18:13	20:07	20:57
3 08:40	09:22 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	26	09:48 (WEA-5 E-160)	17:24	18:15	20:08	20:59
4 08:40	09:23 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	26	09:49 (WEA-5 E-160)	17:25	18:17	20:10	21:01
5 08:40	09:23 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	27	09:50 (WEA-5 E-160)	17:27	18:18	20:12	21:02
6 08:39	09:23 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	28	09:51 (WEA-5 E-160)	17:29	18:20	20:14	21:04
7 08:39	09:23 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	28	09:51 (WEA-5 E-160)	17:31	18:22	20:15	21:06
8 08:38	09:24 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28	09:52 (WEA-5 E-160)	17:33	18:24	20:17	21:07
9 08:38	09:24 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	28	09:52 (WEA-5 E-160)	17:35	18:26	20:19	21:09
10 08:37	09:24 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	28	09:52 (WEA-5 E-160)	17:37	18:27	20:20	21:10
11 08:37	09:24 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	29	09:53 (WEA-5 E-160)	17:38	18:29	20:22	21:12
12 08:36	09:25 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	29	09:54 (WEA-5 E-160)	17:40	18:31	20:24	21:14
13 08:36	09:25 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	29	09:54 (WEA-5 E-160)	17:42	18:33	20:25	21:15
14 08:35	09:26 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	29	09:55 (WEA-5 E-160)	17:44	18:34	20:27	21:17
15 08:34	09:26 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	29	09:55 (WEA-5 E-160)	17:46	18:36	20:29	21:18
16 08:33	09:26 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	29	09:55 (WEA-5 E-160)	17:48	18:38	20:30	21:20
17 08:32	09:27 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	28	09:55 (WEA-5 E-160)	17:49	18:39	20:32	21:21
18 08:31	09:28 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	28	09:56 (WEA-5 E-160)	17:51	18:41	20:34	21:23
19 08:30	09:28 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	28	09:56 (WEA-5 E-160)	17:53	18:43	20:36	21:24
20 08:29	09:28 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	27	09:55 (WEA-5 E-160)	17:55	18:45	20:37	21:26
21 08:28	09:29 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	26	09:55 (WEA-5 E-160)	17:57	18:46	20:39	21:27
22 08:27	09:30 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	25	09:55 (WEA-5 E-160)	17:59	18:48	20:41	21:29
23 08:26	09:30 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	24	09:54 (WEA-5 E-160)	18:00	18:50	20:42	21:30
24 08:25	09:32 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	22	09:54 (WEA-5 E-160)	18:02	18:51	20:44	21:31
25 08:23	09:33 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	21	09:54 (WEA-5 E-160)	18:04	18:53	20:46	21:33
26 08:22	09:34 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	18	09:52 (WEA-5 E-160)	18:06	18:55	20:47	21:34
27 08:21	09:36 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	15	09:51 (WEA-5 E-160)	18:08	18:57	20:49	21:35
28 08:19	09:38 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	11	09:49 (WEA-5 E-160)	18:10	18:58	20:51	21:37
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12	05:21		
17:18			20:03	21:40		
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	718					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	66					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP151/1 - IP151/1 Schulstr. 4d

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	09:06 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34	07:27	16:27 29 09:35 (WEA-5 E-160)
	21:55	21:22	20:20	19:10	17:05	08:18 09:07 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35	07:29	16:26 28 09:35 (WEA-5 E-160)
	21:55	21:20	20:17	19:08	17:03	08:19 09:07 (WEA-5 E-160)
4	05:20	05:59	06:48	07:37	07:31	16:25 28 09:35 (WEA-5 E-160)
	21:54	21:19	20:15	19:06	17:01	08:21 09:08 (WEA-5 E-160)
5	05:21	06:00	06:50	07:39	07:33	16:25 28 09:36 (WEA-5 E-160)
	21:54	21:17	20:13	19:03	17:00	08:22 09:08 (WEA-5 E-160)
6	05:21	06:02	06:51	07:40	07:35	16:24 28 09:36 (WEA-5 E-160)
	21:53	21:15	20:10	19:01	16:58	08:23 09:09 (WEA-5 E-160)
7	05:22	06:03	06:53	07:42	07:36	16:24 28 09:37 (WEA-5 E-160)
	21:53	21:13	20:08	18:59	16:56	08:24 09:10 (WEA-5 E-160)
8	05:23	06:05	06:55	07:44	07:38	16:23 27 09:37 (WEA-5 E-160)
	21:52	21:11	20:06	18:57	16:54	08:26 09:10 (WEA-5 E-160)
9	05:24	06:06	06:56	07:46	07:40	16:23 27 09:37 (WEA-5 E-160)
	21:51	21:10	20:04	18:54	16:53	08:27 09:10 (WEA-5 E-160)
10	05:25	06:08	06:58	07:47	07:42	16:23 27 09:37 (WEA-5 E-160)
	21:51	21:08	20:01	18:52	16:51	08:28 09:12 (WEA-5 E-160)
11	05:26	06:10	07:00	07:49	07:44	16:23 26 09:38 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	16:50	08:29 09:12 (WEA-5 E-160)
12	05:27	06:11	07:01	07:51	07:45	16:22 26 09:38 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	16:48	08:30 09:13 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52	07:47	16:22 25 09:38 (WEA-5 E-160)
	21:48	21:02	19:54	18:46	16:47	08:31 09:14 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	16:22 24 09:38 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	08:32 09:14 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56	07:51	16:22 24 09:38 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	08:33 09:15 (WEA-5 E-160)
16	05:32	06:18	07:08	07:57	07:52	16:22 24 09:39 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	08:34 09:15 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59	07:54	16:22 23 09:38 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	08:35 09:16 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01	07:56	16:23 23 09:39 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	08:36 09:16 (WEA-5 E-160)
19	05:36	06:22	07:12	08:03	07:57	16:23 23 09:39 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	08:37 09:17 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04	07:59	16:23 23 09:40 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	08:37 09:17 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06	08:01	16:23 23 09:40 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	08:37 09:18 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08	08:02	16:24 23 09:41 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	08:38 09:18 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10	08:04	16:24 23 09:41 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	08:38 09:19 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11	08:06	16:25 23 09:42 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	08:39 09:19 (WEA-5 E-160)
25	05:44	06:32	07:22	07:13	08:07	16:25 23 09:42 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	08:39 09:19 (WEA-5 E-160)
26	05:45	06:34	07:24	07:15	08:09	16:26 23 09:42 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	08:39 09:21 (WEA-5 E-160)
27	05:46	06:35	07:26	07:17	08:10	16:27 23 09:44 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	08:40 09:21 (WEA-5 E-160)
28	05:48	06:37	07:27	07:19	08:12	16:28 23 09:44 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	08:40 09:21 (WEA-5 E-160)
29	05:49	06:39	07:29	07:20	08:13	16:28 24 09:45 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	08:40 09:21 (WEA-5 E-160)
30	05:51	06:40	07:30	07:22	08:15	16:29 24 09:45 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	08:40 09:22 (WEA-5 E-160)
31	05:52	06:42	07:32	07:24	08:16	16:30 24 09:46 (WEA-5 E-160)
	21:25	20:24	19:13	17:09	16:26	08:40 09:22 (WEA-5 E-160)
Sonnenscheinstunden	501	453	381	332	267	16:31 25 09:47 (WEA-5 E-160)
astr.max.mögl.Beschattung					418	244
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					45	54

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP152 - IP152 Schulstr. 4e

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:22 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	25 09:47 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2 08:40	09:22 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	26 09:48 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:23 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	26 09:49 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:24 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	26 09:50 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:23 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	27 09:50 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:24 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	27 09:51 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:24 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	27 09:51 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:25 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28 09:53 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:25 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	28 09:53 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:25 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	28 09:53 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:25 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	28 09:53 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:26 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	28 09:54 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:26 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	29 09:55 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:26 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	29 09:55 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:27 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	28 09:55 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:27 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	28 09:55 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:28 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	28 09:56 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:28 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	28 09:56 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:29 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	27 09:56 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:29 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	26 09:55 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:30 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	25 09:55 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:31 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	24 09:55 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:32 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	22 09:54 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:33 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	21 09:54 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:35 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	18 09:53 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:36 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	16 09:52 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21	09:39 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	11 09:50 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28 08:19	09:42 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16
17:13	4 09:46 (WEA-5 E-160)	18:10	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	688					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	64					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP152 - IP152 Schulstr. 4e

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:44	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:31	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					394	777
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					42	54

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP152/1 - IP152/1 Schulstr. 4f

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:22 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	26 09:48 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2 08:40	09:23 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	26 09:49 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:23 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	27 09:50 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:24 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	27 09:51 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:23 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	28 09:51 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:24 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	28 09:52 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:24 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	28 09:52 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:25 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28 09:53 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:25 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	28 09:53 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:25 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	28 09:53 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:25 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	28 09:53 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:26 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	29 09:55 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:26 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	29 09:55 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:27 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	28 09:55 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:27 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	28 09:55 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:28 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	28 09:56 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:28 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	28 09:56 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:29 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	27 09:56 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:30 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	26 09:56 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:30 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	25 09:55 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:31 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	24 09:55 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:32 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	23 09:55 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:32 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	22 09:54 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:34 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	20 09:54 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:36 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	17 09:53 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:37 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	14 09:51 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21	09:40 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15
17:11	10 09:50 (WEA-5 E-160)	18:08	18:57	20:49	21:35	21:56
28 08:20		07:23	06:19	06:11	05:24	05:16
17:13		18:10	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	680					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	63					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP152/1 - IP152/1 Schulstr. 4f

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:44	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42		07:24		08:40
	21:25	20:24		17:09		16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					378	784
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					41	54

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP154 - IP154 Schulstr. 6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1 08:40	09:23 (WEA-5 E-160)	08:14	07:20	07:10	06:06	05:21
16:32	26 09:49 (WEA-5 E-160)	17:20	18:11	20:05	20:56	21:41
2 08:40	09:24 (WEA-5 E-160)	08:12	07:18	07:08	06:04	05:20
16:33	26 09:50 (WEA-5 E-160)	17:22	18:13	20:07	20:57	21:42
3 08:40	09:24 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19
16:34	27 09:51 (WEA-5 E-160)	17:24	18:15	20:08	20:59	21:43
4 08:40	09:25 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18
16:36	27 09:52 (WEA-5 E-160)	17:25	18:17	20:10	21:01	21:44
5 08:40	09:25 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18
16:37	27 09:52 (WEA-5 E-160)	17:27	18:18	20:12	21:02	21:45
6 08:39	09:25 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17
16:38	28 09:53 (WEA-5 E-160)	17:29	18:20	20:14	21:04	21:46
7 08:39	09:25 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16
16:39	28 09:53 (WEA-5 E-160)	17:31	18:22	20:15	21:06	21:47
8 08:38	09:26 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16
16:41	28 09:54 (WEA-5 E-160)	17:33	18:24	20:17	21:07	21:48
9 08:38	09:26 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15
16:42	28 09:54 (WEA-5 E-160)	17:35	18:26	20:19	21:09	21:49
10 08:37	09:26 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15
16:43	28 09:54 (WEA-5 E-160)	17:37	18:27	20:20	21:10	21:50
11 08:37	09:26 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14
16:45	29 09:55 (WEA-5 E-160)	17:38	18:29	20:22	21:12	21:51
12 08:36	09:27 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14
16:46	29 09:56 (WEA-5 E-160)	17:40	18:31	20:24	21:14	21:51
13 08:36	09:28 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14
16:48	28 09:56 (WEA-5 E-160)	17:42	18:33	20:25	21:15	21:52
14 08:35	09:28 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14
16:49	28 09:56 (WEA-5 E-160)	17:44	18:34	20:27	21:17	21:53
15 08:34	09:29 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13
16:51	27 09:56 (WEA-5 E-160)	17:46	18:36	20:29	21:18	21:53
16 08:33	09:29 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13
16:52	28 09:57 (WEA-5 E-160)	17:48	18:38	20:30	21:20	21:54
17 08:32	09:30 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13
16:54	27 09:57 (WEA-5 E-160)	17:49	18:39	20:32	21:21	21:54
18 08:31	09:31 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13
16:55	26 09:57 (WEA-5 E-160)	17:51	18:41	20:34	21:23	21:55
19 08:30	09:31 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13
16:57	26 09:57 (WEA-5 E-160)	17:53	18:43	20:36	21:24	21:55
20 08:29	09:31 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13
16:59	25 09:56 (WEA-5 E-160)	17:55	18:45	20:37	21:26	21:55
21 08:28	09:33 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14
17:00	23 09:56 (WEA-5 E-160)	17:57	18:46	20:39	21:27	21:55
22 08:27	09:34 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14
17:02	22 09:56 (WEA-5 E-160)	17:59	18:48	20:41	21:29	21:56
23 08:26	09:34 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14
17:04	20 09:54 (WEA-5 E-160)	18:00	18:50	20:42	21:30	21:56
24 08:25	09:36 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14
17:06	18 09:54 (WEA-5 E-160)	18:02	18:51	20:44	21:31	21:56
25 08:23	09:38 (WEA-5 E-160)	07:29	06:26	06:17	05:28	05:15
17:07	15 09:53 (WEA-5 E-160)	18:04	18:53	20:46	21:33	21:56
26 08:22	09:40 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15
17:09	10 09:50 (WEA-5 E-160)	18:06	18:55	20:47	21:34	21:56
27 08:21		07:25	06:22	06:13	05:25	05:15
17:11		18:08	18:57	20:49	21:35	21:56
28 08:20		07:23	06:19	06:11	05:24	05:16
17:13		18:10	18:58	20:51	21:37	21:56
29 08:18			07:17	06:09	05:23	05:16
17:14			20:00	20:52	21:38	21:56
30 08:17			07:15	06:08	05:22	05:17
17:16			20:02	20:54	21:39	21:55
31 08:15			07:12		05:21	
17:18			20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	654					
Red.Sonnenscheinwahrsch.	0,20					
Reduktion Betriebsdauer	0,84					
Reduktion Windrichtung	0,56					
Gesamte Reduktion	0,09					
Met.wahrsch.Beschattung	60					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP154 - IP154 Schulstr. 6

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:44	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:42	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	08:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	08:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:46	06:35	07:26	08:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	08:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	08:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	08:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	08:24	08:17	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					349	803
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					38	56

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP169 - IP169 Engelradingstr. 41

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:18 (WEA-5 E-160)	08:14	09:30 (WEA-5 E-160)	07:20	07:10	06:06	05:21			
	16:32	17	09:35 (WEA-5 E-160)	17:20	14	09:44 (WEA-5 E-160)	18:11	20:05	20:56	21:41	
2	08:40	09:18 (WEA-5 E-160)	08:12	09:32 (WEA-5 E-160)	07:18	07:08	06:04	05:20			
	16:33	18	09:36 (WEA-5 E-160)	17:22	9	09:41 (WEA-5 E-160)	18:13	20:07	20:57	21:42	
3	08:40	09:18 (WEA-5 E-160)	08:11	09:18 (WEA-5 E-160)	08:11	07:16	07:06	06:02	05:19		
	16:34	19	09:37 (WEA-5 E-160)	17:24		18:15	20:08	20:59	21:43		
4	08:40	09:18 (WEA-5 E-160)	08:09	09:18 (WEA-5 E-160)	08:09	07:14	07:03	06:00	05:18		
	16:36	20	09:38 (WEA-5 E-160)	17:25		18:17	20:10	21:01	21:44		
5	08:40	09:18 (WEA-5 E-160)	08:07	09:18 (WEA-5 E-160)	08:07	07:12	07:01	05:58	05:18		
	16:37	21	09:39 (WEA-5 E-160)	17:27		18:18	20:12	21:02	21:45		
6	08:39	09:18 (WEA-5 E-160)	08:06	09:40 (WEA-5 E-160)	08:06	07:10	06:59	05:56	05:17		
	16:38	22	09:40 (WEA-5 E-160)	17:29		18:20	20:14	21:04	21:46		
7	08:39	09:18 (WEA-5 E-160)	08:04	09:18 (WEA-5 E-160)	08:04	07:07	06:56	05:55	05:16		
	16:39	22	09:40 (WEA-5 E-160)	17:31		18:22	20:15	21:06	21:47		
8	08:38	09:18 (WEA-5 E-160)	08:02	09:18 (WEA-5 E-160)	08:02	07:05	06:54	05:53	05:16		
	16:41	24	09:42 (WEA-5 E-160)	17:33		18:24	20:17	21:07	21:48		
9	08:38	09:18 (WEA-5 E-160)	08:00	09:42 (WEA-5 E-160)	08:00	07:03	06:52	05:51	05:15		
	16:42	24	09:42 (WEA-5 E-160)	17:35		18:26	20:19	21:09	21:49		
10	08:37	09:18 (WEA-5 E-160)	07:59	09:18 (WEA-5 E-160)	07:59	07:01	06:50	05:49	05:15		
	16:43	25	09:43 (WEA-5 E-160)	17:37		18:27	20:20	21:10	21:50		
11	08:37	09:17 (WEA-5 E-160)	07:57	09:43 (WEA-5 E-160)	07:57	06:58	06:48	05:48	05:14		
	16:45	26	09:43 (WEA-5 E-160)	17:38		18:29	20:22	21:12	21:51		
12	08:36	09:18 (WEA-5 E-160)	07:55	09:18 (WEA-5 E-160)	07:55	06:56	06:45	05:46	05:14		
	16:46	27	09:45 (WEA-5 E-160)	17:40		18:31	20:24	21:14	21:51		
13	08:36	09:18 (WEA-5 E-160)	07:53	09:18 (WEA-5 E-160)	07:53	06:54	06:43	05:44	05:14		
	16:48	28	09:46 (WEA-5 E-160)	17:42		18:33	20:25	21:15	21:52		
14	08:35	09:18 (WEA-5 E-160)	07:51	09:46 (WEA-5 E-160)	07:51	06:52	06:41	05:43	05:14		
	16:49	28	09:46 (WEA-5 E-160)	17:44		18:34	20:27	21:17	21:53		
15	08:34	09:18 (WEA-5 E-160)	07:49	09:18 (WEA-5 E-160)	07:49	06:49	06:39	05:41	05:13		
	16:51	29	09:47 (WEA-5 E-160)	17:46		18:36	20:29	21:18	21:53		
16	08:33	09:18 (WEA-5 E-160)	07:47	09:18 (WEA-5 E-160)	07:47	06:47	06:37	05:40	05:13		
	16:52	29	09:47 (WEA-5 E-160)	17:48		18:38	20:30	21:20	21:54		
17	08:32	09:19 (WEA-5 E-160)	07:45	09:19 (WEA-5 E-160)	07:45	06:45	06:34	05:38	05:13		
	16:54	29	09:48 (WEA-5 E-160)	17:49		18:39	20:32	21:21	21:54		
18	08:31	09:19 (WEA-5 E-160)	07:43	09:19 (WEA-5 E-160)	07:43	06:42	06:32	05:37	05:13		
	16:55	29	09:48 (WEA-5 E-160)	17:51		18:41	20:34	21:23	21:55		
19	08:30	09:19 (WEA-5 E-160)	07:41	09:19 (WEA-5 E-160)	07:41	06:40	06:30	05:35	05:13		
	16:57	30	09:49 (WEA-5 E-160)	17:53		18:43	20:36	21:24	21:55		
20	08:29	09:19 (WEA-5 E-160)	07:39	09:49 (WEA-5 E-160)	07:39	06:38	06:28	05:34	05:13		
	16:59	30	09:49 (WEA-5 E-160)	17:55		18:45	20:37	21:26	21:55		
21	08:28	09:19 (WEA-5 E-160)	07:37	09:19 (WEA-5 E-160)	07:37	06:35	06:26	05:33	05:14		
	17:00	30	09:49 (WEA-5 E-160)	17:57		18:46	20:39	21:27	21:55		
22	08:27	09:20 (WEA-5 E-160)	07:35	09:20 (WEA-5 E-160)	07:35	06:33	06:24	05:31	05:14		
	17:02	30	09:50 (WEA-5 E-160)	17:59		18:48	20:41	21:29	21:56		
23	08:26	09:20 (WEA-5 E-160)	07:33	09:20 (WEA-5 E-160)	07:33	06:31	06:22	05:30	05:14		
	17:04	29	09:49 (WEA-5 E-160)	18:00		18:50	20:42	21:30	21:56		
24	08:25	09:21 (WEA-5 E-160)	07:31	09:21 (WEA-5 E-160)	07:31	06:29	06:20	05:29	05:14		
	17:06	28	09:49 (WEA-5 E-160)	18:02		18:51	20:44	21:31	21:56		
25	08:23	09:22 (WEA-5 E-160)	07:29	09:22 (WEA-5 E-160)	07:29	06:26	06:18	05:28	05:15		
	17:07	28	09:50 (WEA-5 E-160)	18:04		18:53	20:46	21:33	21:56		
26	08:22	09:22 (WEA-5 E-160)	07:27	09:22 (WEA-5 E-160)	07:27	06:24	06:15	05:26	05:15		
	17:09	27	09:49 (WEA-5 E-160)	18:06		18:55	20:47	21:34	21:56		
27	08:21	09:23 (WEA-5 E-160)	07:25	09:23 (WEA-5 E-160)	07:25	06:22	06:13	05:25	05:15		
	17:11	26	09:49 (WEA-5 E-160)	18:08		18:57	20:49	21:35	21:56		
28	08:19	09:23 (WEA-5 E-160)	07:23	09:23 (WEA-5 E-160)	07:23	06:19	06:11	05:24	05:16		
	17:13	25	09:48 (WEA-5 E-160)	18:10		18:58	20:51	21:37	21:56		
29	08:18	09:25 (WEA-5 E-160)	07:21	09:25 (WEA-5 E-160)	07:21	07:17	06:09	05:23	05:16		
	17:14	23	09:48 (WEA-5 E-160)	18:09		20:00	20:52	21:38	21:56		
30	08:17	09:26 (WEA-5 E-160)	07:19	09:26 (WEA-5 E-160)	07:19	07:15	06:08	05:22	05:17		
	17:16	21	09:47 (WEA-5 E-160)	18:07		20:02	20:54	21:39	21:55		
31	08:15	09:27 (WEA-5 E-160)	07:17	09:27 (WEA-5 E-160)	07:17	07:12	06:05	05:21	05:15		
	17:18	18	09:45 (WEA-5 E-160)	18:06		20:03	21:40	21:40	21:55		
Sonnenscheinstunden	259		278			367	416	485	498		
astr.max.mögl.Beschattung	782		23			23					
Red.Sonnenscheinwahrsch.	0,20		0,30			0,30					
Reduktion Betriebsdauer	0,84		0,84			0,84					
Reduktion Windrichtung	0,56		0,56			0,56					
Gesamte Reduktion	0,09		0,14			0,14					
Met.wahrsch.Beschattung	72		3			3					

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP169 - IP169 Engelradingstr. 41

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:55	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:35	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:21
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:22
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:21	06:02	06:51	07:40	07:35	08:23
	21:53	21:15	20:10	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:24
	21:53	21:13	20:08	18:59	16:56	16:23
8	05:23	06:05	06:55	07:44	07:38	08:26
	21:52	21:11	20:06	18:57	16:54	16:23
9	05:24	06:06	06:56	07:46	07:40	08:27
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:28
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:43	08:29
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:30
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:31
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:29	06:14	07:04	07:54	07:49	08:32
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:33
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:57	07:52	08:34
	21:45	20:56	19:47	18:39	16:42	16:22
17	05:33	06:19	07:09	07:59	07:54	08:35
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:35
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:12	08:03	07:57	08:36
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:37
	21:41	20:48	19:38	18:30	16:37	16:23
21	05:38	06:26	07:16	08:06	08:01	08:37
	21:39	20:46	19:36	18:28	16:36	16:24
22	05:39	06:27	07:17	08:08	08:02	08:38
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:38
	21:37	20:41	19:31	18:24	16:34	16:25
24	05:42	06:30	07:21	08:11	08:06	08:39
	21:36	20:39	19:29	18:22	16:33	16:25
25	05:44	06:32	07:22	07:13	08:07	08:39
	21:34	20:37	19:26	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:39
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:47	06:35	07:26	07:17	08:10	08:40
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:40
	21:30	20:31	19:19	17:14	16:29	16:28
29	05:49	06:39	07:29	07:20	08:13	08:40
	21:28	20:28	19:17	17:12	16:28	16:29
30	05:51	06:40	07:30	07:22	08:15	08:40
	21:27	20:26	19:15	17:10	16:27	16:30
31	05:52	06:42	07:32	07:24	08:16	08:40
	21:25	20:24	19:13	17:09	16:26	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					570	470
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					61	32

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP170 - IP170 Engelradingstr. 45

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40		08:14		07:20		07:10		06:06		05:21
	16:32		17:20	26	09:45 (WEA-5 E-160)		18:11		20:05		21:41
2	08:40		08:12		09:19 (WEA-5 E-160)		07:18		07:08		06:04
	16:33		17:22	25	09:44 (WEA-5 E-160)		18:13		20:07		20:57
3	08:40		08:11		09:20 (WEA-5 E-160)		07:16		07:06		06:02
	16:34		17:24	23	09:43 (WEA-5 E-160)		18:15		20:08		20:59
4	08:40		08:09		09:22 (WEA-5 E-160)		07:14		07:03		06:00
	16:36		17:25	20	09:42 (WEA-5 E-160)		18:17		20:10		21:01
5	08:40		08:07		09:24 (WEA-5 E-160)		07:12		07:01		05:58
	16:37	6	09:26 (WEA-5 E-160)		17:27	16	09:40 (WEA-5 E-160)		18:18		20:12
6	08:39		08:06		09:27 (WEA-5 E-160)		07:10		06:59		05:56
	16:38	10	09:29 (WEA-5 E-160)		17:29	11	09:38 (WEA-5 E-160)		18:20		20:14
7	08:39		08:04		09:17 (WEA-5 E-160)		07:07		06:56		05:55
	16:39	13	09:30 (WEA-5 E-160)		17:31		18:22		20:15		21:06
8	08:38		08:02		09:17 (WEA-5 E-160)		07:05		06:54		05:53
	16:41	16	09:33 (WEA-5 E-160)		17:33		18:24		20:17		21:07
9	08:38		08:00		09:16 (WEA-5 E-160)		07:03		06:52		05:51
	16:42	18	09:34 (WEA-5 E-160)		17:35		18:26		20:19		21:09
10	08:37		07:59		09:16 (WEA-5 E-160)		07:01		06:50		05:49
	16:43	19	09:35 (WEA-5 E-160)		17:37		18:27		20:20		21:10
11	08:37		07:57		09:15 (WEA-5 E-160)		06:58		06:48		05:48
	16:45	21	09:36 (WEA-5 E-160)		17:38		18:29		20:22		21:12
12	08:36		07:55		09:15 (WEA-5 E-160)		06:56		06:45		05:46
	16:46	22	09:37 (WEA-5 E-160)		17:40		18:31		20:24		21:14
13	08:36		07:53		09:15 (WEA-5 E-160)		06:54		06:43		05:44
	16:48	23	09:38 (WEA-5 E-160)		17:42		18:33		20:25		21:15
14	08:35		07:51		09:15 (WEA-5 E-160)		06:52		06:41		05:43
	16:49	24	09:39 (WEA-5 E-160)		17:44		18:34		20:27		21:17
15	08:34		07:49		09:14 (WEA-5 E-160)		06:49		06:39		05:41
	16:51	26	09:40 (WEA-5 E-160)		17:46		18:36		20:29		21:18
16	08:33		07:47		09:14 (WEA-5 E-160)		06:47		06:37		05:40
	16:52	27	09:41 (WEA-5 E-160)		17:48		18:38		20:30		21:20
17	08:32		07:45		09:14 (WEA-5 E-160)		06:45		06:34		05:38
	16:54	28	09:42 (WEA-5 E-160)		17:49		18:39		20:32		21:21
18	08:31		07:43		09:14 (WEA-5 E-160)		06:42		06:32		05:37
	16:55	29	09:43 (WEA-5 E-160)		17:51		18:41		20:34		21:23
19	08:30		07:41		09:14 (WEA-5 E-160)		06:40		06:30		05:35
	16:57	30	09:44 (WEA-5 E-160)		17:53		18:43		20:36		21:24
20	08:29		07:39		09:14 (WEA-5 E-160)		06:38		06:28		05:34
	16:59	29	09:43 (WEA-5 E-160)		17:55		18:45		20:37		21:26
21	08:28		07:37		09:14 (WEA-5 E-160)		06:35		06:26		05:33
	17:00	30	09:44 (WEA-5 E-160)		17:57		18:46		20:39		21:27
22	08:27		07:35		09:14 (WEA-5 E-160)		06:33		06:24		05:31
	17:02	31	09:45 (WEA-5 E-160)		17:59		18:48		20:41		21:29
23	08:26		07:33		09:14 (WEA-5 E-160)		06:31		06:22		05:30
	17:04	31	09:45 (WEA-5 E-160)		18:00		18:50		20:42		21:30
24	08:25		07:31		09:14 (WEA-5 E-160)		06:29		06:20		05:29
	17:06	31	09:45 (WEA-5 E-160)		18:02		18:51		20:44		21:31
25	08:23		07:29		09:15 (WEA-5 E-160)		06:26		06:18		05:28
	17:07	31	09:46 (WEA-5 E-160)		18:04		18:53		20:46		21:33
26	08:22		07:27		09:15 (WEA-5 E-160)		06:24		06:15		05:27
	17:09	31	09:46 (WEA-5 E-160)		18:06		18:55		20:47		21:34
27	08:21		07:25		09:16 (WEA-5 E-160)		06:22		06:13		05:25
	17:11	30	09:46 (WEA-5 E-160)		18:08		18:57		20:49		21:35
28	08:19		07:23		09:16 (WEA-5 E-160)		06:19		06:11		05:24
	17:13	30	09:46 (WEA-5 E-160)		18:10		18:58		20:51		21:37
29	08:18		07:17		09:17 (WEA-5 E-160)		06:17		06:09		05:23
	17:14	29	09:46 (WEA-5 E-160)		18:00		18:57		20:52		21:38
30	08:17		07:15		09:17 (WEA-5 E-160)		06:15		06:08		05:22
	17:16	29	09:46 (WEA-5 E-160)		18:02		18:55		20:54		21:39
31	08:15		07:12		09:17 (WEA-5 E-160)		06:12		06:01		05:21
	17:18	28	09:45 (WEA-5 E-160)		18:03		18:51		20:51		21:39
Sonnenscheinstunden	259		278		367		416		485		498
astr.max.mögl.Beschattung	672		121								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,55		0,55								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	61		17								

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP170 - IP170 Engelradungstr. 45

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	07:32 19:13	07:26 17:07	08:16 16:27
2	05:18 21:55	05:55 21:22	06:45 20:20	07:34 19:10	07:27 17:05	08:18 16:26
3	05:19 21:55	05:57 21:20	06:47 20:17	07:35 19:08	07:29 17:03	08:19 16:25
4	05:20 21:54	05:59 21:19	06:48 20:15	07:37 19:06	07:31 17:01	08:21 16:25
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	07:33 17:00	08:22 16:24
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	07:35 16:58	08:23 16:24
7	05:22 21:53	06:03 21:13	06:53 20:08	07:42 18:59	07:36 16:56	08:24 16:23
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57	07:38 16:54	08:26 16:23
9	05:24 21:51	06:06 21:10	06:56 20:04	07:46 18:54	07:40 16:53	08:27 16:23
10	05:25 21:51	06:08 21:08	06:58 20:01	07:47 18:52	07:42 16:51	08:28 16:23
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50	07:43 16:50	08:29 16:22
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48	07:45 16:48	08:30 16:22
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:46	07:47 16:47	08:31 16:22
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43	07:49 16:45	08:32 16:22
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41	07:51 16:44	08:33 16:22
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39	07:52 16:42	08:34 16:22
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37	07:54 16:41	08:35 16:23
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35	07:56 16:40	08:35 16:23
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33	07:57 16:38	08:36 16:23
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30	07:59 16:37	08:37 16:23
21	05:38 21:39	06:26 20:46	07:16 19:36	08:06 18:28	08:01 16:36	08:37 16:24
22	05:39 21:38	06:27 20:44	07:17 19:33	08:08 18:26	08:02 16:35	08:38 16:24
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24	08:04 16:34	08:38 16:25
24	05:42 21:36	06:30 20:39	07:21 19:29	08:11 18:22	08:06 16:33	08:39 16:25
25	05:44 21:34	06:32 20:37	07:22 19:26	08:13 17:20	08:07 16:32	08:39 16:26
26	05:45 21:33	06:34 20:35	07:24 19:24	08:15 17:18	08:09 16:31	08:39 16:27
27	05:47 21:31	06:35 20:33	07:26 19:22	08:17 17:16	08:10 16:30	08:40 16:28
28	05:48 21:30	06:37 20:31	07:27 19:19	08:19 17:14	08:12 16:29	08:40 16:28
29	05:49 21:28	06:39 20:28	07:29 19:17	08:20 17:12	08:13 16:28	08:40 16:29
30	05:51 21:27	06:40 20:26	07:30 19:15	08:22 17:10	08:15 16:27	08:40 16:30
31	05:52 21:25	06:42 20:24	07:32 17:09	08:24 17:09	08:17 16:27	08:40 16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					694	106
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,55	0,55
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					74	7

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP171 - IP171 Engleradingstr. 47

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1 08:40		08:14		07:20	07:10	06:06	05:21				
16:32		17:20	30	09:44 (WEA-5 E-160)	18:11	20:05	20:56	21:41			
2 08:40		08:12		09:15 (WEA-5 E-160)	07:18	07:08	06:04	05:20			
16:33		17:22	29	09:44 (WEA-5 E-160)	18:13	20:07	20:57	21:42			
3 08:40		08:11		09:15 (WEA-5 E-160)	07:16	07:06	06:02	05:19			
16:34		17:24	28	09:43 (WEA-5 E-160)	18:15	20:08	20:59	21:43			
4 08:40		08:09		09:17 (WEA-5 E-160)	07:14	07:03	06:00	05:18			
16:36		17:25	26	09:43 (WEA-5 E-160)	18:17	20:10	21:01	21:44			
5 08:40		08:07		09:17 (WEA-5 E-160)	07:12	07:01	05:58	05:18			
16:37		17:27	25	09:42 (WEA-5 E-160)	18:18	20:12	21:02	21:45			
6 08:39		08:06		09:19 (WEA-5 E-160)	07:10	06:59	05:56	05:17			
16:38		17:29	22	09:41 (WEA-5 E-160)	18:20	20:14	21:04	21:46			
7 08:39		08:04		09:20 (WEA-5 E-160)	07:07	06:56	05:55	05:16			
16:39		17:31	19	09:39 (WEA-5 E-160)	18:22	20:15	21:06	21:47			
8 08:38		08:02		09:22 (WEA-5 E-160)	07:05	06:54	05:53	05:16			
16:41		17:33	15	09:37 (WEA-5 E-160)	18:24	20:17	21:07	21:48			
9 08:38		08:00		09:26 (WEA-5 E-160)	07:03	06:52	05:51	05:15			
16:42	7	09:26 (WEA-5 E-160)	17:35	7	09:33 (WEA-5 E-160)	18:26	20:19	21:09	21:49		
10 08:37		07:59		09:17 (WEA-5 E-160)	07:01	06:50	05:49	05:15			
16:43	11	09:28 (WEA-5 E-160)	17:37		18:27	20:20	21:10	21:50			
11 08:37		07:57		09:16 (WEA-5 E-160)	06:58	06:48	05:48	05:14			
16:45	14	09:30 (WEA-5 E-160)	17:38		18:29	20:22	21:12	21:51			
12 08:36		07:55		09:16 (WEA-5 E-160)	06:56	06:45	05:46	05:14			
16:46	16	09:32 (WEA-5 E-160)	17:40		18:31	20:24	21:14	21:51			
13 08:36		07:53		09:15 (WEA-5 E-160)	06:54	06:43	05:44	05:14			
16:48	19	09:34 (WEA-5 E-160)	17:42		18:33	20:25	21:15	21:52			
14 08:35		07:51		09:14 (WEA-5 E-160)	06:52	06:41	05:43	05:14			
16:49	21	09:35 (WEA-5 E-160)	17:44		18:34	20:27	21:17	21:53			
15 08:34		07:49		09:13 (WEA-5 E-160)	06:49	06:39	05:41	05:13			
16:51	23	09:36 (WEA-5 E-160)	17:46		18:36	20:29	21:18	21:53			
16 08:33		07:47		09:13 (WEA-5 E-160)	06:47	06:37	05:40	05:13			
16:52	24	09:37 (WEA-5 E-160)	17:48		18:38	20:30	21:20	21:54			
17 08:32		07:45		09:13 (WEA-5 E-160)	06:45	06:34	05:38	05:13			
16:54	25	09:38 (WEA-5 E-160)	17:49		18:39	20:32	21:21	21:54			
18 08:31		07:43		09:13 (WEA-5 E-160)	06:42	06:32	05:37	05:13			
16:55	26	09:39 (WEA-5 E-160)	17:51		18:41	20:34	21:23	21:55			
19 08:30		07:41		09:13 (WEA-5 E-160)	06:40	06:30	05:35	05:13			
16:57	27	09:40 (WEA-5 E-160)	17:53		18:43	20:36	21:24	21:55			
20 08:29		07:39		09:12 (WEA-5 E-160)	06:38	06:28	05:34	05:13			
16:59	28	09:40 (WEA-5 E-160)	17:55		18:45	20:37	21:26	21:55			
21 08:28		07:37		09:12 (WEA-5 E-160)	06:35	06:26	05:33	05:14			
17:00	29	09:41 (WEA-5 E-160)	17:57		18:46	20:39	21:27	21:55			
22 08:27		07:35		09:12 (WEA-5 E-160)	06:33	06:24	05:31	05:14			
17:02	30	09:42 (WEA-5 E-160)	17:59		18:48	20:41	21:29	21:56			
23 08:26		07:33		09:11 (WEA-5 E-160)	06:31	06:22	05:30	05:14			
17:04	31	09:42 (WEA-5 E-160)	18:00		18:50	20:42	21:30	21:56			
24 08:25		07:31		09:12 (WEA-5 E-160)	06:29	06:20	05:29	05:14			
17:06	31	09:43 (WEA-5 E-160)	18:02		18:51	20:44	21:31	21:56			
25 08:23		07:29		09:12 (WEA-5 E-160)	06:26	06:18	05:28	05:15			
17:07	32	09:44 (WEA-5 E-160)	18:04		18:53	20:46	21:33	21:56			
26 08:22		07:27		09:12 (WEA-5 E-160)	06:24	06:15	05:27	05:15			
17:09	32	09:44 (WEA-5 E-160)	18:06		18:55	20:47	21:34	21:56			
27 08:21		07:25		09:12 (WEA-5 E-160)	06:22	06:13	05:25	05:15			
17:11	33	09:45 (WEA-5 E-160)	18:08		18:57	20:49	21:35	21:56			
28 08:19		07:23		09:12 (WEA-5 E-160)	06:19	06:11	05:24	05:16			
17:13	32	09:44 (WEA-5 E-160)	18:10		18:58	20:51	21:37	21:56			
29 08:18		18:02		09:13 (WEA-5 E-160)	07:17	06:09	05:23	05:16			
17:14	32	09:45 (WEA-5 E-160)	18:00		20:00	20:52	21:38	21:56			
30 08:17		18:00		09:13 (WEA-5 E-160)	07:15	06:08	05:22	05:17			
17:16	31	09:44 (WEA-5 E-160)	18:00		20:02	20:54	21:39	21:55			
31 08:15		18:00		09:13 (WEA-5 E-160)	07:12	06:05	05:21	05:15			
17:18	31	09:44 (WEA-5 E-160)	18:00		20:03	21:40	21:40	21:55			
Sonnenscheinstunden	259		278		367		416		485		498
astr.max.mögl.Beschattung	585		201								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,55		0,55								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	53		28								

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP171 - IP171 Engelradingstr. 47

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18 21:55	05:54 21:24	06:43 20:22	07:32 19:13	07:26 17:07	08:16 16:27
2	05:18 21:55	05:55 21:22	06:45 20:20	07:34 19:10	07:27 17:05	08:18 16:26
3	05:19 21:55	05:57 21:20	06:47 20:17	07:35 19:08	07:29 17:03	08:19 16:25
4	05:20 21:54	05:59 21:19	06:48 20:15	07:37 19:06	07:31 17:01	08:21 16:25
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:03	07:33 17:00	08:22 16:24
6	05:21 21:53	06:02 21:15	06:51 20:10	07:40 19:01	07:35 16:58	08:23 16:24
7	05:22 21:53	06:03 21:13	06:53 20:08	07:42 18:59	07:36 16:56	08:24 16:23
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57	07:38 16:54	08:26 16:23
9	05:24 21:51	06:06 21:10	06:56 20:04	07:46 18:54	07:40 16:53	08:27 16:23
10	05:25 21:51	06:08 21:08	06:58 20:01	07:47 18:52	07:42 16:51	08:28 16:23
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50	07:43 16:50	08:29 16:22
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48	07:45 16:48	08:30 16:22
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:46	07:47 16:47	08:31 16:22
14	05:29 21:47	06:14 21:00	07:04 19:52	07:54 18:43	07:49 16:45	08:32 16:22
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41	07:51 16:44	08:33 16:22
16	05:32 21:45	06:18 20:56	07:08 19:47	07:57 18:39	07:52 16:42	08:34 16:22
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37	07:54 16:41	08:35 16:23
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35	07:56 16:40	08:35 16:23
19	05:36 21:42	06:22 20:50	07:12 19:40	08:03 18:33	07:57 16:38	08:36 16:23
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:30	07:59 16:37	08:37 16:23
21	05:38 21:39	06:26 20:46	07:16 19:36	08:06 18:28	08:01 16:36	08:37 16:24
22	05:39 21:38	06:27 20:44	07:17 19:33	08:08 18:26	08:02 16:35	08:38 16:24
23	05:41 21:37	06:29 20:41	07:19 19:31	08:10 18:24	08:04 16:34	08:38 16:25
24	05:42 21:36	06:30 20:39	07:21 19:29	08:11 18:22	08:06 16:33	08:39 16:25
25	05:44 21:34	06:32 20:37	07:22 19:26	08:13 17:20	08:07 16:32	08:39 16:26
26	05:45 21:33	06:34 20:35	07:24 19:24	08:15 17:18	08:09 16:31	08:39 16:27
27	05:47 21:31	06:35 20:33	07:26 19:22	08:17 17:16	08:10 16:30	08:40 16:28
28	05:48 21:30	06:37 20:31	07:27 19:19	08:19 17:14	08:12 16:29	08:40 16:28
29	05:49 21:28	06:39 20:28	07:29 19:17	08:20 17:12	08:13 16:28	08:40 16:29
30	05:51 21:27	06:40 20:26	07:30 19:15	08:22 17:10	08:15 16:27	08:40 16:30
31	05:52 21:25	06:42 20:24	07:32 17:09	08:24 17:07	08:17 16:26	08:40 16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					756	32
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,55	0,55
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					80	2

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP172 - IP172 Engelradingstr. 48

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1 08:40		08:14		07:20	07:10	06:06	05:21				
16:32		17:20	33	09:43 (WEA-5 E-160)	18:11	20:05	21:41				
2 08:40		08:12		09:10 (WEA-5 E-160)	07:18	07:08	06:04	05:20			
16:33		17:22	33	09:43 (WEA-5 E-160)	18:13	20:07	20:57	21:42			
3 08:40		08:11		09:10 (WEA-5 E-160)	07:16	07:06	06:02	05:19			
16:34		17:24	32	09:42 (WEA-5 E-160)	18:15	20:08	20:59	21:43			
4 08:40		08:09		09:12 (WEA-5 E-160)	07:14	07:03	06:00	05:18			
16:36		17:25	31	09:43 (WEA-5 E-160)	18:17	20:10	21:01	21:44			
5 08:40		08:07		09:12 (WEA-5 E-160)	07:12	07:01	05:58	05:18			
16:37		17:27	30	09:42 (WEA-5 E-160)	18:18	20:12	21:02	21:45			
6 08:39		08:06		09:13 (WEA-5 E-160)	07:10	06:59	05:56	05:17			
16:38		17:29	28	09:41 (WEA-5 E-160)	18:20	20:14	21:04	21:46			
7 08:39		08:04		09:13 (WEA-5 E-160)	07:07	06:56	05:55	05:16			
16:39		17:31	27	09:40 (WEA-5 E-160)	18:22	20:15	21:06	21:47			
8 08:38		08:02		09:14 (WEA-5 E-160)	07:05	06:54	05:53	05:16			
16:41		17:33	25	09:39 (WEA-5 E-160)	18:24	20:17	21:07	21:48			
9 08:38		08:00		09:16 (WEA-5 E-160)	07:03	06:52	05:51	05:15			
16:42		17:35	22	09:38 (WEA-5 E-160)	18:26	20:19	21:09	21:49			
10 08:37		07:59		09:18 (WEA-5 E-160)	07:01	06:50	05:49	05:15			
16:43		17:37	19	09:37 (WEA-5 E-160)	18:27	20:20	21:10	21:50			
11 08:37		07:57		09:21 (WEA-5 E-160)	06:58	06:48	05:48	05:14			
16:45		17:38	14	09:35 (WEA-5 E-160)	18:29	20:22	21:12	21:51			
12 08:36		07:55		09:25 (WEA-5 E-160)	06:56	06:45	05:46	05:14			
16:46		17:40	5	09:30 (WEA-5 E-160)	18:31	20:24	21:14	21:51			
13 08:36		09:17 (WEA-5 E-160)	07:53		06:54	06:43	05:44	05:14			
16:48	9	09:26 (WEA-5 E-160)	17:42		18:33	20:25	21:15	21:52			
14 08:35		09:15 (WEA-5 E-160)	07:51		06:52	06:41	05:43	05:14			
16:49	13	09:28 (WEA-5 E-160)	17:44		18:34	20:27	21:17	21:53			
15 08:34		09:14 (WEA-5 E-160)	07:49		06:49	06:39	05:41	05:13			
16:51	16	09:30 (WEA-5 E-160)	17:46		18:36	20:29	21:18	21:53			
16 08:33		09:13 (WEA-5 E-160)	07:47		06:47	06:37	05:40	05:13			
16:52	19	09:32 (WEA-5 E-160)	17:48		18:38	20:30	21:20	21:54			
17 08:32		09:12 (WEA-5 E-160)	07:45		06:45	06:34	05:38	05:13			
16:54	21	09:33 (WEA-5 E-160)	17:49		18:39	20:32	21:21	21:54			
18 08:31		09:12 (WEA-5 E-160)	07:43		06:42	06:32	05:37	05:13			
16:55	23	09:35 (WEA-5 E-160)	17:51		18:41	20:34	21:23	21:55			
19 08:30		09:10 (WEA-5 E-160)	07:41		06:40	06:30	05:35	05:13			
16:57	25	09:35 (WEA-5 E-160)	17:53		18:43	20:36	21:24	21:55			
20 08:29		09:10 (WEA-5 E-160)	07:39		06:38	06:28	05:34	05:13			
16:59	26	09:36 (WEA-5 E-160)	17:55		18:45	20:37	21:26	21:55			
21 08:28		09:10 (WEA-5 E-160)	07:37		06:35	06:26	05:33	05:14			
17:00	28	09:38 (WEA-5 E-160)	17:57		18:46	20:39	21:27	21:55			
22 08:27		09:10 (WEA-5 E-160)	07:35		06:33	06:24	05:31	05:14			
17:02	29	09:39 (WEA-5 E-160)	17:59		18:48	20:41	21:29	21:56			
23 08:26		09:09 (WEA-5 E-160)	07:33		06:31	06:22	05:30	05:14			
17:04	30	09:39 (WEA-5 E-160)	18:00		18:50	20:42	21:30	21:56			
24 08:25		09:09 (WEA-5 E-160)	07:31		06:29	06:20	05:29	05:14			
17:06	31	09:40 (WEA-5 E-160)	18:02		18:51	20:44	21:31	21:56			
25 08:23		09:10 (WEA-5 E-160)	07:29		06:26	06:18	05:28	05:15			
17:07	31	09:41 (WEA-5 E-160)	18:04		18:53	20:46	21:33	21:56			
26 08:22		09:09 (WEA-5 E-160)	07:27		06:24	06:15	05:27	05:15			
17:09	32	09:41 (WEA-5 E-160)	18:06		18:55	20:47	21:34	21:56			
27 08:21		09:09 (WEA-5 E-160)	07:25		06:22	06:13	05:25	05:15			
17:11	33	09:42 (WEA-5 E-160)	18:08		18:57	20:49	21:35	21:56			
28 08:19		09:09 (WEA-5 E-160)	07:23		06:19	06:11	05:24	05:16			
17:13	33	09:42 (WEA-5 E-160)	18:10		18:58	20:51	21:37	21:56			
29 08:18		09:10 (WEA-5 E-160)	07:21		07:17	06:09	05:23	05:16			
17:14	33	09:43 (WEA-5 E-160)	18:11		20:00	20:52	21:38	21:56			
30 08:17		09:09 (WEA-5 E-160)	07:19		07:15	06:08	05:22	05:17			
17:16	34	09:43 (WEA-5 E-160)	18:12		20:02	20:54	21:39	21:55			
31 08:15		09:09 (WEA-5 E-160)	07:17		07:12	06:05	05:21	05:15			
17:18	34	09:43 (WEA-5 E-160)	18:13		20:03	21:40	21:40	21:55			
Sonnenscheinstunden	259		278		367		416		485		498
astr.max.mögl.Beschattung	500		299								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,55		0,55								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	45		42								

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP172 - IP172 Engelradingstr. 48

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:46 (WEA-5 E-160) 08:16
	21:55	21:24	20:22	19:13	17:07	20 09:06 (WEA-5 E-160) 16:27
2	05:18	05:55	06:45	07:34	07:27	08:45 (WEA-5 E-160) 08:18
	21:55	21:22	20:20	19:10	17:05	23 09:08 (WEA-5 E-160) 16:26
3	05:19	05:57	06:47	07:35	07:29	08:44 (WEA-5 E-160) 08:19
	21:55	21:20	20:17	19:08	17:03	25 09:09 (WEA-5 E-160) 16:25
4	05:20	05:59	06:48	07:37	07:31	08:43 (WEA-5 E-160) 08:21
	21:54	21:19	20:15	19:06	17:01	27 09:10 (WEA-5 E-160) 16:25
5	05:21	06:00	06:50	07:39	07:33	08:42 (WEA-5 E-160) 08:22
	21:54	21:17	20:13	19:03	17:00	29 09:11 (WEA-5 E-160) 16:24
6	05:21	06:02	06:51	07:40	07:35	08:42 (WEA-5 E-160) 08:23
	21:53	21:15	20:10	19:01	16:58	30 09:12 (WEA-5 E-160) 16:24
7	05:22	06:03	06:53	07:42	07:36	08:41 (WEA-5 E-160) 08:24
	21:53	21:13	20:08	18:59	16:56	32 09:13 (WEA-5 E-160) 16:23
8	05:23	06:05	06:55	07:44	07:38	08:41 (WEA-5 E-160) 08:26
	21:52	21:11	20:06	18:57	16:54	32 09:13 (WEA-5 E-160) 16:23
9	05:24	06:06	06:56	07:46	07:40	08:41 (WEA-5 E-160) 08:27
	21:51	21:10	20:04	18:54	16:53	33 09:14 (WEA-5 E-160) 16:23
10	05:25	06:08	06:58	07:47	07:42	08:41 (WEA-5 E-160) 08:28
	21:51	21:08	20:01	18:52	16:51	33 09:14 (WEA-5 E-160) 16:23
11	05:26	06:10	07:00	07:49	07:43	08:41 (WEA-5 E-160) 08:29
	21:50	21:06	19:59	18:50	16:50	33 09:14 (WEA-5 E-160) 16:22
12	05:27	06:11	07:01	07:51	07:45	08:41 (WEA-5 E-160) 08:30
	21:49	21:04	19:57	18:48	16:48	34 09:15 (WEA-5 E-160) 16:22
13	05:28	06:13	07:03	07:52	07:47	08:41 (WEA-5 E-160) 08:31
	21:48	21:02	19:54	18:46	16:47	34 09:15 (WEA-5 E-160) 16:22
14	05:29	06:14	07:04	07:54	07:49	08:41 (WEA-5 E-160) 08:32
	21:47	21:00	19:52	18:43	16:45	33 09:14 (WEA-5 E-160) 16:22
15	05:31	06:16	07:06	07:56	07:51	08:41 (WEA-5 E-160) 08:33
	21:46	20:58	19:50	18:41	16:44	33 09:14 (WEA-5 E-160) 16:22
16	05:32	06:18	07:08	07:57	07:52	08:42 (WEA-5 E-160) 08:34
	21:45	20:56	19:47	18:39	16:42	32 09:14 (WEA-5 E-160) 16:22
17	05:33	06:19	07:09	07:59	07:54	08:42 (WEA-5 E-160) 08:35
	21:44	20:54	19:45	18:37	16:41	32 09:14 (WEA-5 E-160) 16:23
18	05:34	06:21	07:11	08:01	07:56	08:43 (WEA-5 E-160) 08:35
	21:43	20:52	19:43	18:35	16:40	31 09:14 (WEA-5 E-160) 16:23
19	05:36	06:22	07:12	08:03	07:57	08:44 (WEA-5 E-160) 08:36
	21:42	20:50	19:40	18:33	16:38	30 09:14 (WEA-5 E-160) 16:23
20	05:37	06:24	07:14	08:04	07:59	08:45 (WEA-5 E-160) 08:37
	21:41	20:48	19:38	18:30	16:37	29 09:14 (WEA-5 E-160) 16:23
21	05:38	06:26	07:16	08:06	08:01	08:46 (WEA-5 E-160) 08:37
	21:39	20:46	19:36	18:28	16:36	28 09:14 (WEA-5 E-160) 16:24
22	05:39	06:27	07:17	08:08	08:02	08:46 (WEA-5 E-160) 08:38
	21:38	20:44	19:33	18:26	16:35	27 09:13 (WEA-5 E-160) 16:24
23	05:41	06:29	07:19	08:10	08:04	08:47 (WEA-5 E-160) 08:38
	21:37	20:41	19:31	18:24	16:34	25 09:12 (WEA-5 E-160) 16:25
24	05:42	06:30	07:21	08:11	08:06	08:49 (WEA-5 E-160) 08:39
	21:36	20:39	19:29	18:22	16:33	23 09:12 (WEA-5 E-160) 16:25
25	05:44	06:32	07:22	07:13	08:07	08:50 (WEA-5 E-160) 08:39
	21:34	20:37	19:26	17:20	16:32	21 09:11 (WEA-5 E-160) 16:26
26	05:45	06:34	07:24	07:15	08:09	08:51 (WEA-5 E-160) 08:39
	21:33	20:35	19:24	17:18	16:31	19 09:10 (WEA-5 E-160) 16:27
27	05:47	06:35	07:26	07:17	08:10	08:53 (WEA-5 E-160) 08:40
	21:31	20:33	19:22	17:16	16:30	16 09:09 (WEA-5 E-160) 16:28
28	05:48	06:37	07:27	07:18	08:12	08:55 (WEA-5 E-160) 08:40
	21:30	20:31	19:19	17:14	16:29	13 09:08 (WEA-5 E-160) 16:28
29	05:49	06:39	07:29	07:20	08:13	08:57 (WEA-5 E-160) 08:40
	21:28	20:28	19:17	17:12	16:28	9 09:06 (WEA-5 E-160) 16:29
30	05:51	06:40	07:30	07:22	08:53 (WEA-5 E-160) 08:15	08:40
	21:27	20:26	19:15	17:10	8 09:01 (WEA-5 E-160) 16:27	16:30
31	05:52	06:42	07:32	07:24	08:49 (WEA-5 E-160) 08:16	08:40
	21:25	20:24	19:13	17:09	15 09:04 (WEA-5 E-160) 16:28	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung				23	786	
Red.Sonnenscheinwahrsch.				0,32	0,23	
Reduktion Betriebsdauer				0,84	0,84	
Reduktion Windrichtung				0,55	0,55	
Gesamte Reduktion				0,15	0,11	
Met.wahrsch.Beschattung				3	83	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP173 - IP173 Engelradingstr. 50

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1 08:40		08:14		07:20	07:10	06:06	05:21				
16:32		17:20	33	09:11 (WEA-5 E-160)	18:11	20:05	21:41				
2 08:40		08:12		09:11 (WEA-5 E-160)	07:18	07:08	06:04	05:20			
16:33		17:22	33	09:44 (WEA-5 E-160)	18:13	20:07	20:57	21:42			
3 08:40		08:11		09:11 (WEA-5 E-160)	07:16	07:06	06:02	05:19			
16:34		17:24	32	09:43 (WEA-5 E-160)	18:15	20:08	20:59	21:43			
4 08:40		08:09		09:12 (WEA-5 E-160)	07:14	07:03	06:00	05:18			
16:36		17:25	32	09:44 (WEA-5 E-160)	18:17	20:10	21:01	21:44			
5 08:40		08:07		09:13 (WEA-5 E-160)	07:12	07:01	05:58	05:18			
16:37		17:27	30	09:43 (WEA-5 E-160)	18:18	20:12	21:02	21:45			
6 08:39		08:06		09:13 (WEA-5 E-160)	07:10	06:59	05:56	05:17			
16:38		17:29	29	09:42 (WEA-5 E-160)	18:20	20:14	21:04	21:46			
7 08:39		08:04		09:14 (WEA-5 E-160)	07:07	06:56	05:55	05:16			
16:39		17:31	27	09:41 (WEA-5 E-160)	18:22	20:15	21:06	21:47			
8 08:38		08:02		09:15 (WEA-5 E-160)	07:05	06:54	05:53	05:16			
16:41		17:33	25	09:40 (WEA-5 E-160)	18:24	20:17	21:07	21:48			
9 08:38		08:00		09:17 (WEA-5 E-160)	07:03	06:52	05:51	05:15			
16:42		17:35	21	09:38 (WEA-5 E-160)	18:26	20:19	21:09	21:49			
10 08:37		07:59		09:19 (WEA-5 E-160)	07:01	06:50	05:49	05:15			
16:43		17:37	18	09:37 (WEA-5 E-160)	18:27	20:20	21:10	21:50			
11 08:37		07:57		09:22 (WEA-5 E-160)	06:58	06:48	05:48	05:14			
16:45		17:38	13	09:35 (WEA-5 E-160)	18:29	20:22	21:12	21:51			
12 08:36		09:19 (WEA-5 E-160)	07:55		06:56	06:45	05:46	05:14			
16:46	6	09:25 (WEA-5 E-160)	17:40		18:31	20:24	21:14	21:51			
13 08:36		09:17 (WEA-5 E-160)	07:53		06:54	06:43	05:44	05:14			
16:48	11	09:28 (WEA-5 E-160)	17:42		18:33	20:25	21:15	21:52			
14 08:35		09:15 (WEA-5 E-160)	07:51		06:52	06:41	05:43	05:14			
16:49	15	09:30 (WEA-5 E-160)	17:44		18:34	20:27	21:17	21:53			
15 08:34		09:14 (WEA-5 E-160)	07:49		06:49	06:39	05:41	05:13			
16:51	18	09:32 (WEA-5 E-160)	17:46		18:36	20:29	21:18	21:53			
16 08:33		09:13 (WEA-5 E-160)	07:47		06:47	06:37	05:40	05:13			
16:52	20	09:33 (WEA-5 E-160)	17:48		18:38	20:30	21:20	21:54			
17 08:32		09:13 (WEA-5 E-160)	07:45		06:45	06:34	05:38	05:13			
16:54	22	09:35 (WEA-5 E-160)	17:49		18:39	20:32	21:21	21:54			
18 08:31		09:12 (WEA-5 E-160)	07:43		06:42	06:32	05:37	05:13			
16:55	24	09:36 (WEA-5 E-160)	17:51		18:41	20:34	21:23	21:55			
19 08:30		09:11 (WEA-5 E-160)	07:41		06:40	06:30	05:35	05:13			
16:57	25	09:36 (WEA-5 E-160)	17:53		18:43	20:36	21:24	21:55			
20 08:29		09:11 (WEA-5 E-160)	07:39		06:38	06:28	05:34	05:13			
16:59	27	09:38 (WEA-5 E-160)	17:55		18:45	20:37	21:26	21:55			
21 08:28		09:11 (WEA-5 E-160)	07:37		06:35	06:26	05:33	05:14			
17:00	28	09:39 (WEA-5 E-160)	17:57		18:46	20:39	21:27	21:55			
22 08:27		09:11 (WEA-5 E-160)	07:35		06:33	06:24	05:31	05:14			
17:02	29	09:40 (WEA-5 E-160)	17:59		18:48	20:41	21:29	21:56			
23 08:26		09:10 (WEA-5 E-160)	07:33		06:31	06:22	05:30	05:14			
17:04	30	09:40 (WEA-5 E-160)	18:00		18:50	20:42	21:30	21:56			
24 08:25		09:10 (WEA-5 E-160)	07:31		06:29	06:20	05:29	05:14			
17:06	31	09:41 (WEA-5 E-160)	18:02		18:51	20:44	21:31	21:56			
25 08:23		09:10 (WEA-5 E-160)	07:29		06:26	06:18	05:28	05:15			
17:07	32	09:42 (WEA-5 E-160)	18:04		18:53	20:46	21:33	21:56			
26 08:22		09:10 (WEA-5 E-160)	07:27		06:24	06:15	05:27	05:15			
17:09	32	09:42 (WEA-5 E-160)	18:06		18:55	20:47	21:34	21:56			
27 08:21		09:10 (WEA-5 E-160)	07:25		06:22	06:13	05:25	05:15			
17:11	33	09:43 (WEA-5 E-160)	18:08		18:57	20:49	21:35	21:56			
28 08:19		09:10 (WEA-5 E-160)	07:23		06:19	06:11	05:24	05:16			
17:13	33	09:43 (WEA-5 E-160)	18:10		18:58	20:51	21:37	21:56			
29 08:18		09:10 (WEA-5 E-160)	07:21		07:17	06:09	05:23	05:16			
17:14	34	09:44 (WEA-5 E-160)	18:12		20:00	20:52	21:38	21:56			
30 08:17		09:10 (WEA-5 E-160)	07:19		07:15	06:08	05:22	05:17			
17:16	34	09:44 (WEA-5 E-160)	18:14		20:02	20:54	21:39	21:55			
31 08:15		09:10 (WEA-5 E-160)	07:17		07:12	06:05	05:21	05:15			
17:18	33	09:43 (WEA-5 E-160)	18:16		20:03	21:40	21:40	21:55			
Sonnenscheinstunden	259		278		367		416		485		498
astr.max.mögl.Beschattung	517		293								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,55		0,55								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	47		41								

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP173 - IP173 Engelradingstr. 50

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:48 (WEA-5 E-160) 08:16
	21:55	21:24	20:22	19:13	17:07	18 09:06 (WEA-5 E-160) 16:27
2	05:18	05:55	06:45	07:34	07:27	08:46 (WEA-5 E-160) 08:18
	21:55	21:22	20:20	19:10	17:05	22 09:08 (WEA-5 E-160) 16:26
3	05:19	05:57	06:47	07:35	07:29	08:45 (WEA-5 E-160) 08:19
	21:55	21:20	20:17	19:08	17:03	25 09:10 (WEA-5 E-160) 16:25
4	05:20	05:59	06:48	07:37	07:31	08:44 (WEA-5 E-160) 08:21
	21:54	21:19	20:15	19:06	17:01	27 09:11 (WEA-5 E-160) 16:25
5	05:21	06:00	06:50	07:39	07:33	08:43 (WEA-5 E-160) 08:22
	21:54	21:17	20:13	19:03	17:00	29 09:12 (WEA-5 E-160) 16:24
6	05:21	06:02	06:51	07:40	07:35	08:43 (WEA-5 E-160) 08:23
	21:53	21:15	20:10	19:01	16:58	30 09:13 (WEA-5 E-160) 16:24
7	05:22	06:03	06:53	07:42	07:36	08:42 (WEA-5 E-160) 08:24
	21:53	21:13	20:08	18:59	16:56	31 09:13 (WEA-5 E-160) 16:23
8	05:23	06:05	06:55	07:44	07:38	08:42 (WEA-5 E-160) 08:26
	21:52	21:11	20:06	18:57	16:54	32 09:14 (WEA-5 E-160) 16:23
9	05:24	06:06	06:56	07:46	07:40	08:42 (WEA-5 E-160) 08:27
	21:51	21:10	20:04	18:54	16:53	33 09:15 (WEA-5 E-160) 16:23
10	05:25	06:08	06:58	07:47	07:42	08:42 (WEA-5 E-160) 08:28
	21:51	21:08	20:01	18:52	16:51	33 09:15 (WEA-5 E-160) 16:23
11	05:26	06:10	07:00	07:49	07:43	08:42 (WEA-5 E-160) 08:29
	21:50	21:06	19:59	18:50	16:50	33 09:15 (WEA-5 E-160) 16:22
12	05:27	06:11	07:01	07:51	07:45	08:42 (WEA-5 E-160) 08:30
	21:49	21:04	19:57	18:48	16:48	34 09:16 (WEA-5 E-160) 16:22
13	05:28	06:13	07:03	07:52	07:47	08:42 (WEA-5 E-160) 08:31
	21:48	21:02	19:54	18:46	16:47	34 09:16 (WEA-5 E-160) 16:22
14	05:29	06:14	07:04	07:54	07:49	08:42 (WEA-5 E-160) 08:32
	21:47	21:00	19:52	18:43	16:45	33 09:15 (WEA-5 E-160) 16:22
15	05:31	06:16	07:06	07:56	07:51	08:42 (WEA-5 E-160) 08:33
	21:46	20:58	19:50	18:41	16:44	33 09:15 (WEA-5 E-160) 16:22
16	05:32	06:18	07:08	07:57	07:52	08:42 (WEA-5 E-160) 08:34
	21:45	20:56	19:47	18:39	16:42	33 09:15 (WEA-5 E-160) 16:22
17	05:33	06:19	07:09	07:59	07:54	08:43 (WEA-5 E-160) 08:35
	21:44	20:54	19:45	18:37	16:41	32 09:15 (WEA-5 E-160) 16:23
18	05:34	06:21	07:11	08:01	07:56	08:44 (WEA-5 E-160) 08:35
	21:43	20:52	19:43	18:35	16:40	31 09:15 (WEA-5 E-160) 16:23
19	05:36	06:22	07:12	08:03	07:57	08:45 (WEA-5 E-160) 08:36
	21:42	20:50	19:40	18:33	16:38	30 09:15 (WEA-5 E-160) 16:23
20	05:37	06:24	07:14	08:04	07:59	08:46 (WEA-5 E-160) 08:37
	21:41	20:48	19:38	18:30	16:37	29 09:15 (WEA-5 E-160) 16:23
21	05:38	06:26	07:16	08:06	08:01	08:47 (WEA-5 E-160) 08:37
	21:39	20:46	19:36	18:28	16:36	28 09:15 (WEA-5 E-160) 16:24
22	05:39	06:27	07:17	08:08	08:02	08:47 (WEA-5 E-160) 08:38
	21:38	20:44	19:33	18:26	16:35	27 09:14 (WEA-5 E-160) 16:24
23	05:41	06:29	07:19	08:10	08:04	08:48 (WEA-5 E-160) 08:38
	21:37	20:41	19:31	18:24	16:34	25 09:13 (WEA-5 E-160) 16:25
24	05:42	06:30	07:21	08:11	08:06	08:49 (WEA-5 E-160) 08:39
	21:36	20:39	19:29	18:22	16:33	24 09:13 (WEA-5 E-160) 16:25
25	05:44	06:32	07:22	07:13	08:07	08:51 (WEA-5 E-160) 08:39
	21:34	20:37	19:26	17:20	16:32	22 09:13 (WEA-5 E-160) 16:26
26	05:45	06:34	07:24	07:15	08:09	08:51 (WEA-5 E-160) 08:39
	21:33	20:35	19:24	17:18	16:31	20 09:11 (WEA-5 E-160) 16:27
27	05:47	06:35	07:26	07:17	08:10	08:53 (WEA-5 E-160) 08:40
	21:31	20:33	19:22	17:16	16:30	18 09:11 (WEA-5 E-160) 16:28
28	05:48	06:37	07:27	07:18	08:12	08:55 (WEA-5 E-160) 08:40
	21:30	20:31	19:19	17:14	16:29	15 09:10 (WEA-5 E-160) 16:28
29	05:49	06:39	07:29	07:20	08:13	08:57 (WEA-5 E-160) 08:40
	21:28	20:28	19:17	17:12	16:28	11 09:08 (WEA-5 E-160) 16:29
30	05:51	06:40	07:30	07:22	08:55 (WEA-5 E-160) 08:15	09:00 (WEA-5 E-160) 08:40
	21:27	20:26	19:15	17:10	5 09:00 (WEA-5 E-160) 16:27	6 09:06 (WEA-5 E-160) 16:30
31	05:52	06:42	07:24	07:24	08:50 (WEA-5 E-160) 08:15	09:00 (WEA-5 E-160) 08:40
	21:25	20:24	19:09	17:09	14 09:04 (WEA-5 E-160) 16:27	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung				19	798	
Red.Sonnenscheinwahrsch.				0,32	0,23	
Reduktion Betriebsdauer				0,84	0,84	
Reduktion Windrichtung				0,55	0,55	
Gesamte Reduktion				0,15	0,11	
Met.wahrsch.Beschattung				3	84	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP174 - IP174 Engelradingstr. 51

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni		
1	08:40	09:23 (WEA-5 E-160)	08:14	09:24 (WEA-5 E-160)	07:20	07:10	06:06	05:21				
	16:32	9 09:32 (WEA-5 E-160)	17:20	28 09:52 (WEA-5 E-160)	18:11	20:05	20:56	21:41				
2	08:40	09:22 (WEA-5 E-160)	08:12	09:25 (WEA-5 E-160)	07:18	07:08	06:04	05:20				
	16:33	12 09:34 (WEA-5 E-160)	17:22	26 09:51 (WEA-5 E-160)	18:13	20:07	20:57	21:42				
3	08:40	09:22 (WEA-5 E-160)	08:11	09:26 (WEA-5 E-160)	07:16	07:06	06:02	05:19				
	16:34	14 09:36 (WEA-5 E-160)	17:24	24 09:50 (WEA-5 E-160)	18:15	20:08	20:59	21:43				
4	08:40	09:22 (WEA-5 E-160)	08:09	09:28 (WEA-5 E-160)	07:14	07:03	06:00	05:18				
	16:36	16 09:38 (WEA-5 E-160)	17:25	22 09:50 (WEA-5 E-160)	18:17	20:10	21:01	21:44				
5	08:40	09:21 (WEA-5 E-160)	08:07	09:30 (WEA-5 E-160)	07:12	07:01	05:58	05:18				
	16:37	17 09:38 (WEA-5 E-160)	17:27	18 09:48 (WEA-5 E-160)	18:18	20:12	21:02	21:45				
6	08:39	09:21 (WEA-5 E-160)	08:06	09:32 (WEA-5 E-160)	07:10	06:59	05:56	05:17				
	16:38	19 09:40 (WEA-5 E-160)	17:29	13 09:45 (WEA-5 E-160)	18:20	20:14	21:04	21:46				
7	08:39	09:20 (WEA-5 E-160)	08:04		07:07	06:56	05:55	05:16				
	16:39	21 09:41 (WEA-5 E-160)	17:31		18:22	20:15	21:06	21:47				
8	08:38	09:21 (WEA-5 E-160)	08:02		07:05	06:54	05:53	05:16				
	16:41	21 09:42 (WEA-5 E-160)	17:33		18:24	20:17	21:07	21:48				
9	08:38	09:20 (WEA-5 E-160)	08:00		07:03	06:52	05:51	05:15				
	16:42	23 09:43 (WEA-5 E-160)	17:35		18:26	20:19	21:09	21:49				
10	08:37	09:20 (WEA-5 E-160)	07:59		07:01	06:50	05:49	05:15				
	16:43	24 09:44 (WEA-5 E-160)	17:37		18:27	20:20	21:10	21:50				
11	08:37	09:19 (WEA-5 E-160)	07:57		06:58	06:48	05:48	05:14				
	16:45	26 09:45 (WEA-5 E-160)	17:38		18:29	20:22	21:12	21:51				
12	08:36	09:20 (WEA-5 E-160)	07:55		06:56	06:45	05:46	05:14				
	16:46	26 09:46 (WEA-5 E-160)	17:40		18:31	20:24	21:14	21:51				
13	08:36	09:20 (WEA-5 E-160)	07:53		06:54	06:43	05:44	05:14				
	16:48	27 09:47 (WEA-5 E-160)	17:42		18:33	20:25	21:15	21:52				
14	08:35	09:19 (WEA-5 E-160)	07:51		06:52	06:41	05:43	05:14				
	16:49	29 09:48 (WEA-5 E-160)	17:44		18:34	20:27	21:17	21:53				
15	08:34	09:19 (WEA-5 E-160)	07:49		06:49	06:39	05:41	05:13				
	16:51	30 09:49 (WEA-5 E-160)	17:46		18:36	20:29	21:18	21:53				
16	08:33	09:19 (WEA-5 E-160)	07:47		06:47	06:37	05:40	05:13				
	16:52	30 09:49 (WEA-5 E-160)	17:48		18:38	20:30	21:20	21:54				
17	08:32	09:19 (WEA-5 E-160)	07:45		06:45	06:34	05:38	05:13				
	16:54	31 09:50 (WEA-5 E-160)	17:49		18:39	20:32	21:21	21:54				
18	08:31	09:19 (WEA-5 E-160)	07:43		06:42	06:32	05:37	05:13				
	16:55	32 09:51 (WEA-5 E-160)	17:51		18:41	20:34	21:23	21:55				
19	08:30	09:20 (WEA-5 E-160)	07:41		06:40	06:30	05:35	05:13				
	16:57	32 09:52 (WEA-5 E-160)	17:53		18:43	20:36	21:24	21:55				
20	08:29	09:19 (WEA-5 E-160)	07:39		06:38	06:28	05:34	05:13				
	16:59	33 09:52 (WEA-5 E-160)	17:55		18:45	20:37	21:26	21:55				
21	08:28	09:19 (WEA-5 E-160)	07:37		06:35	06:26	05:33	05:14				
	17:00	33 09:52 (WEA-5 E-160)	17:57		18:46	20:39	21:27	21:55				
22	08:27	09:20 (WEA-5 E-160)	07:35		06:33	06:24	05:31	05:14				
	17:02	33 09:53 (WEA-5 E-160)	17:59		18:48	20:41	21:29	21:56				
23	08:26	09:19 (WEA-5 E-160)	07:33		06:31	06:22	05:30	05:14				
	17:04	34 09:53 (WEA-5 E-160)	18:00		18:50	20:42	21:30	21:56				
24	08:25	09:20 (WEA-5 E-160)	07:31		06:29	06:20	05:29	05:14				
	17:06	33 09:53 (WEA-5 E-160)	18:02		18:51	20:44	21:31	21:56				
25	08:23	09:21 (WEA-5 E-160)	07:29		06:26	06:17	05:28	05:15				
	17:07	33 09:54 (WEA-5 E-160)	18:04		18:53	20:46	21:33	21:56				
26	08:22	09:20 (WEA-5 E-160)	07:27		06:24	06:15	05:26	05:15				
	17:09	33 09:53 (WEA-5 E-160)	18:06		18:55	20:47	21:34	21:56				
27	08:21	09:21 (WEA-5 E-160)	07:25		06:22	06:13	05:25	05:15				
	17:11	33 09:54 (WEA-5 E-160)	18:08		18:57	20:49	21:35	21:56				
28	08:19	09:21 (WEA-5 E-160)	07:23		06:19	06:11	05:24	05:16				
	17:13	32 09:53 (WEA-5 E-160)	18:10		18:58	20:51	21:37	21:56				
29	08:18	09:22 (WEA-5 E-160)			07:17	06:09	05:23	05:16				
	17:14	32 09:54 (WEA-5 E-160)			20:00	20:52	21:38	21:56				
30	08:17	09:23 (WEA-5 E-160)			07:15	06:08	05:22	05:17				
	17:16	30 09:53 (WEA-5 E-160)			20:02	20:54	21:39	21:55				
31	08:15	09:23 (WEA-5 E-160)			07:12		05:21					
	17:18	29 09:52 (WEA-5 E-160)			20:03		21:40					
	Sonnenscheinstunden	259		278		367		416		485		498
	astr.max.mögl.Beschattung	827		131								
	Red.Sonnenscheinwahrsch.	0,20		0,30								
	Reduktion Betriebsdauer	0,84		0,84								
	Reduktion Windrichtung	0,56		0,56								
	Gesamte Reduktion	0,09		0,14								
	Met.wahrsch.Beschattung	76		19								

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP174 - IP174 Engelradingstr. 51

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	09:01 (WEA-5 E-160)
2	05:18	05:55	06:45	07:34	07:27	16:27 26 09:27 (WEA-5 E-160)
	21:55	21:22	20:20	19:10	17:05	08:18 09:03 (WEA-5 E-160)
3	05:19	05:57	06:47	07:35	07:29	16:26 24 09:27 (WEA-5 E-160)
	21:55	21:20	20:17	19:08	17:03	08:19 09:03 (WEA-5 E-160)
4	05:20	05:59	06:48	07:37	07:31	16:25 23 09:26 (WEA-5 E-160)
	21:54	21:19	20:15	19:06	17:01	09:06 (WEA-5 E-160) 08:21 09:05 (WEA-5 E-160)
5	05:21	06:00	06:50	07:39	07:33	5 09:11 (WEA-5 E-160) 16:25 22 09:27 (WEA-5 E-160)
	21:54	21:17	20:13	19:03	17:00	09:02 (WEA-5 E-160) 08:22 09:05 (WEA-5 E-160)
6	05:21	06:02	06:51	07:40	07:35	13 09:15 (WEA-5 E-160) 16:24 21 09:26 (WEA-5 E-160)
	21:53	21:15	20:10	19:01	16:58	19 08:59 (WEA-5 E-160) 08:23 09:07 (WEA-5 E-160)
7	05:22	06:03	06:53	07:42	07:36	19 09:18 (WEA-5 E-160) 16:24 19 09:26 (WEA-5 E-160)
	21:53	21:13	20:08	18:59	16:56	22 08:58 (WEA-5 E-160) 08:24 09:08 (WEA-5 E-160)
8	05:23	06:05	06:55	07:44	07:38	22 09:20 (WEA-5 E-160) 16:23 17 09:25 (WEA-5 E-160)
	21:52	21:11	20:06	18:57	16:54	24 08:57 (WEA-5 E-160) 08:26 09:09 (WEA-5 E-160)
9	05:24	06:06	06:56	07:46	07:40	24 09:21 (WEA-5 E-160) 16:23 16 09:25 (WEA-5 E-160)
	21:51	21:10	20:04	18:54	16:53	26 08:56 (WEA-5 E-160) 08:27 09:10 (WEA-5 E-160)
10	05:25	06:08	06:58	07:47	07:42	26 09:22 (WEA-5 E-160) 16:23 14 09:24 (WEA-5 E-160)
	21:51	21:08	20:01	18:52	16:51	28 08:55 (WEA-5 E-160) 08:28 09:12 (WEA-5 E-160)
11	05:26	06:10	07:00	07:49	07:43	28 09:23 (WEA-5 E-160) 16:23 12 09:24 (WEA-5 E-160)
	21:50	21:06	19:59	18:50	16:50	29 08:55 (WEA-5 E-160) 08:29 09:14 (WEA-5 E-160)
12	05:27	06:11	07:01	07:51	07:45	29 09:24 (WEA-5 E-160) 16:22 9 09:23 (WEA-5 E-160)
	21:49	21:04	19:57	18:48	16:48	31 08:54 (WEA-5 E-160) 08:30 09:16 (WEA-5 E-160)
13	05:28	06:13	07:03	07:52	07:47	31 09:25 (WEA-5 E-160) 16:22 7 09:23 (WEA-5 E-160)
	21:48	21:02	19:54	18:46	16:47	32 08:54 (WEA-5 E-160) 08:31 09:18 (WEA-5 E-160)
14	05:29	06:14	07:04	07:54	07:49	32 09:26 (WEA-5 E-160) 16:22 3 09:21 (WEA-5 E-160)
	21:47	21:00	19:52	18:43	16:45	32 08:53 (WEA-5 E-160) 08:32 09:25 (WEA-5 E-160)
15	05:31	06:16	07:06	07:56	07:51	33 09:25 (WEA-5 E-160) 16:22 08:33 09:26 (WEA-5 E-160)
	21:46	20:58	19:50	18:41	16:44	33 08:53 (WEA-5 E-160) 08:34 09:26 (WEA-5 E-160)
16	05:32	06:18	07:08	07:57	07:52	33 08:53 (WEA-5 E-160) 08:34 09:26 (WEA-5 E-160)
	21:45	20:56	19:47	18:39	16:42	33 09:26 (WEA-5 E-160) 16:22 08:35 09:26 (WEA-5 E-160)
17	05:33	06:19	07:09	07:59	07:54	34 08:53 (WEA-5 E-160) 08:35 09:27 (WEA-5 E-160)
	21:44	20:54	19:45	18:37	16:41	34 09:27 (WEA-5 E-160) 16:23 08:35 09:27 (WEA-5 E-160)
18	05:34	06:21	07:11	08:01	07:56	33 08:54 (WEA-5 E-160) 08:35 09:27 (WEA-5 E-160)
	21:43	20:52	19:43	18:35	16:40	33 09:27 (WEA-5 E-160) 16:23 08:36 09:27 (WEA-5 E-160)
19	05:36	06:22	07:12	08:03	07:57	34 08:54 (WEA-5 E-160) 08:36 09:28 (WEA-5 E-160)
	21:42	20:50	19:40	18:33	16:38	34 09:28 (WEA-5 E-160) 16:23 08:37 09:28 (WEA-5 E-160)
20	05:37	06:24	07:14	08:04	07:59	33 08:55 (WEA-5 E-160) 08:37 09:28 (WEA-5 E-160)
	21:41	20:48	19:38	18:30	16:37	33 09:28 (WEA-5 E-160) 16:23 08:37 09:28 (WEA-5 E-160)
21	05:38	06:26	07:16	08:06	08:01	33 08:55 (WEA-5 E-160) 08:37 09:28 (WEA-5 E-160)
	21:39	20:46	19:36	18:28	16:36	33 09:28 (WEA-5 E-160) 16:24 08:38 09:28 (WEA-5 E-160)
22	05:39	06:27	07:17	08:08	08:02	33 08:55 (WEA-5 E-160) 08:38 09:28 (WEA-5 E-160)
	21:38	20:44	19:33	18:26	16:35	33 09:28 (WEA-5 E-160) 16:24 08:38 09:28 (WEA-5 E-160)
23	05:41	06:29	07:19	08:10	08:04	32 08:56 (WEA-5 E-160) 08:38 09:28 (WEA-5 E-160)
	21:37	20:41	19:31	18:24	16:34	32 09:28 (WEA-5 E-160) 16:25 08:39 09:28 (WEA-5 E-160)
24	05:42	06:30	07:21	08:11	08:06	32 08:56 (WEA-5 E-160) 08:39 09:28 (WEA-5 E-160)
	21:36	20:39	19:29	18:22	16:33	32 09:28 (WEA-5 E-160) 16:25 08:39 09:28 (WEA-5 E-160)
25	05:44	06:32	07:22	08:13	08:07	31 08:57 (WEA-5 E-160) 08:39 09:28 (WEA-5 E-160)
	21:34	20:37	19:26	17:20	16:32	31 09:28 (WEA-5 E-160) 16:26 08:39 09:28 (WEA-5 E-160)
26	05:45	06:34	07:24	08:15	08:09	31 08:57 (WEA-5 E-160) 08:39 09:28 (WEA-5 E-160)
	21:33	20:35	19:24	17:18	16:31	31 09:28 (WEA-5 E-160) 16:27 08:40 09:28 (WEA-5 E-160)
27	05:46	06:35	07:26	08:17	08:10	30 08:58 (WEA-5 E-160) 08:40 09:28 (WEA-5 E-160)
	21:31	20:33	19:22	17:16	16:30	30 09:28 (WEA-5 E-160) 16:28 08:40 09:28 (WEA-5 E-160)
28	05:48	06:37	07:27	08:18	08:12	29 08:59 (WEA-5 E-160) 08:40 09:28 (WEA-5 E-160)
	21:30	20:31	19:19	17:14	16:29	29 09:28 (WEA-5 E-160) 16:28 08:40 09:28 (WEA-5 E-160)
29	05:49	06:39	07:29	08:20	08:13	27 09:00 (WEA-5 E-160) 08:40 09:28 (WEA-5 E-160)
	21:28	20:28	19:17	17:12	16:28	27 09:27 (WEA-5 E-160) 16:29 09:01 (WEA-5 E-160)
30	05:51	06:40	07:30	08:22	08:15	26 09:01 (WEA-5 E-160) 08:40 09:27 (WEA-5 E-160)
	21:27	20:26	19:15	17:10	16:27	26 09:27 (WEA-5 E-160) 16:30 09:25 (WEA-5 E-160)
31	05:52	06:42	07:32	08:24	08:17	08:40 09:31 (WEA-5 E-160)
	21:25	20:24	17:09	16:31	6 09:31 (WEA-5 E-160)	
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					765	219
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,56	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					82	15

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP198 - IP198 Marbecker Straße 81

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:37 (WEA-3 E-160)	08:14	09:18 (WEA-4 E-160)	07:21	07:10	06:06	05:21			
	16:32	23 10:00 (WEA-3 E-160)	17:20	28 09:46 (WEA-4 E-160)	18:11	20:05	20:56	21:41			
2	08:40	09:37 (WEA-3 E-160)	08:12	09:19 (WEA-4 E-160)	07:18	07:08	06:04	05:20			
	16:33	22 09:59 (WEA-3 E-160)	17:22	26 09:45 (WEA-4 E-160)	18:13	20:07	20:57	21:42			
3	08:40	09:38 (WEA-3 E-160)	08:11	09:20 (WEA-4 E-160)	07:16	07:06	06:02	05:19			
	16:35	22 10:00 (WEA-3 E-160)	17:24	24 09:44 (WEA-4 E-160)	18:15	20:08	20:59	21:43			
4	08:40	09:39 (WEA-3 E-160)	08:09	09:22 (WEA-4 E-160)	07:14	07:03	06:00	05:18			
	16:36	21 10:00 (WEA-3 E-160)	17:26	22 09:44 (WEA-4 E-160)	18:17	20:10	21:01	21:45			
5	08:40	09:22 (WEA-4 E-160)	08:07	09:23 (WEA-4 E-160)	07:12	07:01	05:58	05:18			
	16:37	25 10:00 (WEA-3 E-160)	17:27	19 09:42 (WEA-4 E-160)	18:19	20:12	21:02	21:46			
6	08:39	09:20 (WEA-4 E-160)	08:06	09:25 (WEA-4 E-160)	07:10	06:59	05:56	05:17			
	16:38	29 10:00 (WEA-3 E-160)	17:29	15 09:40 (WEA-4 E-160)	18:20	20:14	21:04	21:46			
7	08:39	09:18 (WEA-4 E-160)	08:04	09:28 (WEA-4 E-160)	07:07	06:57	05:55	05:16			
	16:39	32 10:00 (WEA-3 E-160)	17:31	9 09:37 (WEA-4 E-160)	18:22	20:15	21:06	21:47			
8	08:39	09:18 (WEA-4 E-160)	08:02	07:05	06:54	05:53	05:16				
	16:41	34 10:01 (WEA-3 E-160)	17:33	18:24	20:17	21:07	21:48				
9	08:38	09:17 (WEA-4 E-160)	08:00	07:03	06:52	05:51	05:15				
	16:42	34 10:00 (WEA-3 E-160)	17:35	18:26	20:19	21:09	21:49				
10	08:38	09:16 (WEA-4 E-160)	07:59	07:01	06:50	05:49	05:15				
	16:43	36 10:00 (WEA-3 E-160)	17:37	18:27	20:20	21:10	21:50				
11	08:37	09:16 (WEA-4 E-160)	07:57	06:58	06:48	05:48	05:15				
	16:45	35 09:59 (WEA-3 E-160)	17:38	18:29	20:22	21:12	21:51				
12	08:36	09:16 (WEA-4 E-160)	07:55	06:56	06:45	05:46	05:14				
	16:46	34 09:59 (WEA-3 E-160)	17:40	18:31	20:24	21:14	21:51				
13	08:36	09:16 (WEA-4 E-160)	07:53	06:54	06:43	05:44	05:14				
	16:48	33 09:58 (WEA-3 E-160)	17:42	18:33	20:25	21:15	21:52				
14	08:35	09:15 (WEA-4 E-160)	07:51	06:52	06:41	05:43	05:14				
	16:49	30 09:56 (WEA-3 E-160)	17:44	18:34	20:27	21:17	21:53				
15	08:34	09:15 (WEA-4 E-160)	07:49	06:49	06:39	05:41	05:14				
	16:51	26 09:41 (WEA-4 E-160)	17:46	18:36	20:29	21:18	21:53				
16	08:33	09:15 (WEA-4 E-160)	07:47	06:47	06:37	05:40	05:13				
	16:52	27 09:42 (WEA-4 E-160)	17:48	18:38	20:31	21:20	21:54				
17	08:32	09:15 (WEA-4 E-160)	07:45	06:45	06:34	05:38	05:13				
	16:54	28 09:43 (WEA-4 E-160)	17:50	18:40	20:32	21:21	21:54				
18	08:31	09:15 (WEA-4 E-160)	07:43	06:42	06:32	05:37	05:13				
	16:56	28 09:43 (WEA-4 E-160)	17:51	18:41	20:34	21:23	21:55				
19	08:30	09:15 (WEA-4 E-160)	07:41	06:40	06:30	05:35	05:13				
	16:57	29 09:44 (WEA-4 E-160)	17:53	18:43	20:36	21:24	21:55				
20	08:29	09:14 (WEA-4 E-160)	07:39	06:38	06:28	05:34	05:13				
	16:59	30 09:44 (WEA-4 E-160)	17:55	18:45	20:37	21:26	21:55				
21	08:28	09:14 (WEA-4 E-160)	07:37	06:36	06:26	05:33	05:14				
	17:01	31 09:45 (WEA-4 E-160)	17:57	18:46	20:39	21:27	21:55				
22	08:27	09:15 (WEA-4 E-160)	07:35	06:33	06:24	05:31	05:14				
	17:02	31 09:46 (WEA-4 E-160)	17:59	18:48	20:41	21:29	21:56				
23	08:26	09:14 (WEA-4 E-160)	07:33	06:31	06:22	05:30	05:14				
	17:04	32 09:46 (WEA-4 E-160)	18:01	18:50	20:42	21:30	21:56				
24	08:25	09:15 (WEA-4 E-160)	07:31	06:29	06:20	05:29	05:14				
	17:06	31 09:46 (WEA-4 E-160)	18:02	18:51	20:44	21:31	21:56				
25	08:24	09:15 (WEA-4 E-160)	07:29	06:26	06:18	05:28	05:15				
	17:07	32 09:47 (WEA-4 E-160)	18:04	18:53	20:46	21:33	21:56				
26	08:22	09:15 (WEA-4 E-160)	07:27	06:24	06:16	05:27	05:15				
	17:09	32 09:47 (WEA-4 E-160)	18:06	18:55	20:47	21:34	21:56				
27	08:21	09:16 (WEA-4 E-160)	07:25	06:22	06:14	05:26	05:15				
	17:11	31 09:47 (WEA-4 E-160)	18:08	18:57	20:49	21:35	21:56				
28	08:20	09:16 (WEA-4 E-160)	07:23	06:19	06:12	05:24	05:16				
	17:13	31 09:47 (WEA-4 E-160)	18:10	18:58	20:51	21:37	21:56				
29	08:18	09:17 (WEA-4 E-160)		07:17	06:10	05:23	05:17				
	17:15	30 09:47 (WEA-4 E-160)		20:00	20:52	21:38	21:56				
30	08:17	09:17 (WEA-4 E-160)		07:15	06:08	05:22	05:17				
	17:16	30 09:47 (WEA-4 E-160)		20:02	20:54	21:39	21:55				
31	08:15	09:17 (WEA-4 E-160)		07:13		05:22					
	17:18	29 09:46 (WEA-4 E-160)		20:03		21:40					
	Sonnenscheinstunden	259	278	367	416	485	498				
	astr.max.mögl.Beschattung	918	143								
	Red.Sonnenscheinwahrsch.	0,20	0,30								
	Reduktion Betriebsdauer	0,84	0,84								
	Reduktion Windrichtung	0,56	0,55								
	Gesamte Reduktion	0,09	0,14								
	Met.wahrsch.Beschattung	84	20								

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP198 - IP198 Marbecker Straße 81

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:16
	21:55	21:24	20:22	19:13	17:07	16:27
2	05:18	05:56	06:45	07:34	07:27	08:18
	21:55	21:22	20:20	19:10	17:05	16:26
3	05:19	05:57	06:47	07:36	07:29	08:19
	21:55	21:20	20:17	19:08	17:03	16:25
4	05:20	05:59	06:48	07:37	07:31	08:57 (WEA-4 E-160)
	21:54	21:19	20:15	19:06	17:01	16:25
5	05:21	06:00	06:50	07:39	07:33	08:54 (WEA-4 E-160)
	21:54	21:17	20:13	19:03	17:00	16:24
6	05:22	06:02	06:52	07:41	07:35	08:53 (WEA-4 E-160)
	21:53	21:15	20:11	19:01	16:58	16:24
7	05:22	06:03	06:53	07:42	07:36	08:51 (WEA-4 E-160)
	21:53	21:13	20:08	18:59	16:56	16:24
8	05:23	06:05	06:55	07:44	07:38	08:50 (WEA-4 E-160)
	21:52	21:11	20:06	18:57	16:55	16:23
9	05:24	06:06	06:56	07:46	07:40	08:50 (WEA-4 E-160)
	21:51	21:10	20:04	18:54	16:53	16:23
10	05:25	06:08	06:58	07:47	07:42	08:49 (WEA-4 E-160)
	21:51	21:08	20:01	18:52	16:51	16:23
11	05:26	06:10	07:00	07:49	07:44	08:49 (WEA-4 E-160)
	21:50	21:06	19:59	18:50	16:50	16:22
12	05:27	06:11	07:01	07:51	07:45	08:49 (WEA-4 E-160)
	21:49	21:04	19:57	18:48	16:48	16:22
13	05:28	06:13	07:03	07:52	07:47	08:48 (WEA-4 E-160)
	21:48	21:02	19:54	18:46	16:47	16:22
14	05:30	06:14	07:04	07:54	07:49	08:48 (WEA-4 E-160)
	21:47	21:00	19:52	18:43	16:45	16:22
15	05:31	06:16	07:06	07:56	07:51	08:48 (WEA-4 E-160)
	21:46	20:58	19:50	18:41	16:44	16:22
16	05:32	06:18	07:08	07:58	07:52	08:48 (WEA-4 E-160)
	21:45	20:56	19:47	18:39	16:42	16:23
17	05:33	06:19	07:09	07:59	07:54	08:48 (WEA-4 E-160)
	21:44	20:54	19:45	18:37	16:41	16:23
18	05:34	06:21	07:11	08:01	07:56	08:49 (WEA-4 E-160)
	21:43	20:52	19:43	18:35	16:40	16:23
19	05:36	06:22	07:13	08:03	07:57	08:49 (WEA-4 E-160)
	21:42	20:50	19:40	18:33	16:38	16:23
20	05:37	06:24	07:14	08:04	07:59	08:50 (WEA-4 E-160)
	21:41	20:48	19:38	18:31	16:37	16:24
21	05:38	06:26	07:16	08:06	08:01	08:50 (WEA-4 E-160)
	21:40	20:46	19:36	18:28	16:36	16:24
22	05:40	06:27	07:17	08:08	08:02	08:50 (WEA-4 E-160)
	21:38	20:44	19:33	18:26	16:35	16:24
23	05:41	06:29	07:19	08:10	08:04	08:51 (WEA-4 E-160)
	21:37	20:42	19:31	18:24	16:34	16:25
24	05:42	06:31	07:21	08:11	08:06	08:52 (WEA-4 E-160)
	21:36	20:39	19:29	18:22	16:33	16:26
25	05:44	06:32	07:22	07:13	08:07	08:53 (WEA-4 E-160)
	21:34	20:37	19:27	17:20	16:32	16:26
26	05:45	06:34	07:24	07:15	08:09	08:53 (WEA-4 E-160)
	21:33	20:35	19:24	17:18	16:31	16:27
27	05:47	06:35	07:26	07:17	08:10	08:54 (WEA-4 E-160)
	21:31	20:33	19:22	17:16	16:30	16:28
28	05:48	06:37	07:27	07:19	08:12	08:55 (WEA-4 E-160)
	21:30	20:31	19:20	17:14	16:29	16:28
29	05:50	06:39	07:29	07:20	08:14	08:56 (WEA-4 E-160)
	21:28	20:29	19:17	17:12	16:28	16:29
30	05:51	06:40	07:31	07:22	08:15	08:57 (WEA-4 E-160)
	21:27	20:26	19:15	17:11	16:27	16:30
31	05:53	06:42	07:33	07:24	08:16	08:40
	21:25	20:24	19:09	17:09	16:31	16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung					755	788
Red.Sonnenscheinwahrsch.					0,23	0,15
Reduktion Betriebsdauer					0,84	0,84
Reduktion Windrichtung					0,55	0,56
Gesamte Reduktion					0,11	0,07
Met.wahrsch.Beschattung					80	55

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP199 - IP199 Marbecker Straße 85

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:23 (WEA-3 E-160)	08:14	09:00 (WEA-4 E-160)	07:21	07:10	06:06	05:21			
	16:32	25 09:48 (WEA-3 E-160)	17:20	32 09:32 (WEA-4 E-160)	18:11	20:05	20:56	21:41			
2	08:40	09:23 (WEA-3 E-160)	08:12	08:59 (WEA-4 E-160)	07:18	07:08	06:04	05:20			
	16:33	25 09:48 (WEA-3 E-160)	17:22	33 09:32 (WEA-4 E-160)	18:13	20:07	20:57	21:42			
3	08:40	09:24 (WEA-3 E-160)	08:11	08:59 (WEA-4 E-160)	07:16	07:06	06:02	05:19			
	16:35	25 09:49 (WEA-3 E-160)	17:24	33 09:32 (WEA-4 E-160)	18:15	20:08	20:59	21:43			
4	08:40	09:25 (WEA-3 E-160)	08:09	09:00 (WEA-4 E-160)	07:14	07:03	06:00	05:18			
	16:36	25 09:50 (WEA-3 E-160)	17:26	32 09:32 (WEA-4 E-160)	18:17	20:10	21:01	21:45			
5	08:40	09:24 (WEA-3 E-160)	08:07	09:00 (WEA-4 E-160)	07:12	07:01	05:58	05:18			
	16:37	26 09:50 (WEA-3 E-160)	17:27	32 09:32 (WEA-4 E-160)	18:19	20:12	21:02	21:46			
6	08:39	09:25 (WEA-3 E-160)	08:06	09:00 (WEA-4 E-160)	07:10	06:59	05:56	05:17			
	16:38	25 09:50 (WEA-3 E-160)	17:29	32 09:32 (WEA-4 E-160)	18:20	20:14	21:04	21:46			
7	08:39	09:25 (WEA-3 E-160)	08:04	09:00 (WEA-4 E-160)	07:07	06:57	05:55	05:16			
	16:39	25 09:50 (WEA-3 E-160)	17:31	31 09:31 (WEA-4 E-160)	18:22	20:15	21:06	21:47			
8	08:39	09:26 (WEA-3 E-160)	08:02	09:01 (WEA-4 E-160)	07:05	06:54	05:53	05:16			
	16:41	25 09:51 (WEA-3 E-160)	17:33	30 09:31 (WEA-4 E-160)	18:24	20:17	21:07	21:48			
9	08:38	09:26 (WEA-3 E-160)	08:00	09:01 (WEA-4 E-160)	07:03	06:52	05:51	05:15			
	16:42	25 09:51 (WEA-3 E-160)	17:35	29 09:30 (WEA-4 E-160)	18:26	20:19	21:09	21:49			
10	08:38	09:27 (WEA-3 E-160)	07:59	09:03 (WEA-4 E-160)	07:01	06:50	05:49	05:15			
	16:43	24 09:51 (WEA-3 E-160)	17:37	27 09:30 (WEA-4 E-160)	18:27	20:20	21:10	21:50			
11	08:37	09:27 (WEA-3 E-160)	07:57	09:04 (WEA-4 E-160)	06:58	06:48	05:48	05:15			
	16:45	24 09:51 (WEA-3 E-160)	17:38	25 09:29 (WEA-4 E-160)	18:29	20:22	21:12	21:51			
12	08:36	09:28 (WEA-3 E-160)	07:55	09:05 (WEA-4 E-160)	06:56	06:45	05:46	05:14			
	16:46	24 09:52 (WEA-3 E-160)	17:40	23 09:28 (WEA-4 E-160)	18:31	20:24	21:14	21:51			
13	08:36	09:29 (WEA-3 E-160)	07:53	09:06 (WEA-4 E-160)	06:54	06:43	05:44	05:14			
	16:48	23 09:52 (WEA-3 E-160)	17:42	21 09:27 (WEA-4 E-160)	18:33	20:25	21:15	21:52			
14	08:35	09:29 (WEA-3 E-160)	07:51	09:09 (WEA-4 E-160)	06:52	06:41	05:43	05:14			
	16:49	23 09:52 (WEA-3 E-160)	17:44	15 09:24 (WEA-4 E-160)	18:34	20:27	21:17	21:53			
15	08:34	09:30 (WEA-3 E-160)	07:49	09:12 (WEA-4 E-160)	06:49	06:39	05:41	05:14			
	16:51	22 09:52 (WEA-3 E-160)	17:46	9 09:21 (WEA-4 E-160)	18:36	20:29	21:18	21:53			
16	08:33	09:31 (WEA-3 E-160)	07:47		06:47	06:37	05:40	05:13			
	16:52	21 09:52 (WEA-3 E-160)	17:48		18:38	20:31	21:20	21:54			
17	08:32	09:32 (WEA-3 E-160)	07:45		06:45	06:34	05:38	05:13			
	16:54	20 09:52 (WEA-3 E-160)	17:50		18:40	20:32	21:21	21:54			
18	08:31	09:33 (WEA-3 E-160)	07:43		06:42	06:32	05:37	05:13			
	16:56	19 09:52 (WEA-3 E-160)	17:51		18:41	20:34	21:23	21:55			
19	08:30	09:34 (WEA-3 E-160)	07:41		06:40	06:30	05:35	05:13			
	16:57	17 09:51 (WEA-3 E-160)	17:53		18:43	20:36	21:24	21:55			
20	08:29	09:08 (WEA-4 E-160)	07:39		06:38	06:28	05:34	05:13			
	16:59	24 09:50 (WEA-3 E-160)	17:55		18:45	20:37	21:26	21:55			
21	08:28	09:06 (WEA-4 E-160)	07:37		06:36	06:26	05:33	05:14			
	17:01	25 09:48 (WEA-3 E-160)	17:57		18:46	20:39	21:27	21:55			
22	08:27	09:05 (WEA-4 E-160)	07:35		06:33	06:24	05:31	05:14			
	17:02	23 09:46 (WEA-3 E-160)	17:59		18:48	20:41	21:29	21:56			
23	08:26	09:03 (WEA-4 E-160)	07:33		06:31	06:22	05:30	05:14			
	17:04	20 09:23 (WEA-4 E-160)	18:01		18:50	20:42	21:30	21:56			
24	08:25	09:02 (WEA-4 E-160)	07:31		06:29	06:20	05:29	05:14			
	17:06	23 09:25 (WEA-4 E-160)	18:02		18:51	20:44	21:31	21:56			
25	08:24	09:02 (WEA-4 E-160)	07:29		06:26	06:18	05:28	05:15			
	17:07	25 09:27 (WEA-4 E-160)	18:04		18:53	20:46	21:33	21:56			
26	08:22	09:01 (WEA-4 E-160)	07:27		06:24	06:16	05:27	05:15			
	17:09	26 09:27 (WEA-4 E-160)	18:06		18:55	20:47	21:34	21:56			
27	08:21	09:01 (WEA-4 E-160)	07:25		06:22	06:14	05:26	05:16			
	17:11	28 09:29 (WEA-4 E-160)	18:08		18:57	20:49	21:35	21:56			
28	08:20	09:00 (WEA-4 E-160)	07:23		06:19	06:12	05:24	05:16			
	17:13	29 09:29 (WEA-4 E-160)	18:10		18:58	20:51	21:37	21:56			
29	08:18	09:00 (WEA-4 E-160)			07:17	06:10	05:23	05:17			
	17:15	30 09:30 (WEA-4 E-160)			20:00	20:52	21:38	21:56			
30	08:17	09:00 (WEA-4 E-160)			07:15	06:08	05:22	05:17			
	17:16	30 09:30 (WEA-4 E-160)			20:02	20:54	21:39	21:55			
31	08:15	08:59 (WEA-4 E-160)			07:13		05:22				
	17:18	32 09:31 (WEA-4 E-160)			20:03		21:40				
Sonnenscheinstunden	259		278		367	416	485	498			
astr.max.mögl.Beschattung	758		404								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,56		0,57								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	70		58								

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP199 - IP199 Marbecker Straße 85

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	07:26	08:31 (WEA-4 E-160) 08:16
	21:55	21:24	20:22	19:13	17:07	28 08:59 (WEA-4 E-160) 16:27
2	05:18	05:56	06:45	07:34	07:27	08:31 (WEA-4 E-160) 08:18
	21:55	21:22	20:20	19:10	17:05	29 09:00 (WEA-4 E-160) 16:26
3	05:19	05:57	06:47	07:36	07:29	08:30 (WEA-4 E-160) 08:19
	21:55	21:20	20:17	19:08	17:03	31 09:01 (WEA-4 E-160) 16:25
4	05:20	05:59	06:48	07:37	07:31	08:30 (WEA-4 E-160) 08:21
	21:54	21:19	20:15	19:06	17:01	31 09:01 (WEA-4 E-160) 16:25
5	05:21	06:00	06:50	07:39	07:33	08:30 (WEA-4 E-160) 08:22
	21:54	21:17	20:13	19:03	17:00	32 09:02 (WEA-4 E-160) 16:24
6	05:22	06:02	06:52	07:41	07:35	08:30 (WEA-4 E-160) 08:23
	21:53	21:15	20:11	19:01	16:58	32 09:02 (WEA-4 E-160) 16:24
7	05:22	06:03	06:53	07:42	07:36	08:30 (WEA-4 E-160) 08:24
	21:53	21:13	20:08	18:59	16:56	32 09:02 (WEA-4 E-160) 16:24
8	05:23	06:05	06:55	07:44	07:38	08:30 (WEA-4 E-160) 08:26
	21:52	21:11	20:06	18:57	16:55	32 09:02 (WEA-4 E-160) 16:23
9	05:24	06:06	06:56	07:46	07:40	08:30 (WEA-4 E-160) 08:27
	21:51	21:10	20:04	18:54	16:53	33 09:03 (WEA-4 E-160) 16:23
10	05:25	06:08	06:58	07:47	07:42	08:31 (WEA-4 E-160) 08:28
	21:51	21:08	20:01	18:52	16:51	32 09:03 (WEA-4 E-160) 16:23
11	05:26	06:10	07:00	07:49	07:44	08:31 (WEA-4 E-160) 08:29
	21:50	21:06	19:59	18:50	16:50	31 09:02 (WEA-4 E-160) 16:23
12	05:27	06:11	07:01	07:51	07:45	08:32 (WEA-4 E-160) 08:30
	21:49	21:04	19:57	18:48	16:48	30 09:02 (WEA-4 E-160) 16:22
13	05:28	06:13	07:03	07:52	07:47	08:32 (WEA-4 E-160) 08:31
	21:48	21:02	19:54	18:46	16:47	30 09:02 (WEA-4 E-160) 16:22
14	05:30	06:14	07:04	07:54	07:49	08:33 (WEA-4 E-160) 08:32
	21:47	21:00	19:52	18:43	16:45	29 09:02 (WEA-4 E-160) 16:22
15	05:31	06:16	07:06	07:56	07:51	08:33 (WEA-4 E-160) 08:33
	21:46	20:58	19:50	18:41	16:44	28 09:01 (WEA-4 E-160) 16:22
16	05:32	06:18	07:08	07:58	07:52	08:34 (WEA-4 E-160) 08:34
	21:45	20:56	19:47	18:39	16:42	26 09:00 (WEA-4 E-160) 16:23
17	05:33	06:19	07:09	07:59	07:54	08:35 (WEA-4 E-160) 08:35
	21:44	20:54	19:45	18:37	16:41	25 09:00 (WEA-4 E-160) 16:23
18	05:34	06:21	07:11	08:01	07:56	08:36 (WEA-4 E-160) 08:35
	21:43	20:52	19:43	18:35	16:40	23 08:59 (WEA-4 E-160) 16:23
19	05:36	06:22	07:13	08:03	07:57	08:38 (WEA-4 E-160) 08:36
	21:42	20:50	19:40	18:33	16:38	20 08:58 (WEA-4 E-160) 16:23
20	05:37	06:24	07:14	08:04	07:59	08:40 (WEA-4 E-160) 08:37
	21:41	20:48	19:38	18:31	16:37	22 09:21 (WEA-3 E-160) 16:24
21	05:38	06:26	07:16	08:06	08:01	08:42 (WEA-4 E-160) 08:37
	21:40	20:46	19:36	18:28	16:36	25 09:24 (WEA-3 E-160) 16:24
22	05:40	06:27	07:17	08:08	08:02	08:44 (WEA-4 E-160) 08:38
	21:38	20:44	19:33	18:26	16:35	24 09:26 (WEA-3 E-160) 16:24
23	05:41	06:29	07:19	08:10	08:04	09:11 (WEA-3 E-160) 08:38
	21:37	20:42	19:31	18:24	16:34	16 09:27 (WEA-3 E-160) 16:25
24	05:42	06:31	07:21	08:11	08:06	09:10 (WEA-3 E-160) 08:39
	21:36	20:39	19:29	18:22	16:33	19 09:29 (WEA-3 E-160) 16:26
25	05:44	06:32	07:22	07:13	08:07	09:10 (WEA-3 E-160) 08:39
	21:34	20:37	19:27	17:20	16:32	20 09:30 (WEA-3 E-160) 16:26
26	05:45	06:34	07:24	07:15	08:09	09:09 (WEA-3 E-160) 08:40
	21:33	20:35	19:24	17:18	16:31	21 09:30 (WEA-3 E-160) 16:27
27	05:47	06:35	07:26	07:17	08:10	09:09 (WEA-3 E-160) 08:40
	21:31	20:33	19:22	17:16	16:30	22 09:31 (WEA-3 E-160) 16:28
28	05:48	06:37	07:27	07:19	08:12	09:10 (WEA-3 E-160) 08:40
	21:30	20:31	19:20	17:14	16:29	22 09:32 (WEA-3 E-160) 16:28
29	05:50	06:39	07:29	07:20	08:14	09:09 (WEA-3 E-160) 08:40
	21:28	20:29	19:17	17:12	16:28	23 09:32 (WEA-3 E-160) 16:29
30	05:51	06:40	07:31	07:22	08:15	09:09 (WEA-3 E-160) 08:40
	21:27	20:26	19:15	17:11	16:27	24 09:33 (WEA-3 E-160) 16:30
31	05:53	06:42	07:32	07:24	08:16	09:10 (WEA-3 E-160) 08:40
	21:25	20:24	19:14	17:09	16:26	24 09:34 (WEA-3 E-160) 16:31
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung				100	792	755
Red.Sonnenscheinwahrsch.				0,32	0,23	0,15
Reduktion Betriebsdauer				0,84	0,84	0,84
Reduktion Windrichtung				0,57	0,56	0,56
Gesamte Reduktion				0,15	0,11	0,07
Met.wahrsch.Beschattung				15	86	52

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP200 - IP200 Marbecker Straße 89

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni			
1 08:40	09:14 (WEA-3 E-160)	08:14	08:49 (WEA-4 E-160)	07:21	07:10	05:21			
16:32	18	09:32 (WEA-3 E-160)	17:20	21	09:10 (WEA-4 E-160)	18:11	20:05	20:56	21:41
2 08:40	09:13 (WEA-3 E-160)	08:12	08:48 (WEA-4 E-160)	07:18	07:08	06:04	05:20		
16:33	19	09:32 (WEA-3 E-160)	17:22	23	09:11 (WEA-4 E-160)	18:13	20:07	20:57	21:42
3 08:40	09:14 (WEA-3 E-160)	08:11	08:47 (WEA-4 E-160)	07:16	07:06	06:02	05:19		
16:35	19	09:33 (WEA-3 E-160)	17:24	25	09:12 (WEA-4 E-160)	18:15	20:08	20:59	21:43
4 08:40	09:14 (WEA-3 E-160)	08:09	08:47 (WEA-4 E-160)	07:14	07:03	06:00	05:18		
16:36	20	09:34 (WEA-3 E-160)	17:26	27	09:14 (WEA-4 E-160)	18:17	20:10	21:01	21:45
5 08:40	09:14 (WEA-3 E-160)	08:07	08:46 (WEA-4 E-160)	07:12	07:01	05:58	05:18		
16:37	20	09:34 (WEA-3 E-160)	17:27	28	09:14 (WEA-4 E-160)	18:19	20:12	21:02	21:46
6 08:39	09:14 (WEA-3 E-160)	08:06	08:45 (WEA-4 E-160)	07:10	06:59	05:56	05:17		
16:38	22	09:36 (WEA-3 E-160)	17:29	30	09:15 (WEA-4 E-160)	18:20	20:14	21:04	21:46
7 08:39	09:14 (WEA-3 E-160)	08:04	08:45 (WEA-4 E-160)	07:07	06:57	05:55	05:16		
16:39	22	09:36 (WEA-3 E-160)	17:31	30	09:15 (WEA-4 E-160)	18:22	20:15	21:06	21:47
8 08:39	09:15 (WEA-3 E-160)	08:02	08:44 (WEA-4 E-160)	07:05	06:54	05:53	05:16		
16:41	22	09:37 (WEA-3 E-160)	17:33	31	09:15 (WEA-4 E-160)	18:24	20:17	21:07	21:48
9 08:38	09:15 (WEA-3 E-160)	08:00	08:45 (WEA-4 E-160)	07:03	06:52	05:51	05:15		
16:42	23	09:38 (WEA-3 E-160)	17:35	32	09:17 (WEA-4 E-160)	18:26	20:19	21:09	21:49
10 08:38	09:14 (WEA-3 E-160)	07:59	08:45 (WEA-4 E-160)	07:01	06:50	05:49	05:15		
16:43	24	09:38 (WEA-3 E-160)	17:37	32	09:17 (WEA-4 E-160)	18:27	20:20	21:10	21:50
11 08:37	09:14 (WEA-3 E-160)	07:57	08:45 (WEA-4 E-160)	06:58	06:48	05:48	05:15		
16:45	24	09:38 (WEA-3 E-160)	17:38	32	09:17 (WEA-4 E-160)	18:29	20:22	21:12	21:51
12 08:36	09:15 (WEA-3 E-160)	07:55	08:45 (WEA-4 E-160)	06:56	06:45	05:46	05:14		
16:46	25	09:40 (WEA-3 E-160)	17:40	31	09:16 (WEA-4 E-160)	18:31	20:24	21:14	21:51
13 08:36	09:15 (WEA-3 E-160)	07:53	08:45 (WEA-4 E-160)	06:54	06:43	05:44	05:14		
16:48	25	09:40 (WEA-3 E-160)	17:42	31	09:16 (WEA-4 E-160)	18:33	20:25	21:15	21:52
14 08:35	09:16 (WEA-3 E-160)	07:51	08:45 (WEA-4 E-160)	06:52	06:41	05:43	05:14		
16:49	25	09:41 (WEA-3 E-160)	17:44	31	09:16 (WEA-4 E-160)	18:34	20:27	21:17	21:53
15 08:34	09:16 (WEA-3 E-160)	07:49	08:46 (WEA-4 E-160)	06:49	06:39	05:41	05:14		
16:51	25	09:41 (WEA-3 E-160)	17:46	29	09:15 (WEA-4 E-160)	18:36	20:29	21:18	21:53
16 08:33	09:16 (WEA-3 E-160)	07:47	08:47 (WEA-4 E-160)	06:47	06:37	05:40	05:13		
16:52	25	09:41 (WEA-3 E-160)	17:48	28	09:15 (WEA-4 E-160)	18:38	20:31	21:20	21:54
17 08:32	09:17 (WEA-3 E-160)	07:45	08:47 (WEA-4 E-160)	06:45	06:34	05:38	05:13		
16:54	25	09:42 (WEA-3 E-160)	17:50	27	09:14 (WEA-4 E-160)	18:40	20:32	21:21	21:54
18 08:31	09:17 (WEA-3 E-160)	07:43	08:49 (WEA-4 E-160)	06:42	06:32	05:37	05:13		
16:56	25	09:42 (WEA-3 E-160)	17:51	23	09:12 (WEA-4 E-160)	18:41	20:34	21:23	21:55
19 08:30	09:18 (WEA-3 E-160)	07:41	08:50 (WEA-4 E-160)	06:40	06:30	05:35	05:13		
16:57	24	09:42 (WEA-3 E-160)	17:53	21	09:11 (WEA-4 E-160)	18:43	20:36	21:24	21:55
20 08:29	09:18 (WEA-3 E-160)	07:39	08:51 (WEA-4 E-160)	06:38	06:28	05:34	05:13		
16:59	24	09:42 (WEA-3 E-160)	17:55	17	09:08 (WEA-4 E-160)	18:45	20:37	21:26	21:55
21 08:28	09:19 (WEA-3 E-160)	07:37	08:54 (WEA-4 E-160)	06:36	06:26	05:33	05:14		
17:01	23	09:42 (WEA-3 E-160)	17:57	11	09:05 (WEA-4 E-160)	18:46	20:39	21:27	21:55
22 08:27	09:20 (WEA-3 E-160)	07:35	06:33	06:24	05:31	05:14			
17:02	22	09:42 (WEA-3 E-160)	17:59	18:48	20:41	21:29	21:56		
23 08:26	09:20 (WEA-3 E-160)	07:33	06:31	06:22	05:30	05:14			
17:04	21	09:41 (WEA-3 E-160)	18:01	18:50	20:42	21:30	21:56		
24 08:25	09:21 (WEA-3 E-160)	07:31	06:29	06:20	05:29	05:14			
17:06	20	09:41 (WEA-3 E-160)	18:02	18:51	20:44	21:31	21:56		
25 08:24	09:23 (WEA-3 E-160)	07:29	06:26	06:18	05:28	05:15			
17:07	18	09:41 (WEA-3 E-160)	18:04	18:53	20:46	21:33	21:56		
26 08:22	09:23 (WEA-3 E-160)	07:27	06:24	06:16	05:27	05:15			
17:09	16	09:39 (WEA-3 E-160)	18:06	18:55	20:47	21:34	21:56		
27 08:21	09:26 (WEA-3 E-160)	07:25	06:22	06:14	05:26	05:16			
17:11	12	09:38 (WEA-3 E-160)	18:08	18:57	20:49	21:35	21:56		
28 08:20	09:28 (WEA-3 E-160)	07:23	06:19	06:12	05:24	05:16			
17:13	8	09:36 (WEA-3 E-160)	18:10	18:58	20:51	21:37	21:56		
29 08:18	08:56 (WEA-4 E-160)		07:17	06:10	05:23	05:17			
17:15	7	09:03 (WEA-4 E-160)	20:00	20:52	21:38	21:56			
30 08:17	08:52 (WEA-4 E-160)		07:15	06:08	05:22	05:17			
17:16	14	09:06 (WEA-4 E-160)	20:02	20:54	21:39	21:55			
31 08:15	08:50 (WEA-4 E-160)		07:13	05:22					
17:18	18	09:08 (WEA-4 E-160)	20:03	21:40					
Sonnenscheinstunden	259	278	367	416	485	498			
astr.max.mögl.Beschattung	635	560							
Red.Sonnenscheinwahrsch.	0,20	0,30							
Reduktion Betriebsdauer	0,84	0,84							
Reduktion Windrichtung	0,56	0,58							
Gesamte Reduktion	0,09	0,15							
Met.wahrsch.Beschattung	58	83							

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP200 - IP200 Marbecker Straße 89

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober		November	Dezember		
1	05:18 21:55	05:54 21:24	06:43 20:22	07:32 19:13		07:26 17:07	08:13 (WEA-4 E-160)	08:16 16:27	08:56 (WEA-3 E-160)
2	05:18 21:55	05:56 21:22	06:45 20:20	07:34 19:10		07:27 17:05	08:14 (WEA-4 E-160)	08:18 16:26	08:57 (WEA-3 E-160)
3	05:19 21:55	05:57 21:20	06:47 20:17	07:36 19:08		07:29 17:03	08:14 (WEA-4 E-160)	08:19 16:25	08:58 (WEA-3 E-160)
4	05:20 21:54	05:59 21:19	06:48 20:15	07:37 19:06		07:31 17:01	08:14 (WEA-4 E-160)	08:21 16:25	08:59 (WEA-3 E-160)
5	05:21 21:54	06:00 21:17	06:50 20:13	07:39 19:04		07:33 17:00	08:15 (WEA-4 E-160)	08:22 16:24	08:59 (WEA-3 E-160)
6	05:22 21:53	06:02 21:15	06:52 20:11	07:41 19:01		07:35 16:58	08:16 (WEA-4 E-160)	08:23 16:24	09:00 (WEA-3 E-160)
7	05:22 21:53	06:03 21:13	06:53 20:08	07:42 18:59		07:36 16:56	08:16 (WEA-4 E-160)	08:24 16:24	09:01 (WEA-3 E-160)
8	05:23 21:52	06:05 21:11	06:55 20:06	07:44 18:57		07:38 16:55	08:17 (WEA-4 E-160)	08:26 16:23	09:01 (WEA-3 E-160)
9	05:24 21:51	06:06 21:10	06:56 20:04	07:46 18:54		07:40 16:53	08:19 (WEA-4 E-160)	08:27 16:23	09:02 (WEA-3 E-160)
10	05:25 21:51	06:08 21:08	06:58 20:01	07:47 18:52		07:42 16:51	08:20 (WEA-4 E-160)	08:28 16:23	09:04 (WEA-3 E-160)
11	05:26 21:50	06:10 21:06	07:00 19:59	07:49 18:50		07:44 16:50	08:22 (WEA-4 E-160)	08:29 16:23	09:04 (WEA-3 E-160)
12	05:27 21:49	06:11 21:04	07:01 19:57	07:51 18:48		07:45 16:48	08:24 (WEA-4 E-160)	08:30 16:22	09:05 (WEA-3 E-160)
13	05:28 21:48	06:13 21:02	07:03 19:54	07:52 18:46		07:47 16:47	08:28 (WEA-4 E-160)	08:31 16:22	09:06 (WEA-3 E-160)
14	05:30 21:47	06:14 21:00	07:04 19:52	07:54 18:43		07:49 16:45	09:00 (WEA-3 E-160)	08:32 16:22	09:06 (WEA-3 E-160)
15	05:31 21:46	06:16 20:58	07:06 19:50	07:56 18:41		07:51 16:44	09:09 (WEA-3 E-160)	08:33 16:22	09:07 (WEA-3 E-160)
16	05:32 21:45	06:18 20:56	07:08 19:47	07:58 18:39		07:52 16:42	08:56 (WEA-3 E-160)	08:34 16:23	09:07 (WEA-3 E-160)
17	05:33 21:44	06:19 20:54	07:09 19:45	07:59 18:37		07:54 16:41	09:12 (WEA-3 E-160)	08:35 16:23	09:08 (WEA-3 E-160)
18	05:34 21:43	06:21 20:52	07:11 19:43	08:01 18:35		07:56 16:40	09:14 (WEA-3 E-160)	08:35 16:23	09:09 (WEA-3 E-160)
19	05:36 21:42	06:22 20:50	07:13 19:40	08:03 18:33		07:57 16:38	08:55 (WEA-3 E-160)	08:36 16:23	09:10 (WEA-3 E-160)
20	05:37 21:41	06:24 20:48	07:14 19:38	08:04 18:31	09:30 (WEA-4 E-160)	07:59 16:37	09:16 (WEA-3 E-160)	08:37 16:24	09:10 (WEA-3 E-160)
21	05:38 21:40	06:26 20:46	07:16 19:36	08:06 18:28	09:32 (WEA-4 E-160)	08:01 16:36	09:17 (WEA-3 E-160)	08:37 16:24	09:11 (WEA-3 E-160)
22	05:40 21:38	06:27 20:44	07:17 19:33	08:08 18:26	09:38 (WEA-4 E-160)	08:02 16:35	08:54 (WEA-3 E-160)	08:38 16:24	09:11 (WEA-3 E-160)
23	05:41 21:37	06:29 20:42	07:19 19:31	08:10 18:24	09:39 (WEA-4 E-160)	08:04 16:34	09:18 (WEA-3 E-160)	08:38 16:25	09:12 (WEA-3 E-160)
24	05:42 21:36	06:31 20:39	07:21 19:29	08:11 18:22	09:41 (WEA-4 E-160)	08:06 16:33	09:18 (WEA-3 E-160)	08:39 16:26	09:12 (WEA-3 E-160)
25	05:44 21:34	06:32 20:37	07:22 19:27	08:13 18:20	09:42 (WEA-4 E-160)	08:07 16:32	09:19 (WEA-3 E-160)	08:39 16:26	09:12 (WEA-3 E-160)
26	05:45 21:33	06:34 20:35	07:24 19:24	08:15 18:18	09:44 (WEA-4 E-160)	08:09 16:31	09:20 (WEA-3 E-160)	08:40 16:27	09:13 (WEA-3 E-160)
27	05:47 21:31	06:35 20:33	07:26 19:22	08:17 18:16	09:45 (WEA-4 E-160)	08:10 16:30	09:19 (WEA-3 E-160)	08:40 16:28	09:13 (WEA-3 E-160)
28	05:48 21:30	06:37 20:31	07:27 19:20	08:19 18:14	09:46 (WEA-4 E-160)	08:12 16:29	09:20 (WEA-3 E-160)	08:40 16:28	09:13 (WEA-3 E-160)
29	05:50 21:28	06:39 20:29	07:29 19:17	08:20 18:12	09:47 (WEA-4 E-160)	08:14 16:28	09:21 (WEA-3 E-160)	08:40 16:29	09:13 (WEA-3 E-160)
30	05:51 21:27	06:40 20:26	07:31 19:15	08:22 18:11	09:48 (WEA-4 E-160)	08:15 16:27	09:20 (WEA-3 E-160)	08:40 16:30	09:14 (WEA-3 E-160)
31	05:53 21:25	06:42 20:24		08:24 18:09	09:49 (WEA-4 E-160)	08:16 16:27	09:21 (WEA-3 E-160)	08:40 16:31	09:14 (WEA-3 E-160)
Sonnenscheinstunden	501	453	381	332		267		244	
astr.max.mögl.Beschattung				289		681			527
Red.Sonnenscheinwahrsch.				0,32		0,23			0,15
Reduktion Betriebsdauer				0,84		0,84			0,84
Reduktion Windrichtung				0,58		0,57			0,55
Gesamte Reduktion				0,15		0,11			0,07
Met.wahrsch.Beschattung				45		74			36

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP201 - IP201 Marbecker Straße 93

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:18 (WEA-3 E-160)	08:14	09:32 (WEA-3 E-160)	07:21	08:46 (WEA-4 E-160)	07:10	06:06	05:21		
	16:32	18	09:36 (WEA-3 E-160)	17:20	10	09:42 (WEA-3 E-160)	18:11	21	09:07 (WEA-4 E-160)	20:05	20:56
2	08:40	09:18 (WEA-3 E-160)	08:12			07:18			08:49 (WEA-4 E-160)	07:08	06:04
	16:33	19	09:37 (WEA-3 E-160)	17:22		18:13	15	09:04 (WEA-4 E-160)	20:07	20:57	21:42
3	08:40	09:18 (WEA-3 E-160)	08:11			07:16			07:06	06:02	05:19
	16:35	20	09:38 (WEA-3 E-160)	17:24		18:15			20:08	20:59	21:43
4	08:40	09:18 (WEA-3 E-160)	08:09	08:53 (WEA-4 E-160)	07:14				07:03	06:00	05:18
	16:36	21	09:39 (WEA-3 E-160)	17:26	11	09:04 (WEA-4 E-160)	18:17		20:10	21:01	21:44
5	08:40	09:18 (WEA-3 E-160)	08:07	08:50 (WEA-4 E-160)	07:12				07:01	05:58	05:18
	16:37	21	09:39 (WEA-3 E-160)	17:27	17	09:07 (WEA-4 E-160)	18:19		20:12	21:02	21:45
6	08:39	09:18 (WEA-3 E-160)	08:06	08:47 (WEA-4 E-160)	07:10				06:59	05:56	05:17
	16:38	23	09:41 (WEA-3 E-160)	17:29	22	09:09 (WEA-4 E-160)	18:20		20:14	21:04	21:46
7	08:39	09:18 (WEA-3 E-160)	08:04	08:46 (WEA-4 E-160)	07:07				06:57	05:55	05:16
	16:39	23	09:41 (WEA-3 E-160)	17:31	25	09:11 (WEA-4 E-160)	18:22		20:15	21:06	21:47
8	08:38	09:18 (WEA-3 E-160)	08:02	08:44 (WEA-4 E-160)	07:05				06:54	05:53	05:16
	16:41	25	09:43 (WEA-3 E-160)	17:33	28	09:12 (WEA-4 E-160)	18:24		20:17	21:07	21:48
9	08:38	09:18 (WEA-3 E-160)	08:00	08:43 (WEA-4 E-160)	07:03				06:52	05:51	05:15
	16:42	25	09:43 (WEA-3 E-160)	17:35	30	09:13 (WEA-4 E-160)	18:26		20:19	21:09	21:49
10	08:37	09:18 (WEA-3 E-160)	07:59	08:43 (WEA-4 E-160)	07:01				06:50	05:49	05:15
	16:43	26	09:44 (WEA-3 E-160)	17:37	32	09:15 (WEA-4 E-160)	18:27		20:20	21:10	21:50
11	08:37	09:18 (WEA-3 E-160)	07:57	08:42 (WEA-4 E-160)	06:58				06:48	05:48	05:15
	16:45	26	09:44 (WEA-3 E-160)	17:38	34	09:16 (WEA-4 E-160)	18:29		20:22	21:12	21:51
12	08:36	09:18 (WEA-3 E-160)	07:55	08:41 (WEA-4 E-160)	06:56				06:45	05:46	05:14
	16:46	28	09:46 (WEA-3 E-160)	17:40	36	09:17 (WEA-4 E-160)	18:31		20:24	21:14	21:51
13	08:36	09:18 (WEA-3 E-160)	07:53	08:41 (WEA-4 E-160)	06:54				06:43	05:44	05:14
	16:48	28	09:46 (WEA-3 E-160)	17:42	36	09:17 (WEA-4 E-160)	18:33		20:25	21:15	21:52
14	08:35	09:18 (WEA-3 E-160)	07:51	08:40 (WEA-4 E-160)	06:52				06:41	05:43	05:14
	16:49	29	09:47 (WEA-3 E-160)	17:44	38	09:18 (WEA-4 E-160)	18:34		20:27	21:17	21:53
15	08:34	09:19 (WEA-3 E-160)	07:49	08:40 (WEA-4 E-160)	06:49				06:39	05:41	05:14
	16:51	28	09:47 (WEA-3 E-160)	17:46	38	09:18 (WEA-4 E-160)	18:36		20:29	21:18	21:53
16	08:33	09:19 (WEA-3 E-160)	07:47	08:39 (WEA-4 E-160)	06:47				06:37	05:40	05:13
	16:52	29	09:48 (WEA-3 E-160)	17:48	39	09:18 (WEA-4 E-160)	18:38		20:31	21:20	21:54
17	08:32	09:19 (WEA-3 E-160)	07:45	08:39 (WEA-4 E-160)	06:45				06:34	05:38	05:13
	16:54	29	09:48 (WEA-3 E-160)	17:50	40	09:19 (WEA-4 E-160)	18:39		20:32	21:21	21:54
18	08:31	09:19 (WEA-3 E-160)	07:43	08:39 (WEA-4 E-160)	06:42				06:32	05:37	05:13
	16:56	30	09:49 (WEA-3 E-160)	17:51	40	09:19 (WEA-4 E-160)	18:41		20:34	21:23	21:55
19	08:30	09:20 (WEA-3 E-160)	07:41	08:39 (WEA-4 E-160)	06:40				06:30	05:35	05:13
	16:57	29	09:49 (WEA-3 E-160)	17:53	40	09:19 (WEA-4 E-160)	18:43		20:36	21:24	21:55
20	08:29	09:19 (WEA-3 E-160)	07:39	08:39 (WEA-4 E-160)	06:38				06:28	05:34	05:13
	16:59	30	09:49 (WEA-3 E-160)	17:55	38	09:17 (WEA-4 E-160)	18:45		20:37	21:26	21:55
21	08:28	09:20 (WEA-3 E-160)	07:37	08:39 (WEA-4 E-160)	06:36				06:26	05:33	05:14
	17:01	29	09:49 (WEA-3 E-160)	17:57	38	09:17 (WEA-4 E-160)	18:46		20:39	21:27	21:55
22	08:27	09:21 (WEA-3 E-160)	07:35	08:39 (WEA-4 E-160)	06:33				06:24	05:31	05:14
	17:02	29	09:50 (WEA-3 E-160)	17:59	38	09:17 (WEA-4 E-160)	18:48		20:41	21:29	21:56
23	08:26	09:21 (WEA-3 E-160)	07:33	08:40 (WEA-4 E-160)	06:31				06:22	05:30	05:14
	17:04	28	09:49 (WEA-3 E-160)	18:01	36	09:16 (WEA-4 E-160)	18:50		20:42	21:30	21:56
24	08:25	09:22 (WEA-3 E-160)	07:31	08:40 (WEA-4 E-160)	06:29				06:20	05:29	05:14
	17:06	27	09:49 (WEA-3 E-160)	18:02	35	09:15 (WEA-4 E-160)	18:51		20:44	21:31	21:56
25	08:24	09:23 (WEA-3 E-160)	07:29	08:41 (WEA-4 E-160)	06:26				06:18	05:28	05:15
	17:07	27	09:50 (WEA-3 E-160)	18:04	34	09:15 (WEA-4 E-160)	18:53		20:46	21:33	21:56
26	08:22	09:23 (WEA-3 E-160)	07:27	08:42 (WEA-4 E-160)	06:24				06:16	05:27	05:15
	17:09	26	09:49 (WEA-3 E-160)	18:06	31	09:13 (WEA-4 E-160)	18:55		20:47	21:34	21:56
27	08:21	09:24 (WEA-3 E-160)	07:25	08:43 (WEA-4 E-160)	06:22				06:14	05:26	05:16
	17:11	25	09:49 (WEA-3 E-160)	18:08	28	09:11 (WEA-4 E-160)	18:57		20:49	21:35	21:56
28	08:20	09:25 (WEA-3 E-160)	07:23	08:44 (WEA-4 E-160)	06:19				06:12	05:24	05:16
	17:13	23	09:48 (WEA-3 E-160)	18:10	25	09:09 (WEA-4 E-160)	18:58		20:51	21:37	21:56
29	08:18	09:26 (WEA-3 E-160)			07:17				06:10	05:23	05:17
	17:15	21	09:47 (WEA-3 E-160)		20:00				20:52	21:38	21:56
30	08:17	09:27 (WEA-3 E-160)			07:15				06:08	05:22	05:17
	17:16	19	09:46 (WEA-3 E-160)		20:02				20:54	21:39	21:55
31	08:15	09:29 (WEA-3 E-160)			07:13					05:22	
	17:18	15	09:44 (WEA-3 E-160)		20:03					21:40	
Sonnenscheinstunden	259		278		367		416		485		498
astr.max.mögl.Beschattung	776		819		36						
Red.Sonnenscheinwahrsch.	0,20		0,30		0,30						
Reduktion Betriebsdauer	0,84		0,84		0,84						
Reduktion Windrichtung	0,56		0,59		0,59						
Gesamte Reduktion	0,09		0,15		0,15						
Met.wahrsch.Beschattung	71		122		5						

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP201 - IP201 Marbecker Straße 93

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober		November	Dezember		
1	05:18	05:54	06:43	07:32		07:26	08:12 (WEA-4 E-160)	08:16	09:00 (WEA-3 E-160)
	21:55	21:24	20:22	19:13		17:07	32 08:44 (WEA-4 E-160)	16:27	26 09:26 (WEA-3 E-160)
2	05:18	05:56	06:45	07:34		07:27	08:13 (WEA-4 E-160)	08:18	09:01 (WEA-3 E-160)
	21:55	21:22	20:20	19:10		17:05	30 08:43 (WEA-4 E-160)	16:26	26 09:27 (WEA-3 E-160)
3	05:19	05:57	06:47	07:36		07:29	08:14 (WEA-4 E-160)	08:19	09:01 (WEA-3 E-160)
	21:55	21:20	20:17	19:08		17:03	28 08:42 (WEA-4 E-160)	16:25	25 09:26 (WEA-3 E-160)
4	05:20	05:59	06:48	07:37		07:31	08:16 (WEA-4 E-160)	08:21	09:02 (WEA-3 E-160)
	21:54	21:19	20:15	19:06		17:01	24 08:40 (WEA-4 E-160)	16:25	25 09:27 (WEA-3 E-160)
5	05:21	06:00	06:50	07:39		07:33	08:18 (WEA-4 E-160)	08:22	09:03 (WEA-3 E-160)
	21:54	21:17	20:13	19:03		17:00	21 08:39 (WEA-4 E-160)	16:24	23 09:26 (WEA-3 E-160)
6	05:22	06:02	06:52	07:41		07:35	08:20 (WEA-4 E-160)	08:23	09:04 (WEA-3 E-160)
	21:53	21:15	20:11	19:01		16:58	16 08:36 (WEA-4 E-160)	16:24	23 09:27 (WEA-3 E-160)
7	05:22	06:03	06:53	07:42		07:36	08:24 (WEA-4 E-160)	08:24	09:05 (WEA-3 E-160)
	21:53	21:13	20:08	18:59		16:56	9 08:33 (WEA-4 E-160)	16:24	22 09:27 (WEA-3 E-160)
8	05:23	06:05	06:55	07:44		07:38	08:26	08:26	09:05 (WEA-3 E-160)
	21:52	21:11	20:06	18:57		16:55	16:23	21 09:26 (WEA-3 E-160)	
9	05:24	06:06	06:56	07:46		07:40	08:27	09:06 (WEA-3 E-160)	
	21:51	21:10	20:04	18:54		16:53	16:23	20 09:26 (WEA-3 E-160)	
10	05:25	06:08	06:58	07:47		07:42	09:03 (WEA-3 E-160)	08:28	09:08 (WEA-3 E-160)
	21:51	21:08	20:01	18:52		16:51	10 09:13 (WEA-3 E-160)	16:23	19 09:27 (WEA-3 E-160)
11	05:26	06:10	07:00	07:49		07:44	09:01 (WEA-3 E-160)	08:29	09:09 (WEA-3 E-160)
	21:50	21:06	19:59	18:50	10	09:35 (WEA-4 E-160)	16:50	15 09:16 (WEA-3 E-160)	18 09:27 (WEA-3 E-160)
12	05:27	06:11	07:01	07:51		07:45	09:21 (WEA-4 E-160)	08:30	09:09 (WEA-3 E-160)
	21:49	21:04	19:57	18:48	18	09:39 (WEA-4 E-160)	16:48	19 09:18 (WEA-3 E-160)	18 09:27 (WEA-3 E-160)
13	05:28	06:13	07:03	07:52		07:47	09:19 (WEA-4 E-160)	08:31	09:10 (WEA-3 E-160)
	21:48	21:02	19:54	18:46	22	09:41 (WEA-4 E-160)	16:47	21 09:19 (WEA-3 E-160)	17 09:27 (WEA-3 E-160)
14	05:30	06:14	07:04	07:54		07:49	09:17 (WEA-4 E-160)	08:32	09:11 (WEA-3 E-160)
	21:47	21:00	19:52	18:43	26	09:43 (WEA-4 E-160)	16:45	23 09:21 (WEA-3 E-160)	16 09:27 (WEA-3 E-160)
15	05:31	06:16	07:06	07:56		07:51	09:15 (WEA-4 E-160)	08:33	09:12 (WEA-3 E-160)
	21:46	20:58	19:50	18:41	30	09:45 (WEA-4 E-160)	16:44	25 09:21 (WEA-3 E-160)	15 09:27 (WEA-3 E-160)
16	05:32	06:18	07:08	07:57		07:52	09:13 (WEA-4 E-160)	08:34	09:12 (WEA-3 E-160)
	21:45	20:56	19:47	18:39	32	09:45 (WEA-4 E-160)	16:42	26 09:22 (WEA-3 E-160)	14 09:26 (WEA-3 E-160)
17	05:33	06:19	07:09	07:59		07:54	09:12 (WEA-4 E-160)	08:35	09:13 (WEA-3 E-160)
	21:44	20:54	19:45	18:37	34	09:46 (WEA-4 E-160)	16:41	26 09:22 (WEA-3 E-160)	13 09:26 (WEA-3 E-160)
18	05:34	06:21	07:11	08:01		07:56	09:12 (WEA-4 E-160)	08:35	09:14 (WEA-3 E-160)
	21:43	20:52	19:43	18:35	35	09:47 (WEA-4 E-160)	16:40	27 09:23 (WEA-3 E-160)	13 09:27 (WEA-3 E-160)
19	05:36	06:22	07:13	08:03		07:57	09:11 (WEA-4 E-160)	08:36	09:15 (WEA-3 E-160)
	21:42	20:50	19:40	18:33	37	09:48 (WEA-4 E-160)	16:38	28 09:24 (WEA-3 E-160)	12 09:27 (WEA-3 E-160)
20	05:37	06:24	07:14	08:04		07:59	09:10 (WEA-4 E-160)	08:37	09:15 (WEA-3 E-160)
	21:41	20:48	19:38	18:31	38	09:48 (WEA-4 E-160)	16:37	29 09:25 (WEA-3 E-160)	12 09:27 (WEA-3 E-160)
21	05:38	06:26	07:16	08:06		08:01	09:10 (WEA-4 E-160)	08:37	09:16 (WEA-3 E-160)
	21:39	20:46	19:36	18:28	39	09:49 (WEA-4 E-160)	16:36	29 09:25 (WEA-3 E-160)	12 09:28 (WEA-3 E-160)
22	05:40	06:27	07:17	08:08		08:02	09:09 (WEA-4 E-160)	08:38	09:16 (WEA-3 E-160)
	21:38	20:44	19:33	18:26	39	09:48 (WEA-4 E-160)	16:35	30 09:25 (WEA-3 E-160)	12 09:28 (WEA-3 E-160)
23	05:41	06:29	07:19	08:10		08:04	09:09 (WEA-4 E-160)	08:38	09:17 (WEA-3 E-160)
	21:37	20:42	19:31	18:24	39	09:48 (WEA-4 E-160)	16:34	29 09:25 (WEA-3 E-160)	12 09:29 (WEA-3 E-160)
24	05:42	06:31	07:21	08:11		08:06	09:09 (WEA-4 E-160)	08:39	09:17 (WEA-3 E-160)
	21:36	20:39	19:29	18:22	39	09:48 (WEA-4 E-160)	16:33	29 09:26 (WEA-3 E-160)	12 09:29 (WEA-3 E-160)
25	05:44	06:32	07:22	07:13		08:07	08:09 (WEA-4 E-160)	08:39	09:17 (WEA-3 E-160)
	21:34	20:37	19:27	17:20	39	08:48 (WEA-4 E-160)	16:32	29 09:26 (WEA-3 E-160)	13 09:30 (WEA-3 E-160)
26	05:45	06:34	07:24	07:15		08:09	08:09 (WEA-4 E-160)	08:39	09:18 (WEA-3 E-160)
	21:33	20:35	19:24	17:18	39	08:48 (WEA-4 E-160)	16:31	29 09:26 (WEA-3 E-160)	13 09:31 (WEA-3 E-160)
27	05:47	06:35	07:26	07:17		08:10	08:09 (WEA-4 E-160)	08:40	09:18 (WEA-3 E-160)
	21:31	20:33	19:22	17:16	39	08:48 (WEA-4 E-160)	16:30	28 09:26 (WEA-3 E-160)	14 09:32 (WEA-3 E-160)
28	05:48	06:37	07:27	07:19		08:12	08:10 (WEA-4 E-160)	08:40	09:18 (WEA-3 E-160)
	21:30	20:31	19:20	17:14	37	08:47 (WEA-4 E-160)	16:29	28 09:27 (WEA-3 E-160)	15 09:33 (WEA-3 E-160)
29	05:50	06:39	07:29	07:20		08:13	08:10 (WEA-4 E-160)	08:40	09:18 (WEA-3 E-160)
	21:28	20:29	19:17	17:12	37	08:47 (WEA-4 E-160)	16:28	27 09:26 (WEA-3 E-160)	15 09:33 (WEA-3 E-160)
30	05:51	06:40	07:31	07:22		08:15	08:11 (WEA-4 E-160)	08:40	09:18 (WEA-3 E-160)
	21:27	20:26	19:15	17:11	35	08:46 (WEA-4 E-160)	16:27	27 09:27 (WEA-3 E-160)	16 09:34 (WEA-3 E-160)
31	05:53	06:42	07:32	07:24		08:16	08:11 (WEA-4 E-160)	08:40	09:18 (WEA-3 E-160)
	21:25	20:24	19:13	17:09	34	08:45 (WEA-4 E-160)	16:26	17 16:31	17 09:35 (WEA-3 E-160)
Sonnenscheinstunden	501	453	381	332		267		244	
astr.max.mögl.Beschattung				698		694			529
Red.Sonnenscheinwahrsch.				0,32		0,23			0,15
Reduktion Betriebsdauer				0,84		0,84			0,84
Reduktion Windrichtung				0,59		0,56			0,56
Gesamte Reduktion				0,16		0,11			0,07
Met.wahrsch.Beschattung				109		75			36

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP202 - IP202 Marbecker Straße 97

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:33 (WEA-1)	08:14	08:55 (WEA-3 E-160)	07:21	07:10		08:49 (WEA-4 E-160)	06:06	05:21	
	16:32	09:55 (WEA-1)	17:20	09:25 (WEA-3 E-160)	18:11	20:05	23	09:12 (WEA-4 E-160)	20:56	21:41	
2	08:40	09:33 (WEA-1)	08:12	08:55 (WEA-3 E-160)	07:18	07:08		08:51 (WEA-4 E-160)	06:04	05:20	
	16:33	09:55 (WEA-1)	17:22	09:26 (WEA-3 E-160)	18:13	20:07	16	09:07 (WEA-4 E-160)	20:57	21:42	
3	08:40	09:34 (WEA-1)	08:11	08:54 (WEA-3 E-160)	07:16	07:06			06:02	05:19	
	16:35	09:56 (WEA-1)	17:24	09:26 (WEA-3 E-160)	18:15	20:08			20:59	21:43	
4	08:40	09:35 (WEA-1)	08:09	08:54 (WEA-3 E-160)	07:14	07:03		08:05 (WEA-4 E-160)	06:00	05:18	
	16:36	09:57 (WEA-1)	17:26	09:27 (WEA-3 E-160)	18:17	20:10	8	08:13 (WEA-4 E-160)	21:01	21:44	
5	08:40	09:35 (WEA-1)	08:07	08:54 (WEA-3 E-160)	07:12	07:01		07:59 (WEA-4 E-160)	05:58	05:18	
	16:37	09:56 (WEA-1)	17:27	09:28 (WEA-3 E-160)	18:19	20:12	19	08:18 (WEA-4 E-160)	21:02	21:45	
6	08:39	09:36 (WEA-1)	08:06	08:53 (WEA-3 E-160)	07:10	06:59		07:56 (WEA-4 E-160)	05:56	05:17	
	16:38	09:57 (WEA-1)	17:29	09:28 (WEA-3 E-160)	18:20	20:14	25	08:21 (WEA-4 E-160)	21:04	21:46	
7	08:39	09:36 (WEA-1)	08:04	08:53 (WEA-3 E-160)	07:07	06:57		07:53 (WEA-4 E-160)	05:55	05:16	
	16:39	09:57 (WEA-1)	17:31	09:28 (WEA-3 E-160)	18:22	20:15	30	08:23 (WEA-4 E-160)	21:06	21:47	
8	08:38	09:38 (WEA-1)	08:02	08:53 (WEA-3 E-160)	07:05	06:54		07:51 (WEA-4 E-160)	05:53	05:16	
	16:41	09:57 (WEA-1)	17:33	09:28 (WEA-3 E-160)	18:24	20:17	33	08:24 (WEA-4 E-160)	21:07	21:48	
9	08:38	09:38 (WEA-1)	08:00	08:53 (WEA-3 E-160)	07:03	06:52		07:50 (WEA-4 E-160)	05:51	05:15	
	16:42	09:57 (WEA-1)	17:35	09:28 (WEA-3 E-160)	18:26	20:19	36	08:26 (WEA-4 E-160)	21:09	21:49	
10	08:37	09:39 (WEA-1)	07:59	08:54 (WEA-3 E-160)	07:01	06:50		07:49 (WEA-4 E-160)	05:49	05:15	
	16:43	09:57 (WEA-1)	17:37	09:29 (WEA-3 E-160)	18:27	20:20	38	08:27 (WEA-4 E-160)	21:10	21:50	
11	08:37	09:39 (WEA-1)	07:57	08:54 (WEA-3 E-160)	06:58	06:48		07:47 (WEA-4 E-160)	05:48	05:15	
	16:45	09:56 (WEA-1)	17:38	09:28 (WEA-3 E-160)	18:29	20:22	40	08:27 (WEA-4 E-160)	21:12	21:51	
12	08:36	09:41 (WEA-1)	07:55	08:55 (WEA-3 E-160)	06:56	06:45		07:46 (WEA-4 E-160)	05:46	05:14	
	16:46	09:57 (WEA-1)	17:40	09:28 (WEA-3 E-160)	18:31	20:24	42	08:28 (WEA-4 E-160)	21:14	21:51	
13	08:36	09:42 (WEA-1)	07:53	08:55 (WEA-3 E-160)	06:54	06:43		07:45 (WEA-4 E-160)	05:44	05:14	
	16:48	09:56 (WEA-1)	17:42	09:27 (WEA-3 E-160)	18:33	20:25	44	08:29 (WEA-4 E-160)	21:15	21:52	
14	08:35	09:44 (WEA-1)	07:51	08:56 (WEA-3 E-160)	06:52	06:41		07:44 (WEA-4 E-160)	05:43	05:14	
	16:49	09:56 (WEA-1)	17:44	09:27 (WEA-3 E-160)	18:34	20:27	45	08:29 (WEA-4 E-160)	21:17	21:53	
15	08:34	09:45 (WEA-1)	07:49	08:56 (WEA-3 E-160)	06:49	06:39		07:43 (WEA-4 E-160)	05:41	05:14	
	16:51	09:54 (WEA-1)	17:46	09:26 (WEA-3 E-160)	18:36	20:29	46	08:29 (WEA-4 E-160)	21:18	21:53	
16	08:33	09:49 (WEA-1)	07:47	08:57 (WEA-3 E-160)	06:47	06:37		07:43 (WEA-4 E-160)	05:40	05:13	
	16:52	09:52 (WEA-1)	17:48	09:25 (WEA-3 E-160)	18:38	20:31	47	08:30 (WEA-4 E-160)	21:20	21:54	
17	08:32		07:45	08:59 (WEA-3 E-160)	06:45	06:34		07:41 (WEA-4 E-160)	05:38	05:13	
	16:54		17:50	09:23 (WEA-3 E-160)	18:39	20:32	48	08:29 (WEA-4 E-160)	21:21	21:54	
18	08:31		07:43	09:00 (WEA-3 E-160)	06:42	06:32		07:41 (WEA-4 E-160)	05:37	05:13	
	16:56		17:51	09:22 (WEA-3 E-160)	18:41	20:34	48	08:29 (WEA-4 E-160)	21:23	21:55	
19	08:30		07:41	09:02 (WEA-3 E-160)	06:40	06:30		07:41 (WEA-4 E-160)	05:35	05:13	
	16:57		17:53	09:20 (WEA-3 E-160)	18:43	20:36	48	08:29 (WEA-4 E-160)	21:24	21:55	
20	08:29		07:39	09:05 (WEA-3 E-160)	06:38	06:28		07:40 (WEA-4 E-160)	05:34	05:14	
	16:59		17:55	09:15 (WEA-3 E-160)	18:45	20:37	48	08:28 (WEA-4 E-160)	21:26	21:55	
21	08:28		07:37		06:36	06:26		07:41 (WEA-4 E-160)	05:33	05:14	
	17:01		17:57		18:46	20:39	47	08:28 (WEA-4 E-160)	21:27	21:55	
22	08:27		07:35		06:33	06:24		07:41 (WEA-4 E-160)	05:31	05:14	
	17:02		17:59		18:48	20:41	46	08:27 (WEA-4 E-160)	21:29	21:56	
23	08:26		07:33		06:31	06:22		07:40 (WEA-4 E-160)	05:30	05:14	
	17:04		18:01		18:50	20:42	46	08:26 (WEA-4 E-160)	21:30	21:56	
24	08:25		07:31		06:29	06:20		07:41 (WEA-4 E-160)	05:29	05:14	
	17:06		18:02		18:51	20:44	44	08:25 (WEA-4 E-160)	21:31	21:56	
25	08:23	09:05 (WEA-3 E-160)	07:29		06:26	06:18		07:41 (WEA-4 E-160)	05:28	05:15	
	17:07	8	09:13 (WEA-3 E-160)	18:04	18:53	20:46	43	08:24 (WEA-4 E-160)	21:33	21:56	
26	08:22	09:01 (WEA-3 E-160)	07:27		06:24	06:16		07:42 (WEA-4 E-160)	05:27	05:15	
	17:09	15	09:16 (WEA-3 E-160)	18:06	18:55	20:47	42	08:24 (WEA-4 E-160)	21:34	21:56	
27	08:21	09:00 (WEA-3 E-160)	07:25		06:22	06:14		07:42 (WEA-4 E-160)	05:26	05:16	
	17:11	18	09:18 (WEA-3 E-160)	18:08	18:57	20:49	40	08:22 (WEA-4 E-160)	21:35	21:56	
28	08:20	08:58 (WEA-3 E-160)	07:23		06:19	06:12		07:43 (WEA-4 E-160)	05:24	05:16	
	17:13	22	09:20 (WEA-3 E-160)	18:10	18:58	20:51	37	08:20 (WEA-4 E-160)	21:37	21:56	
29	08:18	08:58 (WEA-3 E-160)			07:17	06:10		08:44 (WEA-4 E-160)	05:23	05:17	
	17:15	24	09:22 (WEA-3 E-160)		20:00	20:52	35	09:19 (WEA-4 E-160)	21:38	21:56	
30	08:17	08:56 (WEA-3 E-160)			07:15	06:08		08:45 (WEA-4 E-160)	05:22	05:17	
	17:16	27	09:23 (WEA-3 E-160)		20:02	20:54	31	09:16 (WEA-4 E-160)	21:39	21:55	
31	08:15	08:55 (WEA-3 E-160)			07:13	06:08		08:46 (WEA-4 E-160)	05:22		
	17:18	28	09:23 (WEA-3 E-160)		20:03	20:54	28	09:14 (WEA-4 E-160)	21:40		
Sonnenscheinstunden		259	278	367		416		485	498		
astr.max.mögl.Beschattung		420	597	1084		39					
Red.Sonnenscheinwahrsch.		0,20	0,30	0,30		0,41					
Reduktion Betriebsdauer		0,84	0,84	0,84		0,84					
Reduktion Windrichtung		0,57	0,57	0,62		0,62					
Gesamte Reduktion		0,09	0,15	0,15		0,21					
Met.wahrsch.Beschattung		39	87	167		8					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP202 - IP202 Marbecker Straße 97

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli	August	September	Oktober	November	Dezember
1	05:18	05:54	06:43	07:32	08:24 (WEA-4 E-160)	08:16
2	21:55	21:24	20:22	19:13	09:07 (WEA-4 E-160)	08:57 (WEA-3 E-160)
3	05:18	05:56	06:45	07:34	08:25 (WEA-4 E-160)	08:18
4	21:55	21:22	20:20	19:10	09:07 (WEA-4 E-160)	08:57 (WEA-3 E-160)
5	05:19	05:57	06:47	07:36	08:26 (WEA-4 E-160)	08:19
6	21:55	21:20	20:17	19:08	09:06 (WEA-4 E-160)	08:58 (WEA-3 E-160)
7	05:20	05:59	06:48	07:37	08:26 (WEA-4 E-160)	08:21
8	21:54	21:19	20:15	19:06	09:04 (WEA-4 E-160)	08:58 (WEA-3 E-160)
9	05:21	06:00	06:50	07:39	08:28 (WEA-4 E-160)	08:22
10	21:54	21:17	20:13	19:03	09:02 (WEA-4 E-160)	08:57 (WEA-3 E-160)
11	05:22	06:02	06:52	07:41	08:29 (WEA-4 E-160)	08:23
12	21:53	21:15	20:11	19:01	09:01 (WEA-4 E-160)	08:57 (WEA-3 E-160)
13	05:22	06:03	06:53	07:42	08:30 (WEA-4 E-160)	08:24
14	21:53	21:13	20:08	18:59	08:57 (WEA-4 E-160)	08:57 (WEA-3 E-160)
15	05:23	06:05	06:55	07:44	08:33 (WEA-4 E-160)	08:25
16	21:52	21:11	20:06	18:57	08:55 (WEA-4 E-160)	08:57 (WEA-3 E-160)
17	05:24	06:06	06:56	07:46	08:36 (WEA-4 E-160)	08:25
18	21:51	21:10	20:04	18:54	08:51 (WEA-4 E-160)	08:56 (WEA-3 E-160)
19	05:25	06:08	06:58	07:47	08:26 (WEA-4 E-160)	08:28
20	21:51	21:08	20:01	18:52	09:00 (WEA-4 E-160)	08:56 (WEA-3 E-160)
21	05:26	06:10	07:00	07:49	08:41 (WEA-4 E-160)	08:29
22	21:50	21:06	19:59	18:50	09:03 (WEA-4 E-160)	08:57 (WEA-3 E-160)
23	05:27	06:11	07:01	07:51	08:39 (WEA-4 E-160)	08:30
24	21:49	21:04	19:57	18:48	09:06 (WEA-4 E-160)	08:55 (WEA-3 E-160)
25	05:28	06:13	07:03	07:52	08:36 (WEA-4 E-160)	08:31
26	21:48	21:02	19:54	18:46	09:07 (WEA-4 E-160)	08:54 (WEA-3 E-160)
27	05:30	06:14	07:04	07:54	08:35 (WEA-4 E-160)	08:32
28	21:47	21:00	19:52	18:43	09:09 (WEA-4 E-160)	08:52 (WEA-3 E-160)
29	05:31	06:16	07:06	07:56	08:32 (WEA-4 E-160)	08:33
30	21:46	20:58	19:50	18:41	09:09 (WEA-4 E-160)	08:50 (WEA-3 E-160)
31	05:32	06:18	07:08	07:57	08:31 (WEA-4 E-160)	08:34
32	21:45	20:56	19:47	18:39	09:11 (WEA-4 E-160)	08:49 (WEA-3 E-160)
33	05:33	06:19	07:09	07:59	08:30 (WEA-4 E-160)	08:35
34	21:44	20:54	19:45	18:37	09:11 (WEA-4 E-160)	08:38 (WEA-3 E-160)
35	05:34	06:21	07:11	08:01	08:29 (WEA-4 E-160)	08:35
36	21:43	20:52	19:43	18:35	09:12 (WEA-4 E-160)	08:35
37	05:36	06:22	07:13	08:03	08:28 (WEA-4 E-160)	08:36
38	21:42	20:50	19:40	18:33	09:12 (WEA-4 E-160)	08:36
39	05:37	06:24	07:14	08:04	08:27 (WEA-4 E-160)	08:37
40	21:41	20:48	19:38	18:31	09:12 (WEA-4 E-160)	08:37
41	05:38	06:26	07:16	08:06	08:26 (WEA-4 E-160)	08:37
42	21:39	20:46	19:36	18:28	09:13 (WEA-4 E-160)	08:37
43	05:40	06:27	07:17	08:08	08:25 (WEA-4 E-160)	08:38
44	21:38	20:44	19:33	18:26	09:12 (WEA-4 E-160)	08:38
45	05:41	06:29	07:19	08:10	09:31 (WEA-3 E-160)	08:38
46	21:37	20:42	19:31	18:24	09:12 (WEA-4 E-160)	08:38
47	05:42	06:31	07:21	08:11	09:29 (WEA-3 E-160)	08:39
48	21:36	20:39	19:29	18:22	09:13 (WEA-4 E-160)	08:39
49	05:44	06:32	07:22	08:13	08:28 (WEA-3 E-160)	08:39
50	21:34	20:37	19:27	18:20	08:53 (WEA-3 E-160)	08:39
51	05:45	06:34	07:24	08:15	08:27 (WEA-3 E-160)	08:39
52	21:33	20:35	19:24	18:18	08:55 (WEA-3 E-160)	08:39
53	05:47	06:35	07:26	08:17	08:26 (WEA-3 E-160)	08:39
54	21:31	20:33	19:22	18:16	08:56 (WEA-3 E-160)	08:39
55	05:48	06:37	07:27	08:19	08:25 (WEA-3 E-160)	08:39
56	21:30	20:31	19:20	18:14	08:56 (WEA-3 E-160)	08:39
57	05:50	06:39	07:29	08:20	08:25 (WEA-3 E-160)	08:39
58	21:28	20:29	19:17	18:12	08:57 (WEA-3 E-160)	08:39
59	05:51	06:40	07:31	08:22	08:24 (WEA-3 E-160)	08:40
60	21:27	20:26	19:15	18:11	08:58 (WEA-3 E-160)	08:40
61	05:53	06:42	07:32	08:23	09:38 (WEA-1)	08:40
62	21:25	20:24	19:13	17:09	08:23 (WEA-3 E-160)	08:40
63				332	08:57 (WEA-3 E-160)	08:40
64	Sonnenscheinstunden	501	453	381	267	244
65	astr.max.mögl.Beschattung			848	562	678
66	Red.Sonnenscheinwahrsch.			0,36	0,32	0,15
67	Reduktion Betriebsdauer			0,84	0,84	0,84
68	Reduktion Windrichtung			0,62	0,60	0,56
69	Gesamte Reduktion			0,19	0,16	0,07
70	Met.wahrsch.Beschattung			158	89	47

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

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



Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP203 - IP203 Marbecker Straße 98

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni	
1	08:40	09:17 (WEA-1) 08:14	07:21	08:36 (WEA-3 E-160) 07:10	08:07 (WEA-4 E-160) 06:06	05:21	
2	16:32 18	09:35 (WEA-1) 17:20	18:11	08:55 (WEA-3 E-160) 20:05	08:53 (WEA-4 E-160) 20:56	21:41	
3	08:40	09:18 (WEA-1) 08:12	07:18	08:38 (WEA-3 E-160) 07:08	08:05 (WEA-4 E-160) 06:04	05:20	
4	16:33 18	09:36 (WEA-1) 17:22	18:13	08:52 (WEA-3 E-160) 20:07	08:52 (WEA-4 E-160) 20:57	21:42	
5	08:40	09:18 (WEA-1) 08:11	07:16	07:06	08:05 (WEA-4 E-160) 06:02	05:19	
6	16:35 19	09:37 (WEA-1) 17:24	18:15	20:08	08:51 (WEA-4 E-160) 20:59	21:43	
7	08:40	09:19 (WEA-1) 08:09	07:14	07:03	08:06 (WEA-4 E-160) 06:00	05:18	
8	16:36 19	09:38 (WEA-1) 17:26	18:17	20:10	08:51 (WEA-4 E-160) 21:01	21:44	
9	08:40	09:18 (WEA-1) 08:07	07:12	07:01	08:06 (WEA-4 E-160) 05:58	05:18	
10	16:37 20	09:38 (WEA-1) 17:27	18:19	20:12	08:51 (WEA-4 E-160) 21:02	21:45	
11	08:39	09:19 (WEA-1) 08:06	07:10	06:59	08:05 (WEA-4 E-160) 05:56	05:17	
12	16:38 20	09:39 (WEA-1) 17:29	18:20	20:14	08:49 (WEA-4 E-160) 21:04	21:46	
13	08:39	09:18 (WEA-1) 08:04	08:44 (WEA-3 E-160) 07:07	06:57	08:06 (WEA-4 E-160) 05:55	05:16	
14	16:39 22	09:40 (WEA-1) 17:31	18:22	20:15	08:48 (WEA-4 E-160) 21:06	21:47	
15	08:38	09:19 (WEA-1) 08:02	08:39 (WEA-3 E-160) 07:05	06:54	08:06 (WEA-4 E-160) 05:53	05:16	
16	16:41 22	09:41 (WEA-1) 17:33	18:24	20:17	08:48 (WEA-4 E-160) 21:07	21:48	
17	08:38	09:19 (WEA-1) 08:00	08:37 (WEA-3 E-160) 07:03	06:52	08:07 (WEA-4 E-160) 05:51	05:15	
18	16:42 22	09:41 (WEA-1) 17:35	18:26	20:19	08:47 (WEA-4 E-160) 21:09	21:49	
19	08:37	09:19 (WEA-1) 07:59	08:36 (WEA-3 E-160) 07:01	06:50	08:07 (WEA-4 E-160) 05:49	05:15	
20	16:43 22	09:41 (WEA-1) 17:37	18:27	20:20	08:46 (WEA-4 E-160) 21:10	21:50	
21	08:37	09:19 (WEA-1) 07:57	08:35 (WEA-3 E-160) 06:58	06:48	08:07 (WEA-4 E-160) 05:48	05:15	
22	16:45 23	09:42 (WEA-1) 17:38	18:29	20:22	08:43 (WEA-4 E-160) 21:12	21:51	
23	08:36	09:20 (WEA-1) 07:55	08:33 (WEA-3 E-160) 06:56	06:45	08:08 (WEA-4 E-160) 05:46	05:14	
24	16:46 23	09:43 (WEA-1) 17:40	18:31	20:24	08:42 (WEA-4 E-160) 21:14	21:51	
25	08:36	09:20 (WEA-1) 07:53	08:32 (WEA-3 E-160) 06:54	06:43	08:10 (WEA-4 E-160) 05:44	05:14	
26	16:48 23	09:43 (WEA-1) 17:42	18:33	20:25	08:40 (WEA-4 E-160) 21:15	21:52	
27	08:35	09:21 (WEA-1) 07:51	08:32 (WEA-3 E-160) 06:52	06:41	08:11 (WEA-4 E-160) 05:43	05:14	
28	16:49 23	09:44 (WEA-1) 17:44	18:34	20:27	08:38 (WEA-4 E-160) 21:17	21:53	
29	08:34	09:21 (WEA-1) 07:49	08:31 (WEA-3 E-160) 06:49	06:39	08:13 (WEA-4 E-160) 05:41	05:14	
30	16:51 23	09:44 (WEA-1) 17:46	18:36	20:29	08:36 (WEA-4 E-160) 21:18	21:53	
31	08:33	09:21 (WEA-1) 07:47	08:31 (WEA-3 E-160) 06:47	06:37	08:16 (WEA-4 E-160) 05:40	05:13	
32	16:52 23	09:44 (WEA-1) 17:48	18:38	20:31	08:32 (WEA-4 E-160) 21:20	21:54	
33	08:32	09:22 (WEA-1) 07:45	08:30 (WEA-3 E-160) 06:45	06:34	08:21 (WEA-4 E-160) 05:38	05:13	
34	16:54 23	09:45 (WEA-1) 17:50	18:39	20:32	08:25 (WEA-4 E-160) 21:21	21:54	
35	08:31	09:23 (WEA-1) 07:43	08:30 (WEA-3 E-160) 06:42	06:32	08:16 (WEA-4 E-160) 05:37	05:13	
36	16:56 22	09:45 (WEA-1) 17:51	18:41	20:34	08:25 (WEA-4 E-160) 21:21	21:54	
37	08:30	09:22 (WEA-1) 07:41	08:30 (WEA-3 E-160) 06:40	06:30	08:16 (WEA-4 E-160) 05:37	05:13	
38	16:57 22	09:44 (WEA-1) 17:53	18:43	20:36	08:25 (WEA-4 E-160) 21:23	21:55	
39	08:29	09:23 (WEA-1) 07:39	08:29 (WEA-3 E-160) 06:38	06:28	08:13 (WEA-4 E-160) 05:35	05:13	
40	16:59 21	09:44 (WEA-1) 17:55	18:45	20:37	08:16 (WEA-4 E-160) 05:40	05:13	
41	08:28	09:24 (WEA-1) 07:37	08:29 (WEA-3 E-160) 06:36	06:26	08:16 (WEA-4 E-160) 05:40	05:13	
42	17:01 20	09:44 (WEA-1) 17:57	18:46	20:39	08:16 (WEA-4 E-160) 05:40	05:13	
43	08:27	09:25 (WEA-1) 07:35	08:29 (WEA-3 E-160) 06:33	06:24	08:16 (WEA-4 E-160) 05:40	05:13	
44	17:02 19	09:44 (WEA-1) 17:59	18:48	20:41	08:16 (WEA-4 E-160) 05:40	05:13	
45	08:26	09:26 (WEA-1) 07:33	08:30 (WEA-3 E-160) 06:31	06:22	08:16 (WEA-4 E-160) 05:40	05:13	
46	17:04 17	09:43 (WEA-1) 18:01	18:50	20:42	08:16 (WEA-4 E-160) 05:40	05:13	
47	08:25	09:28 (WEA-1) 07:31	08:30 (WEA-3 E-160) 06:29	06:20	08:16 (WEA-4 E-160) 05:40	05:13	
48	17:06 14	09:42 (WEA-1) 18:02	18:51	20:44	08:16 (WEA-4 E-160) 05:40	05:13	
49	08:23	09:30 (WEA-1) 07:29	08:31 (WEA-3 E-160) 06:26	06:18	08:16 (WEA-4 E-160) 05:40	05:13	
50	17:07 12	09:42 (WEA-1) 18:04	18:53	20:46	08:16 (WEA-4 E-160) 05:40	05:13	
51	08:22	09:32 (WEA-1) 07:27	08:32 (WEA-3 E-160) 06:24	06:16	08:16 (WEA-4 E-160) 05:40	05:13	
52	17:09 7	09:39 (WEA-1) 18:06	18:55	20:47	08:16 (WEA-4 E-160) 05:40	05:13	
53	08:21	07:25	08:32 (WEA-3 E-160) 06:22	06:14	08:16 (WEA-4 E-160) 05:40	05:13	
54	17:11	18:08	08:59 (WEA-3 E-160) 18:57	20:49	08:16 (WEA-4 E-160) 05:40	05:13	
55	08:20	07:23	08:34 (WEA-3 E-160) 06:19	06:12	08:16 (WEA-4 E-160) 05:40	05:13	
56	17:13	18:10	08:57 (WEA-3 E-160) 18:58	20:51	08:16 (WEA-4 E-160) 05:40	05:13	
57	08:18		07:17	06:10	08:08 (WEA-4 E-160) 05:33	05:17	
58	17:15		20:00	20:52	08:53 (WEA-4 E-160) 21:38	21:56	
59	08:17		07:15	06:08	08:07 (WEA-4 E-160) 05:22	05:17	
60	17:16		20:02	20:54	08:52 (WEA-4 E-160) 21:39	21:55	
61	08:15		07:13	06:07	08:07 (WEA-4 E-160) 05:22	05:17	
62	17:18		20:03	20:54	08:53 (WEA-4 E-160) 21:40	21:55	
63	Sonnenscheinstunden	259	278	367	416	485	498
64	astr.max.mögl.Beschattung	517	628	507	606		
65	Red.Sonnenscheinwahrsch.	0,20	0,30	0,30	0,41		
66	Reduktion Betriebsdauer	0,84	0,84	0,84	0,84		
67	Reduktion Windrichtung	0,56	0,60	0,65	0,65		
68	Gesamte Reduktion	0,09	0,15	0,16	0,22		
69	Met.wahrsch.Beschattung	47	94	81	133		

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP203 - IP203 Marbecker Straße 98

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	05:54		06:43	08:06 (WEA-4 E-160)	07:32		07:26	08:05 (WEA-3 E-160)	08:16	09:01 (WEA-1)
	21:55	21:24		20:22	36 08:42 (WEA-4 E-160)	19:13		17:07	22 08:27 (WEA-3 E-160)	16:27	23 09:24 (WEA-1)
2	05:18	05:56		06:45	08:05 (WEA-4 E-160)	07:34		07:27	08:07 (WEA-3 E-160)	08:18	09:02 (WEA-1)
	21:55	21:22		20:20	39 08:44 (WEA-4 E-160)	19:10		17:05	18 08:25 (WEA-3 E-160)	16:26	23 09:25 (WEA-1)
3	05:19	05:57		06:47	08:05 (WEA-4 E-160)	07:36		07:29	08:09 (WEA-3 E-160)	08:19	09:02 (WEA-1)
	21:55	21:20		20:17	40 08:45 (WEA-4 E-160)	19:08		17:03	14 08:23 (WEA-3 E-160)	16:25	22 09:24 (WEA-1)
4	05:20	05:59		06:48	08:03 (WEA-4 E-160)	07:37		07:31	08:15 (WEA-3 E-160)	08:21	09:03 (WEA-1)
	21:54	21:19		20:15	42 08:45 (WEA-4 E-160)	19:06		17:01	3 08:18 (WEA-3 E-160)	16:25	22 09:25 (WEA-1)
5	05:21	06:00		06:50	08:03 (WEA-4 E-160)	07:39		07:33		08:22	09:04 (WEA-1)
	21:54	21:17		20:13	42 08:45 (WEA-4 E-160)	19:03		17:00		16:24	21 09:25 (WEA-1)
6	05:22	06:02		06:52	08:01 (WEA-4 E-160)	07:41		07:35		08:23	09:05 (WEA-1)
	21:53	21:15		20:11	44 08:45 (WEA-4 E-160)	19:01		16:58		16:24	21 09:26 (WEA-1)
7	05:22	06:03		06:53	08:01 (WEA-4 E-160)	07:42		07:36		08:24	09:05 (WEA-1)
	21:53	21:13		20:08	45 08:46 (WEA-4 E-160)	18:59		16:56		16:24	20 09:25 (WEA-1)
8	05:23	06:05		06:55	08:00 (WEA-4 E-160)	07:44		07:38		08:26	09:06 (WEA-1)
	21:52	21:11		20:06	45 08:45 (WEA-4 E-160)	18:57		16:55		16:23	19 09:25 (WEA-1)
9	05:24	06:06		06:56	08:00 (WEA-4 E-160)	07:46		07:40		08:27	09:06 (WEA-1)
	21:51	21:10		20:04	46 08:46 (WEA-4 E-160)	18:54		16:53		16:23	19 09:25 (WEA-1)
10	05:25	06:08		06:58	07:59 (WEA-4 E-160)	07:47		07:42		08:28	09:08 (WEA-1)
	21:51	21:08		20:01	46 08:45 (WEA-4 E-160)	18:52		16:51		16:23	18 09:26 (WEA-1)
11	05:26	06:10		07:00	07:59 (WEA-4 E-160)	07:49		07:44		08:29	09:08 (WEA-1)
	21:50	21:06		19:59	46 08:45 (WEA-4 E-160)	18:50	9	09:23 (WEA-3 E-160)	09:14 (WEA-3 E-160)	16:23	18 09:26 (WEA-1)
12	05:27	06:11		07:01	07:59 (WEA-4 E-160)	07:51		07:45		08:30	09:09 (WEA-1)
	21:49	21:04		19:57	46 08:45 (WEA-4 E-160)	18:48	17	09:27 (WEA-3 E-160)	09:10 (WEA-3 E-160)	16:22	17 09:26 (WEA-1)
13	05:28	06:13		07:03	07:58 (WEA-4 E-160)	07:52		07:47		08:31	09:10 (WEA-1)
	21:48	21:02		19:54	46 08:44 (WEA-4 E-160)	18:46	21	09:29 (WEA-3 E-160)	09:08 (WEA-3 E-160)	16:22	16 09:26 (WEA-1)
14	05:30	06:14		07:04	07:59 (WEA-4 E-160)	07:54		07:49		08:32	09:10 (WEA-1)
	21:47	21:00		19:52	45 08:44 (WEA-4 E-160)	18:43	25	09:31 (WEA-3 E-160)	09:06 (WEA-3 E-160)	16:22	17 09:27 (WEA-1)
15	05:31	06:16		07:06	07:58 (WEA-4 E-160)	07:56		07:51		08:33	09:11 (WEA-1)
	21:46	20:58		19:50	44 08:42 (WEA-4 E-160)	18:41	27	09:32 (WEA-3 E-160)	09:05 (WEA-3 E-160)	16:22	16 09:27 (WEA-1)
16	05:32	06:18		07:08	07:59 (WEA-4 E-160)	07:57		07:52		08:34	09:11 (WEA-1)
	21:45	20:56		19:47	43 08:42 (WEA-4 E-160)	18:39	29	09:32 (WEA-3 E-160)	09:03 (WEA-3 E-160)	16:23	15 09:26 (WEA-1)
17	05:33	06:19		07:09	07:59 (WEA-4 E-160)	07:59		07:54		08:35	09:12 (WEA-1)
	21:44	20:54		19:45	41 08:40 (WEA-4 E-160)	18:37	31	09:33 (WEA-3 E-160)	09:02 (WEA-3 E-160)	16:23	15 09:27 (WEA-1)
18	05:34	06:21		07:11	07:59 (WEA-4 E-160)	08:01		07:56		08:35	09:13 (WEA-1)
	21:43	20:52		19:43	40 08:39 (WEA-4 E-160)	18:35	33	09:34 (WEA-3 E-160)	09:01 (WEA-3 E-160)	16:23	14 09:27 (WEA-1)
19	05:36	06:22		07:13	08:00 (WEA-4 E-160)	08:03		07:57		08:36	09:14 (WEA-1)
	21:42	20:50		19:40	38 08:38 (WEA-4 E-160)	18:33	34	09:35 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:23	14 09:28 (WEA-1)
20	05:37	06:24		07:14	08:01 (WEA-4 E-160)	08:04		07:59		08:37	09:14 (WEA-1)
	21:41	20:48		19:38	35 08:36 (WEA-4 E-160)	18:31	34	09:35 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:24	14 09:28 (WEA-1)
21	05:38	06:26		07:16	08:02 (WEA-4 E-160)	08:06		08:01		08:37	09:15 (WEA-1)
	21:39	20:46		19:36	33 08:35 (WEA-4 E-160)	18:28	35	09:35 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:24	14 09:29 (WEA-1)
22	05:40	06:27		07:17	08:03 (WEA-4 E-160)	08:08		08:02		08:38	09:15 (WEA-1)
	21:38	20:44		19:33	29 08:32 (WEA-4 E-160)	18:26	35	09:34 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:25	14 09:29 (WEA-1)
23	05:41	06:29		07:19	08:05 (WEA-4 E-160)	08:10		08:04		08:38	09:16 (WEA-1)
	21:37	20:42		19:31	25 08:30 (WEA-4 E-160)	18:24	35	09:34 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:25	14 09:30 (WEA-1)
24	05:42	06:31		07:21	08:08 (WEA-4 E-160)	08:11		08:06		08:39	09:16 (WEA-1)
	21:36	20:39		19:29	19 08:27 (WEA-4 E-160)	18:22	34	09:34 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:26	14 09:30 (WEA-1)
25	05:44	06:32		07:22	08:12 (WEA-4 E-160)	07:13		08:07		08:39	09:16 (WEA-1)
	21:34	20:37		19:27	9 08:21 (WEA-4 E-160)	17:20	34	08:34 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:26	14 09:30 (WEA-1)
26	05:45	06:34		07:24	08:23 (WEA-4 E-160)	07:24		08:09		08:39	09:17 (WEA-1)
	21:33	20:35	6	19:24	08:29 (WEA-4 E-160)	19:24	34	08:34 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:27	15 09:32 (WEA-1)
27	05:47	06:35		07:26	08:18 (WEA-4 E-160)	07:26		08:10		08:40	09:17 (WEA-1)
	21:31	20:33	17	19:22	08:35 (WEA-4 E-160)	19:22	32	08:33 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:28	15 09:32 (WEA-1)
28	05:48	06:37		07:27	08:14 (WEA-4 E-160)	07:27		08:12		08:40	09:17 (WEA-1)
	21:30	20:31	23	19:20	08:37 (WEA-4 E-160)	19:20	31	08:32 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:28	15 09:32 (WEA-1)
29	05:50	06:39		07:29	08:12 (WEA-4 E-160)	07:29		08:13		08:40	09:17 (WEA-1)
	21:28	20:29	27	19:17	08:39 (WEA-4 E-160)	19:17	30	08:32 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:29	16 09:33 (WEA-1)
30	05:51	06:40		07:31	08:10 (WEA-4 E-160)	07:31		08:15		08:40	09:18 (WEA-1)
	21:27	20:26	30	19:15	08:40 (WEA-4 E-160)	19:15	28	08:31 (WEA-3 E-160)	09:00 (WEA-3 E-160)	16:30	16 09:34 (WEA-1)
31	05:53	06:42			08:08 (WEA-4 E-160)			08:16		08:40	09:18 (WEA-1)
	21:25	20:24	34		08:42 (WEA-4 E-160)			08:29 (WEA-3 E-160)		16:31	17 09:35 (WEA-1)
Sonnenscheinstunden	501	453		381			332	267		244	
astr.max.mögl.Beschattung		137		964			614	349		529	
Red.Sonnenscheinwahrsch.		0,43		0,36			0,32	0,23		0,15	
Reduktion Betriebsdauer		0,84		0,84			0,84	0,84		0,84	
Reduktion Windrichtung		0,65		0,65			0,60	0,56		0,56	
Gesamte Reduktion		0,23		0,19			0,16	0,11		0,07	
Met.wahrsch.Beschattung		31		186			96	37		36	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP204 - IP204 Marbecker Straße 110

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	07:21	08:25 (WEA-1)	07:10	06:06
	16:32	17:20	18:11	08:54 (WEA-1)	20:05	20:56
2	08:40	08:12	07:18	08:26 (WEA-1)	07:08	06:04
	16:34	17:22	18:13	08:53 (WEA-1)	20:07	20:57
3	08:40	08:11	07:16	08:27 (WEA-1)	07:06	06:02
	16:35	17:24	18:15	08:50 (WEA-1)	20:08	20:59
4	08:40	08:09	07:14	08:28 (WEA-1)	07:03	06:00
	16:36	17:26	18:17	08:49 (WEA-1)	20:10	21:01
5	08:40	08:07	07:12	08:31 (WEA-1)	07:01	05:58
	16:37	17:27	18:19	08:46 (WEA-1)	20:12	21:02
6	08:39	08:06	07:10	08:35 (WEA-1)	06:59	05:56
	16:38	17:29	18:20	08:42 (WEA-1)	20:14	21:04
7	08:39	08:04	07:07		06:57	
	16:39	17:31	18:22		20:15	15 07:59 (WEA-3 E-160)
8	08:38	08:02	07:05		06:54	07:40 (WEA-3 E-160)
	16:41	17:33	18:24		20:17	22 08:02 (WEA-3 E-160)
9	08:38	08:00	07:03		06:52	07:38 (WEA-3 E-160)
	16:42	17:35	18:26		20:19	27 08:05 (WEA-3 E-160)
10	08:37	07:59	07:01	07:30 (WEA-2 E-138)	06:50	07:36 (WEA-3 E-160)
	16:43	17:37	18:27	5 07:35 (WEA-2 E-138)	20:20	31 08:07 (WEA-3 E-160)
11	08:37	07:57	06:58	07:25 (WEA-2 E-138)	06:48	07:33 (WEA-3 E-160)
	16:45	17:39	18:29	13 07:38 (WEA-2 E-138)	20:22	34 08:07 (WEA-3 E-160)
12	08:36	07:55	06:56	07:23 (WEA-2 E-138)	06:45	07:31 (WEA-3 E-160)
	16:46	17:40	18:31	17 07:40 (WEA-2 E-138)	20:24	38 08:09 (WEA-3 E-160)
13	08:36	07:53	06:54	07:22 (WEA-2 E-138)	06:43	07:30 (WEA-3 E-160)
	16:48	17:42	18:33	19 07:41 (WEA-2 E-138)	20:25	40 08:10 (WEA-3 E-160)
14	08:35	07:51	06:52	07:20 (WEA-2 E-138)	06:41	07:29 (WEA-3 E-160)
	16:49	17:44	18:34	21 07:41 (WEA-2 E-138)	20:27	42 08:11 (WEA-3 E-160)
15	08:34	07:49	06:49	07:20 (WEA-2 E-138)	06:39	07:28 (WEA-3 E-160)
	16:51	17:46	18:36	22 07:42 (WEA-2 E-138)	20:29	43 08:11 (WEA-3 E-160)
16	08:33	07:47	06:47	07:20 (WEA-2 E-138)	06:37	07:27 (WEA-3 E-160)
	16:52	17:48	18:38	22 07:42 (WEA-2 E-138)	20:30	45 08:12 (WEA-3 E-160)
17	08:32	07:45	06:45	07:18 (WEA-2 E-138)	06:34	07:25 (WEA-3 E-160)
	16:54	17:50	18:39	23 07:41 (WEA-2 E-138)	20:32	46 08:11 (WEA-3 E-160)
18	08:31	07:43	06:42	07:19 (WEA-2 E-138)	06:32	07:25 (WEA-3 E-160)
	16:56	17:51	18:41	22 07:41 (WEA-2 E-138)	20:34	47 08:12 (WEA-3 E-160)
19	08:30	07:41	06:40	07:19 (WEA-2 E-138)	06:30	07:24 (WEA-3 E-160)
	16:57	17:53	18:43	22 07:41 (WEA-2 E-138)	20:36	48 08:12 (WEA-3 E-160)
20	08:29	07:39	06:38	07:19 (WEA-2 E-138)	06:28	07:24 (WEA-3 E-160)
	16:59	17:55	18:45	20 07:39 (WEA-2 E-138)	20:37	48 08:12 (WEA-3 E-160)
21	08:28	07:37	06:36	07:19 (WEA-2 E-138)	06:26	07:23 (WEA-3 E-160)
	17:01	17:57	18:46	19 07:38 (WEA-2 E-138)	20:39	49 08:12 (WEA-3 E-160)
22	08:27	07:35	06:33	07:21 (WEA-2 E-138)	06:24	07:23 (WEA-3 E-160)
	17:02	17:59	18:48	16 07:37 (WEA-2 E-138)	20:41	49 08:12 (WEA-3 E-160)
23	08:26	07:33	06:31	07:22 (WEA-2 E-138)	06:22	07:23 (WEA-3 E-160)
	17:04	18:01	18:50	12 07:34 (WEA-2 E-138)	20:42	48 08:11 (WEA-3 E-160)
24	08:25	07:31	06:29	07:26 (WEA-2 E-138)	06:20	07:22 (WEA-3 E-160)
	17:06	18:02	18:51	4 07:30 (WEA-2 E-138)	20:44	49 08:11 (WEA-3 E-160)
25	08:23	07:29	06:26		06:18	07:22 (WEA-3 E-160)
	17:07	18:04	18:53		20:46	49 08:11 (WEA-3 E-160)
26	08:22	07:27	06:24		06:16	07:22 (WEA-3 E-160)
	17:09	18:06	18:55		20:47	48 08:10 (WEA-3 E-160)
27	08:21	07:25	06:22		06:14	07:22 (WEA-3 E-160)
	17:11	18:08	18:57		20:49	48 08:10 (WEA-3 E-160)
28	08:19	07:23	06:19		06:12	07:23 (WEA-3 E-160)
	17:13	18:10	18:58		20:51	47 08:10 (WEA-3 E-160)
29	08:18		07:17		06:10	07:23 (WEA-3 E-160)
	17:15		20:00		20:52	46 08:09 (WEA-3 E-160)
30	08:17		07:15		06:08	07:23 (WEA-3 E-160)
	17:16		20:02		20:54	45 08:08 (WEA-3 E-160)
31	08:15		07:13			05:22
	17:18		20:03			21:40
Sonnenscheinstunden	259	278	367		416	485
astr.max.mögl.Beschattung		450	379	1004		385
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41		0,46
Reduktion Betriebsdauer		0,84	0,84	0,84		0,84
Reduktion Windrichtung		0,60	0,62	0,69		0,69
Gesamte Reduktion		0,15	0,16	0,23		0,26
Met.wahrsch.Beschattung		69	59	235		101

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP204 - IP204 Marbecker Straße 110

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Juli		August		September		Oktober		November		Dezember	
1	05:18	05:54	07:46 (WEA-3 E-160)	06:43	07:32 (WEA-3 E-160)	07:32	08:02 (WEA-2 E-138)	07:26	08:16		
	21:55	21:24	08:03 (WEA-3 E-160)	20:22	08:06 (WEA-3 E-160)	19:13	08:19 (WEA-2 E-138)	17:07	16:27		
2	05:18	05:56	07:44 (WEA-3 E-160)	06:45	07:34 (WEA-3 E-160)	07:34	08:03 (WEA-2 E-138)	07:27	08:18		
	21:55	21:22	08:05 (WEA-3 E-160)	20:20	08:05 (WEA-3 E-160)	19:10	08:18 (WEA-2 E-138)	17:05	16:26		
3	05:19	05:57	07:42 (WEA-3 E-160)	06:47	07:36 (WEA-3 E-160)	07:35	08:06 (WEA-2 E-138)	07:29	08:19		
	21:54	21:20	08:07 (WEA-3 E-160)	20:17	08:03 (WEA-3 E-160)	19:08	08:15 (WEA-2 E-138)	17:03	16:25		
4	05:20	05:59	07:40 (WEA-3 E-160)	06:48	07:37 (WEA-3 E-160)	07:37		07:31	08:21		
	21:54	21:19	08:09 (WEA-3 E-160)	20:15	08:00 (WEA-3 E-160)	19:06		17:01	16:25		
5	05:21	06:00	07:38 (WEA-3 E-160)	06:50	07:41 (WEA-3 E-160)	07:39		07:33	08:22		
	21:54	21:17	08:09 (WEA-3 E-160)	20:13	07:56 (WEA-3 E-160)	19:03		17:00	16:24		
6	05:22	06:02	07:37 (WEA-3 E-160)	06:52		07:40		07:35	08:23		
	21:53	21:15	08:11 (WEA-3 E-160)	20:11		19:01		16:58	16:24		
7	05:22	06:03	07:36 (WEA-3 E-160)	06:53		07:42		07:36	08:24		
	21:52	21:13	08:12 (WEA-3 E-160)	20:08		18:59		16:56	16:24		
8	05:23	06:05	07:35 (WEA-3 E-160)	06:55		07:44	09:07 (WEA-1)	07:38	08:26		
	21:52	21:11	08:13 (WEA-3 E-160)	20:06		18:57	09:20 (WEA-1)	16:55	16:23		
9	05:24	06:06	07:34 (WEA-3 E-160)	06:56		07:46	09:04 (WEA-1)	07:40	08:27		
	21:51	21:10	08:14 (WEA-3 E-160)	20:04		18:54	09:23 (WEA-1)	16:53	16:23		
10	05:25	06:08	07:34 (WEA-3 E-160)	06:58		07:47	09:03 (WEA-1)	07:42	08:28		
	21:50	21:08	08:15 (WEA-3 E-160)	20:01		18:52	09:25 (WEA-1)	16:51	16:23		
11	05:26	06:10	07:32 (WEA-3 E-160)	07:00		07:49	09:00 (WEA-1)	07:43	08:29		
	21:50	21:06	08:15 (WEA-3 E-160)	19:59		18:50	09:25 (WEA-1)	16:50	16:23		
12	05:27	06:11	07:32 (WEA-3 E-160)	07:01		07:51	08:59 (WEA-1)	07:45	08:30		
	21:49	21:04	08:16 (WEA-3 E-160)	19:57		18:48	09:26 (WEA-1)	16:48	16:22		
13	05:28	06:13	07:31 (WEA-3 E-160)	07:03		07:52	08:58 (WEA-1)	07:47	08:31		
	21:48	21:02	08:16 (WEA-3 E-160)	19:54		18:46	09:27 (WEA-1)	16:47	16:22		
14	05:30	06:14	07:31 (WEA-3 E-160)	07:04		07:54	08:20 (WEA02)	07:49	08:32		
	21:47	21:00	08:17 (WEA-3 E-160)	19:52		18:43	09:28 (WEA-1)	16:45	16:22		
15	05:31	06:16	07:30 (WEA-3 E-160)	07:06		07:56	08:22 (WEA02)	07:51	08:33		
	21:46	20:58	08:17 (WEA-3 E-160)	19:50		18:41	09:29 (WEA-1)	16:44	16:22		
16	05:32	06:18	07:30 (WEA-3 E-160)	07:08		07:57	08:56 (WEA-1)	07:52	08:34		
	21:45	20:56	08:17 (WEA-3 E-160)	19:47		18:39	09:28 (WEA-1)	16:42	16:23		
17	05:33	06:19	07:29 (WEA-3 E-160)	07:09		07:59	08:55 (WEA-1)	07:54	08:35		
	21:44	20:54	08:17 (WEA-3 E-160)	19:45		18:37	09:28 (WEA-1)	16:41	16:23		
18	05:34	06:21	07:29 (WEA-3 E-160)	07:11		08:01	08:55 (WEA-1)	07:56	08:35		
	21:43	20:52	08:17 (WEA-3 E-160)	19:43		18:35	09:28 (WEA-1)	16:40	16:23		
19	05:36	06:22	07:28 (WEA-3 E-160)	07:13		08:03	08:55 (WEA-1)	07:57	08:36		
	21:42	20:50	08:17 (WEA-3 E-160)	19:40		18:33	09:28 (WEA-1)	16:38	16:23		
20	05:37	06:24	07:28 (WEA-3 E-160)	07:14		08:04	08:56 (WEA-1)	07:59	08:37		
	21:41	20:48	08:17 (WEA-3 E-160)	19:38	08:09 (WEA-2 E-138)	18:31	09:28 (WEA-1)	16:37	16:24		
21	05:38	06:26	07:29 (WEA-3 E-160)	07:16		08:06	08:55 (WEA-1)	08:01	08:37		
	21:39	20:46	08:17 (WEA-3 E-160)	19:36	08:22 (WEA-2 E-138)	18:28	09:27 (WEA-1)	16:36	16:24		
22	05:40	06:27	07:28 (WEA-3 E-160)	07:17		08:08	08:55 (WEA-1)	08:02	08:38		
	21:38	20:44	08:16 (WEA-3 E-160)	19:33	08:22 (WEA-2 E-138)	18:26	09:26 (WEA-1)	16:35	16:25		
23	05:41	06:29	07:28 (WEA-3 E-160)	07:19		08:10	08:56 (WEA-1)	08:04	08:38		
	21:37	20:42	08:16 (WEA-3 E-160)	19:31	08:23 (WEA-2 E-138)	18:24	09:26 (WEA-1)	16:34	16:25		
24	05:42	06:31	07:28 (WEA-3 E-160)	07:21		08:11	08:57 (WEA-1)	08:06	08:39		
	21:36	20:39	08:15 (WEA-3 E-160)	19:29	08:24 (WEA-2 E-138)	18:22	09:25 (WEA-1)	16:33	16:26		
25	05:44	06:32	07:29 (WEA-3 E-160)	07:22		08:13	08:58 (WEA-1)	08:07	08:39		
	21:34	20:37	08:15 (WEA-3 E-160)	19:26	08:23 (WEA-2 E-138)	17:20	08:24 (WEA-1)	16:32	16:26		
26	05:45	06:34	07:28 (WEA-3 E-160)	07:24		08:15	08:59 (WEA-1)	08:09	08:39		
	21:33	20:35	08:14 (WEA-3 E-160)	19:24	08:24 (WEA-2 E-138)	17:18	08:23 (WEA-1)	16:31	16:27		
27	05:47	06:35	07:29 (WEA-3 E-160)	07:26		08:16	08:01 (WEA-1)	08:10	08:40		
	21:31	20:33	08:14 (WEA-3 E-160)	19:22	08:24 (WEA-2 E-138)	17:16	08:21 (WEA-1)	16:30	16:28		
28	05:48	06:37	07:29 (WEA-3 E-160)	07:27		08:17	08:03 (WEA-1)	08:12	08:40		
	21:30	20:31	08:12 (WEA-3 E-160)	19:20	08:22 (WEA-2 E-138)	17:14	08:19 (WEA-1)	16:29	16:28		
29	05:50	06:39	07:30 (WEA-3 E-160)	07:29		08:18	08:06 (WEA-1)	08:13	08:40		
	21:28	20:28	08:11 (WEA-3 E-160)	19:17	08:22 (WEA-2 E-138)	17:12	08:16 (WEA-1)	16:28	16:29		
30	05:51	06:40	07:30 (WEA-3 E-160)	07:31		08:19	08:02 (WEA-2 E-138)	08:15	08:40		
	21:27	20:26	08:10 (WEA-3 E-160)	19:15	08:21 (WEA-2 E-138)	17:11		16:27	16:30		
31	05:53	07:50 (WEA-3 E-160)	06:42	07:31 (WEA-3 E-160)		07:24		16:27	08:40		
	21:25	07:58 (WEA-3 E-160)	20:24	08:09 (WEA-3 E-160)		17:09		16:31	16:31		
			453		381		332		267		244
	Sonnenscheinstunden	501									
	astr.max.mögl.Beschattung	8	1268		345		621				
	Red.Sonnenscheinwahrsch.	0,41	0,43		0,36		0,32				
	Reduktion Betriebsdauer	0,84	0,84		0,84		0,84				
	Reduktion Windrichtung	0,69	0,69		0,65		0,61				
	Gesamte Reduktion	0,24	0,24		0,20		0,16				
	Met.wahrsch.Beschattung	2	310		68		99				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP205 - IP205 Marbecker Straße 112

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	07:21	08:23 (WEA-1)	07:10	06:06
	16:32	17:20	18:11	08:49 (WEA-1)	20:05	20:56
2	08:40	08:12	07:18	08:24 (WEA-1)	07:08	06:04
	16:34	17:22	18:13	08:48 (WEA-1)	20:07	20:57
3	08:40	08:11	07:16	08:24 (WEA-1)	07:06	06:02
	16:35	17:24	18:15	08:46 (WEA-1)	20:08	20:59
4	08:40	08:09	07:14	08:26 (WEA-1)	07:03	06:00
	16:36	17:26	18:17	08:44 (WEA-1)	20:10	21:01
5	08:40	08:07	07:12	08:29 (WEA-1)	07:01	06:58
	16:37	17:27	18:19	08:41 (WEA-1)	20:12	21:02
6	08:39	08:06	07:10		06:59	06:56
	16:38	17:29	18:20		20:14	21:04
7	08:39	08:04	07:07		06:57	06:55
	16:39	17:31	18:22		20:15	21:06
8	08:38	08:02	07:05		06:54	06:53
	16:41	17:33	18:24		20:17	21:07
9	08:38	08:00	07:03		06:52	06:51
	16:42	17:35	18:26		20:19	21:09
10	08:37	07:59	07:01	07:28 (WEA-2 E-138)	06:50	07:34 (WEA-3 E-160)
	16:43	17:37	18:27	07:37 (WEA-2 E-138)	20:20	21:10
11	08:37	07:57	06:58	07:24 (WEA-2 E-138)	06:48	07:32 (WEA-3 E-160)
	16:45	17:39	18:29	07:38 (WEA-2 E-138)	20:22	21:12
12	08:36	07:55	06:56	07:23 (WEA-2 E-138)	06:45	07:31 (WEA-3 E-160)
	16:46	17:40	18:31	07:40 (WEA-2 E-138)	20:24	21:14
13	08:36	07:53	06:54	07:22 (WEA-2 E-138)	06:43	07:31 (WEA-3 E-160)
	16:48	17:42	18:33	07:41 (WEA-2 E-138)	20:25	21:15
14	08:35	07:51	06:52	07:20 (WEA-2 E-138)	06:41	07:30 (WEA-3 E-160)
	16:49	17:44	18:34	07:41 (WEA-2 E-138)	20:27	21:17
15	08:34	07:49	06:49	07:20 (WEA-2 E-138)	06:39	07:29 (WEA-3 E-160)
	16:51	17:46	18:36	07:41 (WEA-2 E-138)	20:29	21:18
16	08:33	07:47	06:47	07:20 (WEA-2 E-138)	06:37	07:29 (WEA-3 E-160)
	16:52	17:48	18:38	07:41 (WEA-2 E-138)	20:30	21:20
17	08:32	07:45	06:45	07:19 (WEA-2 E-138)	06:34	07:27 (WEA-3 E-160)
	16:54	17:50	18:39	07:40 (WEA-2 E-138)	20:32	21:21
18	08:31	07:43	06:42	07:19 (WEA-2 E-138)	06:32	07:27 (WEA-3 E-160)
	16:56	17:51	18:41	07:40 (WEA-2 E-138)	20:34	21:23
19	08:30	07:41	06:40	07:20 (WEA-2 E-138)	06:30	07:27 (WEA-3 E-160)
	16:57	17:53	18:43	07:40 (WEA-2 E-138)	20:36	21:24
20	08:29	07:39	06:38	07:19 (WEA-2 E-138)	06:28	07:27 (WEA-3 E-160)
	16:59	17:55	18:45	07:38 (WEA-2 E-138)	20:37	21:26
21	08:28	07:37	06:36	07:21 (WEA-2 E-138)	06:26	07:27 (WEA-3 E-160)
	17:01	17:57	18:46	07:37 (WEA-2 E-138)	20:39	21:27
22	08:27	07:35	06:33	07:22 (WEA-2 E-138)	06:24	07:27 (WEA-3 E-160)
	17:02	17:59	18:48	07:35 (WEA-2 E-138)	20:41	21:29
23	08:26	07:33	06:31	07:25 (WEA-2 E-138)	06:22	07:27 (WEA-3 E-160)
	17:04	18:01	18:50	07:30 (WEA-2 E-138)	20:42	21:30
24	08:25	07:31	06:29		06:20	07:27 (WEA-3 E-160)
	17:06	18:02	18:51		20:44	21:31
25	08:23	07:29	06:26		06:18	07:27 (WEA-3 E-160)
	17:07	18:04	18:53		20:46	21:33
26	08:22	07:27	06:24		06:16	07:27 (WEA-3 E-160)
	17:09	18:06	18:55		20:47	21:34
27	08:21	07:25	06:22		06:14	07:28 (WEA-3 E-160)
	17:11	18:08	18:57		20:49	21:35
28	08:19	07:23	06:19		06:12	07:29 (WEA-3 E-160)
	17:13	18:10	18:58		20:51	21:36
29	08:18		07:17		06:10	07:30 (WEA-3 E-160)
	17:15		20:00		20:52	21:38
30	08:17		07:15		06:08	07:30 (WEA-3 E-160)
	17:16		20:02		20:54	21:39
31	08:15		07:13			05:22
	17:18		20:03			21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung		409	339	1031	140	
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41	0,46	
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	
Reduktion Windrichtung		0,61	0,63	0,68	0,68	
Gesamte Reduktion		0,15	0,16	0,23	0,26	
Met.wahrsch.Beschattung		63	53	240	37	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP205 - IP205 Marbecker Straße 112

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember				
1	05:18	05:54	06:43	07:31 (WEA-3 E-160)	07:32	08:01 (WEA-2 E-138)	07:26	08:16		
	21:55	21:24	20:22	19:13	18	08:19 (WEA-2 E-138)	17:07	16:27		
2	05:18	05:56	06:45	07:32 (WEA-3 E-160)	07:34	08:03 (WEA-2 E-138)	07:27	08:18		
	21:55	21:22	20:20	19:10	15	08:18 (WEA-2 E-138)	17:05	16:26		
3	05:19	05:57	06:47	07:34 (WEA-3 E-160)	07:35	08:05 (WEA-2 E-138)	07:29	08:19		
	21:54	21:20	20:17	19:08	11	08:16 (WEA-2 E-138)	17:03	16:25		
4	05:20	05:59	06:48	07:34 (WEA-3 E-160)	07:37	08:08 (WEA-2 E-138)	07:31	08:21		
	21:54	21:19	20:15	19:06	2	08:10 (WEA-2 E-138)	17:01	16:25		
5	05:21	06:00	06:50	07:36 (WEA-3 E-160)	07:39		07:33	08:22		
	21:54	21:17	20:13	19:03			17:00	16:24		
6	05:22	06:02	06:52	07:37 (WEA-3 E-160)	07:41		07:35	08:23		
	21:53	21:15	20:11	19:01			16:58	16:24		
7	05:22	06:03	06:53	07:40 (WEA-3 E-160)	07:42		07:36	08:24		
	21:52	21:13	20:08	18:59			16:56	16:24		
8	05:23	06:05	06:55	07:46 (WEA-3 E-160)	07:44	09:06 (WEA-1)	07:38	08:26		
	21:52	21:11	20:06	11	07:54 (WEA-3 E-160)	18:57	8	09:14 (WEA-1)	16:55	16:23
9	05:24	06:06	06:56	07:43 (WEA-3 E-160)	07:46		09:02 (WEA-1)	07:40	08:27	
	21:51	21:10	20:04	16	18:54		09:18 (WEA-1)	16:53	16:23	
10	05:25	06:08	06:58	07:42 (WEA-3 E-160)	07:47		09:00 (WEA-1)	07:42	08:28	
	21:50	21:08	20:01	18:52	20		09:20 (WEA-1)	16:51	16:23	
11	05:26	06:10	07:00	07:40 (WEA-3 E-160)	07:49		08:58 (WEA-1)	07:43	08:29	
	21:50	21:06	19:59	18:50	23		09:21 (WEA-1)	16:50	16:23	
12	05:27	06:11	07:01	07:39 (WEA-3 E-160)	07:51		08:56 (WEA-1)	07:45	08:30	
	21:49	21:04	19:57	18:48	26		09:22 (WEA-1)	16:48	16:22	
13	05:28	06:13	07:03	07:38 (WEA-3 E-160)	07:52		08:55 (WEA-1)	07:47	08:31	
	21:48	21:02	19:54	18:46	28		09:23 (WEA-1)	16:47	16:22	
14	05:30	06:14	07:04	07:37 (WEA-3 E-160)	07:54		08:20 (WEA02)	07:49	08:32	
	21:47	21:00	19:52	18:43	30		09:24 (WEA-1)	16:45	16:22	
15	05:31	06:16	07:06	07:35 (WEA-3 E-160)	07:56		08:54 (WEA-1)	07:51	08:33	
	21:46	20:58	19:50	18:41	30		09:24 (WEA-1)	16:44	16:22	
16	05:32	06:18	07:08	07:35 (WEA-3 E-160)	07:57		08:53 (WEA-1)	07:52	08:34	
	21:45	20:56	19:47	18:39	31		09:24 (WEA-1)	16:42	16:23	
17	05:33	06:19	07:09	07:34 (WEA-3 E-160)	07:59		08:53 (WEA-1)	07:54	08:35	
	21:44	20:54	19:45	18:37	31		09:24 (WEA-1)	16:41	16:23	
18	05:34	06:21	07:11	07:33 (WEA-3 E-160)	08:01		08:53 (WEA-1)	07:56	08:35	
	21:43	20:52	19:43	18:35	31		09:24 (WEA-1)	16:40	16:23	
19	05:36	06:22	07:13	07:32 (WEA-3 E-160)	08:03		08:53 (WEA-1)	07:57	08:36	
	21:42	20:50	19:40	18:33	31		09:24 (WEA-1)	16:38	16:23	
20	05:37	06:24	07:14	07:32 (WEA-3 E-160)	08:04		08:53 (WEA-1)	07:59	08:37	
	21:41	20:48	19:38	18:31	31		09:24 (WEA-1)	16:37	16:24	
21	05:38	06:26	07:16	07:32 (WEA-3 E-160)	08:06		08:52 (WEA-1)	08:01	08:37	
	21:39	20:46	19:36	11	08:20 (WEA-2 E-138)	18:28	30	09:22 (WEA-1)	16:36	16:24
22	05:40	06:27	07:17	07:31 (WEA-3 E-160)	08:08		08:53 (WEA-1)	08:02	08:38	
	21:38	20:44	19:33	15	08:21 (WEA-2 E-138)	18:26	29	09:22 (WEA-1)	16:35	16:25
23	05:41	06:29	07:19	07:31 (WEA-3 E-160)	08:10		08:53 (WEA-1)	08:04	08:38	
	21:37	20:42	19:31	18	08:22 (WEA-2 E-138)	18:24	28	09:21 (WEA-1)	16:34	16:25
24	05:42	06:31	07:21	07:31 (WEA-3 E-160)	08:11		08:54 (WEA-1)	08:06	08:39	
	21:36	20:39	19:29	20	08:23 (WEA-2 E-138)	18:22	26	09:20 (WEA-1)	16:33	16:26
25	05:44	06:32	07:22	07:31 (WEA-3 E-160)	08:13		07:55 (WEA-1)	08:07	08:39	
	21:34	20:37	19:27	21	08:23 (WEA-2 E-138)	17:20	24	08:19 (WEA-1)	16:32	16:26
26	05:45	06:34	07:24	07:30 (WEA-3 E-160)	08:15		07:57 (WEA-1)	08:09	08:39	
	21:33	20:35	19:24	22	08:23 (WEA-2 E-138)	17:18	21	08:18 (WEA-1)	16:31	16:27
27	05:47	06:35	07:26	07:31 (WEA-3 E-160)	08:17		07:59 (WEA-1)	08:10	08:40	
	21:31	20:33	19:22	22	08:23 (WEA-2 E-138)	17:16	17	08:16 (WEA-1)	16:30	16:28
28	05:48	06:37	07:27	07:30 (WEA-3 E-160)	08:19		08:01 (WEA-1)	08:12	08:40	
	21:30	20:31	19:20	22	08:22 (WEA-2 E-138)	17:14	12	08:13 (WEA-1)	16:29	16:28
29	05:50	06:39	07:29	07:31 (WEA-3 E-160)	08:20			08:13	08:40	
	21:28	20:28	19:17	21	08:22 (WEA-2 E-138)	17:12		16:28	16:29	
30	05:51	06:40	07:31	07:30 (WEA-3 E-160)	08:21			08:15	08:40	
	21:27	20:26	19:15	20	08:21 (WEA-2 E-138)	17:11		16:27	16:30	
31	05:53	06:42	07:31 (WEA-3 E-160)		07:24				08:40	
	21:25	20:24	08:12 (WEA-3 E-160)		17:09				16:31	
Sonnenscheinstunden	501	453	381		332		267	244		
astr.max.mögl.Beschattung		960	420	569						
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32						
Reduktion Betriebsdauer		0,84	0,84	0,84						
Reduktion Windrichtung		0,68	0,66	0,61						
Gesamte Reduktion		0,24	0,20	0,16						
Met.wahrsch.Beschattung		234	84	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)	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
	Minuten mit Schatten	

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP206 - IP206 Dorstener Postweg 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	08:57 (WEA-3 E-160)	07:21	08:08 (WEA-4 E-160)	07:10
	16:32	17:20	09:24 (WEA-3 E-160)	18:11	08:43 (WEA-4 E-160)	20:05
2	08:40	08:12	08:57 (WEA-3 E-160)	07:18	08:09 (WEA-4 E-160)	07:08
	16:33	17:22	09:24 (WEA-3 E-160)	18:13	08:43 (WEA-4 E-160)	20:07
3	08:40	08:11	08:57 (WEA-3 E-160)	07:16	08:08 (WEA-4 E-160)	07:06
	16:35	17:24	09:23 (WEA-3 E-160)	18:15	08:42 (WEA-4 E-160)	20:08
4	08:40	08:09	08:58 (WEA-3 E-160)	07:14	08:08 (WEA-4 E-160)	07:03
	16:36	17:26	09:24 (WEA-3 E-160)	18:17	08:42 (WEA-4 E-160)	20:10
5	08:40	08:07	08:58 (WEA-3 E-160)	07:12	08:09 (WEA-4 E-160)	07:01
	16:37	17:27	09:23 (WEA-3 E-160)	18:19	08:41 (WEA-4 E-160)	20:12
6	08:39	08:06	08:59 (WEA-3 E-160)	07:10	08:10 (WEA-4 E-160)	06:59
	16:38	17:29	09:23 (WEA-3 E-160)	18:20	08:40 (WEA-4 E-160)	20:14
7	08:39	08:04	08:59 (WEA-3 E-160)	07:07	08:10 (WEA-4 E-160)	06:57
	16:39	17:31	09:22 (WEA-3 E-160)	18:22	08:38 (WEA-4 E-160)	20:15
8	08:39	08:02	09:00 (WEA-3 E-160)	07:05	08:11 (WEA-4 E-160)	06:54
	16:41	17:33	09:21 (WEA-3 E-160)	18:24	08:37 (WEA-4 E-160)	20:17
9	08:38	08:00	09:02 (WEA-3 E-160)	07:03	08:12 (WEA-4 E-160)	06:52
	16:42	17:35	09:19 (WEA-3 E-160)	18:26	08:36 (WEA-4 E-160)	20:19
10	08:37	07:59	09:04 (WEA-3 E-160)	07:01	08:15 (WEA-4 E-160)	06:50
	16:43	17:37	09:18 (WEA-3 E-160)	18:27	08:34 (WEA-4 E-160)	20:20
11	08:37	07:57	09:08 (WEA-3 E-160)	06:58	08:17 (WEA-4 E-160)	06:48
	16:45	17:39	09:15 (WEA-3 E-160)	18:29	08:30 (WEA-4 E-160)	20:22
12	08:36	07:55		06:56		06:45
	16:46	17:40		18:31		20:24
13	08:36	07:53		06:54		06:43
	16:48	17:42		18:33		20:25
14	08:35	07:51		06:52		06:41
	16:49	17:44		18:34		20:27
15	08:34	07:49		06:49		06:39
	16:51	17:46		18:36		20:29
16	08:33	07:47		06:47		06:37
	16:52	17:48		18:38		20:31
17	08:32	07:45	08:25 (WEA-4 E-160)	06:45		06:34
	16:54	17:50	5 08:30 (WEA-4 E-160)	18:40		20:32
18	08:31	07:43	08:20 (WEA-4 E-160)	06:42		06:32
	16:56	17:51	15 08:35 (WEA-4 E-160)	18:41		20:34
19	08:30	09:04 (WEA-3 E-160)	07:41	08:18 (WEA-4 E-160)	06:40	06:30
	16:57	7 09:11 (WEA-3 E-160)	17:53	20 08:38 (WEA-4 E-160)	18:43	20:36
20	08:29	09:01 (WEA-3 E-160)	07:39	08:15 (WEA-4 E-160)	06:38	06:28
	16:59	12 09:13 (WEA-3 E-160)	17:55	23 08:38 (WEA-4 E-160)	18:45	20:37
21	08:28	09:00 (WEA-3 E-160)	07:37	08:13 (WEA-4 E-160)	06:36	06:26
	17:01	15 09:15 (WEA-3 E-160)	17:57	27 08:40 (WEA-4 E-160)	18:46	20:39
22	08:27	08:59 (WEA-3 E-160)	07:35	08:12 (WEA-4 E-160)	06:33	06:24
	17:02	18 09:17 (WEA-3 E-160)	17:59	29 08:41 (WEA-4 E-160)	18:48	20:41
23	08:26	08:58 (WEA-3 E-160)	07:33	08:11 (WEA-4 E-160)	06:31	06:22
	17:04	20 09:18 (WEA-3 E-160)	18:01	31 08:42 (WEA-4 E-160)	18:50	20:42
24	08:25	08:58 (WEA-3 E-160)	07:31	08:11 (WEA-4 E-160)	06:29	06:20
	17:06	21 09:19 (WEA-3 E-160)	18:02	32 08:43 (WEA-4 E-160)	18:51	20:44
25	08:24	08:58 (WEA-3 E-160)	07:29	08:10 (WEA-4 E-160)	06:26	06:18
	17:07	22 09:20 (WEA-3 E-160)	18:04	34 08:44 (WEA-4 E-160)	18:53	20:46
26	08:22	08:57 (WEA-3 E-160)	07:27	08:10 (WEA-4 E-160)	06:24	06:16
	17:09	24 09:21 (WEA-3 E-160)	18:06	34 08:44 (WEA-4 E-160)	18:55	20:47
27	08:21	08:57 (WEA-3 E-160)	07:25	08:09 (WEA-4 E-160)	06:22	06:14
	17:11	25 09:22 (WEA-3 E-160)	18:08	34 08:43 (WEA-4 E-160)	18:57	20:49
28	08:20	08:56 (WEA-3 E-160)	07:23	08:08 (WEA-4 E-160)	06:19	06:12
	17:13	26 09:22 (WEA-3 E-160)	18:10	35 08:43 (WEA-4 E-160)	18:58	20:51
29	08:18	08:57 (WEA-3 E-160)		07:17		06:10
	17:15	26 09:23 (WEA-3 E-160)		20:00		20:52
30	08:17	08:56 (WEA-3 E-160)		07:15		06:08
	17:16	27 09:23 (WEA-3 E-160)		20:02		20:54
31	08:15	08:56 (WEA-3 E-160)		07:13		05:22
	17:18	27 09:23 (WEA-3 E-160)		20:03		21:40
Sonnenscheinstunden	259	278		367	416	485
astr.max.mögl.Beschattung	270	556		309		
Red.Sonnenscheinwahrsch.	0,20	0,30		0,30		
Reduktion Betriebsdauer	0,84	0,84		0,84		
Reduktion Windrichtung	0,57	0,59		0,61		
Gesamte Reduktion	0,09	0,15		0,15		
Met.wahrsch.Beschattung	25	84		47		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP206 - IP206 Dorstener Postweg 3

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

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

1	05:18	05:54	06:43	07:32		07:26		08:33 (WEA-3 E-160)	08:16
	21:55	21:24	20:22	19:13		17:07	14	08:47 (WEA-3 E-160)	16:27
2	05:18	05:56	06:45	07:34		08:57 (WEA-4 E-160)	07:27	08:31 (WEA-3 E-160)	08:18
	21:55	21:22	20:20	19:10	9	09:06 (WEA-4 E-160)	17:05	08:49 (WEA-3 E-160)	16:26
3	05:19	05:57	06:47	07:36		08:54 (WEA-4 E-160)	07:29	08:30 (WEA-3 E-160)	08:19
	21:55	21:20	20:17	19:08	16	09:10 (WEA-4 E-160)	17:03	08:51 (WEA-3 E-160)	16:25
4	05:20	05:59	06:48	07:37		08:50 (WEA-4 E-160)	07:31	08:29 (WEA-3 E-160)	08:21
	21:54	21:19	20:15	19:06	22	09:12 (WEA-4 E-160)	17:01	08:52 (WEA-3 E-160)	16:25
5	05:21	06:00	06:50	07:39		08:49 (WEA-4 E-160)	07:33	08:28 (WEA-3 E-160)	08:22
	21:54	21:17	20:13	19:04	25	09:14 (WEA-4 E-160)	17:00	08:53 (WEA-3 E-160)	16:24
6	05:22	06:02	06:52	07:41		08:47 (WEA-4 E-160)	07:35	08:28 (WEA-3 E-160)	08:23
	21:53	21:15	20:11	19:01	28	09:15 (WEA-4 E-160)	16:58	08:53 (WEA-3 E-160)	16:24
7	05:22	06:03	06:53	07:42		08:45 (WEA-4 E-160)	07:36	08:28 (WEA-3 E-160)	08:24
	21:53	21:13	20:08	18:59	30	09:15 (WEA-4 E-160)	16:56	08:54 (WEA-3 E-160)	16:24
8	05:23	06:05	06:55	07:44		08:44 (WEA-4 E-160)	07:38	08:27 (WEA-3 E-160)	08:26
	21:52	21:11	20:06	18:57	32	09:16 (WEA-4 E-160)	16:55	08:54 (WEA-3 E-160)	16:23
9	05:24	06:06	06:56	07:46		08:44 (WEA-4 E-160)	07:40	08:27 (WEA-3 E-160)	08:27
	21:51	21:10	20:04	18:54	33	09:17 (WEA-4 E-160)	16:53	08:55 (WEA-3 E-160)	16:23
10	05:25	06:08	06:58	07:47		08:43 (WEA-4 E-160)	07:42	08:27 (WEA-3 E-160)	08:28
	21:51	21:08	20:01	18:52	34	09:17 (WEA-4 E-160)	16:51	08:55 (WEA-3 E-160)	16:23
11	05:26	06:10	07:00	07:49		08:42 (WEA-4 E-160)	07:44	08:28 (WEA-3 E-160)	08:29
	21:50	21:06	19:59	18:50	34	09:16 (WEA-4 E-160)	16:50	08:55 (WEA-3 E-160)	16:23
12	05:27	06:11	07:01	07:51		08:42 (WEA-4 E-160)	07:45	08:28 (WEA-3 E-160)	08:30
	21:49	21:04	19:57	18:48	35	09:17 (WEA-4 E-160)	16:48	08:55 (WEA-3 E-160)	16:22
13	05:28	06:13	07:03	07:52		08:42 (WEA-4 E-160)	07:47	08:29 (WEA-3 E-160)	08:31
	21:48	21:02	19:54	18:46	35	09:17 (WEA-4 E-160)	16:47	08:55 (WEA-3 E-160)	16:22
14	05:30	06:14	07:04	07:54		08:42 (WEA-4 E-160)	07:49	08:29 (WEA-3 E-160)	08:32
	21:47	21:00	19:52	18:43	35	09:17 (WEA-4 E-160)	16:45	08:55 (WEA-3 E-160)	16:22
15	05:31	06:16	07:06	07:56		08:42 (WEA-4 E-160)	07:51	08:29 (WEA-3 E-160)	08:33
	21:46	20:58	19:50	18:41	34	09:16 (WEA-4 E-160)	16:44	08:54 (WEA-3 E-160)	16:22
16	05:32	06:18	07:08	07:58		08:41 (WEA-4 E-160)	07:52	08:30 (WEA-3 E-160)	08:34
	21:45	20:56	19:47	18:39	34	09:15 (WEA-4 E-160)	16:42	08:54 (WEA-3 E-160)	16:23
17	05:33	06:19	07:09	07:59		08:42 (WEA-4 E-160)	07:54	08:31 (WEA-3 E-160)	08:35
	21:44	20:54	19:45	18:37	33	09:15 (WEA-4 E-160)	16:41	08:53 (WEA-3 E-160)	16:23
18	05:34	06:21	07:11	08:01		08:42 (WEA-4 E-160)	07:56	08:32 (WEA-3 E-160)	08:35
	21:43	20:52	19:43	18:35	32	09:14 (WEA-4 E-160)	16:40	08:53 (WEA-3 E-160)	16:23
19	05:36	06:22	07:13	08:03		08:43 (WEA-4 E-160)	07:57	08:33 (WEA-3 E-160)	08:36
	21:42	20:50	19:40	18:33	30	09:13 (WEA-4 E-160)	16:38	08:53 (WEA-3 E-160)	16:23
20	05:37	06:24	07:14	08:04		08:44 (WEA-4 E-160)	07:59	08:34 (WEA-3 E-160)	08:37
	21:41	20:48	19:38	18:31	28	09:12 (WEA-4 E-160)	16:37	08:52 (WEA-3 E-160)	16:24
21	05:38	06:26	07:16	08:06		08:45 (WEA-4 E-160)	08:01	08:36 (WEA-3 E-160)	08:37
	21:39	20:46	19:36	18:28	26	09:11 (WEA-4 E-160)	16:36	08:51 (WEA-3 E-160)	16:24
22	05:40	06:27	07:17	08:08		08:46 (WEA-4 E-160)	08:02	08:37 (WEA-3 E-160)	08:38
	21:38	20:44	19:33	18:26	22	09:08 (WEA-4 E-160)	16:35	08:49 (WEA-3 E-160)	16:24
23	05:41	06:29	07:19	08:10		08:48 (WEA-4 E-160)	08:04	08:40 (WEA-3 E-160)	08:38
	21:37	20:42	19:31	18:24	18	09:06 (WEA-4 E-160)	16:34	16:25	08:39
24	05:42	06:31	07:21	08:11		08:51 (WEA-4 E-160)	08:06	08:39	16:26
	21:36	20:39	19:29	18:22	13	09:04 (WEA-4 E-160)	16:33	16:26	08:39
25	05:44	06:32	07:22	08:13			08:07	16:26	08:39
	21:34	20:37	19:27	17:20			16:32	16:26	08:40
26	05:45	06:34	07:24	08:15			08:09	16:27	08:40
	21:33	20:35	19:24	17:18			16:31	16:27	08:40
27	05:47	06:35	07:26	08:17			08:10	16:28	08:40
	21:31	20:33	19:22	17:16			16:30	16:28	08:40
28	05:48	06:37	07:27	08:19			08:12	16:28	08:40
	21:30	20:31	19:20	17:14			16:29	16:28	08:40
29	05:50	06:39	07:29	08:20			08:13	16:29	08:40
	21:28	20:29	19:17	17:12			16:28	16:29	08:40
30	05:51	06:40	07:31	08:22			08:15	16:30	08:40
	21:27	20:26	19:15	17:11			16:27	16:30	08:40
31	05:53	06:42		07:24		08:35 (WEA-3 E-160)		16:30	08:40
	21:25	20:24		17:09	9	08:44 (WEA-3 E-160)		16:31	08:40
Sonnenscheinstunden	501	453	381	332		267		244	
astr.max.mögl.Beschattung				647		505			
Red.Sonnenscheinwahrsch.				0,32		0,23			
Reduktion Betriebsdauer				0,84		0,84			
Reduktion Windrichtung				0,61		0,57			
Gesamte Reduktion				0,16		0,11			
Met.wahrsch.Beschattung				105		55			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenziertes Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP206/1 - IP206/1 Dorstener Postweg 3a

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	08:56 (WEA-3 E-160)	07:21	08:08 (WEA-4 E-160)	07:10
	16:32	17:20	27 09:23 (WEA-3 E-160)	18:11	35 08:43 (WEA-4 E-160)	20:05
2	08:40	08:12	08:56 (WEA-3 E-160)	07:18	08:08 (WEA-4 E-160)	07:08
	16:33	17:22	27 09:23 (WEA-3 E-160)	18:13	35 08:43 (WEA-4 E-160)	20:07
3	08:40	08:11	08:56 (WEA-3 E-160)	07:16	08:08 (WEA-4 E-160)	07:06
	16:35	17:24	27 09:23 (WEA-3 E-160)	18:15	33 08:41 (WEA-4 E-160)	20:08
4	08:40	08:09	08:57 (WEA-3 E-160)	07:14	08:08 (WEA-4 E-160)	07:03
	16:36	17:26	26 09:23 (WEA-3 E-160)	18:17	33 08:41 (WEA-4 E-160)	20:10
5	08:40	08:07	08:57 (WEA-3 E-160)	07:12	08:09 (WEA-4 E-160)	07:01
	16:37	17:27	26 09:23 (WEA-3 E-160)	18:19	31 08:40 (WEA-4 E-160)	20:12
6	08:39	08:06	08:58 (WEA-3 E-160)	07:10	08:09 (WEA-4 E-160)	06:59
	16:38	17:29	24 09:22 (WEA-3 E-160)	18:20	31 08:40 (WEA-4 E-160)	20:14
7	08:39	08:04	08:59 (WEA-3 E-160)	07:07	08:09 (WEA-4 E-160)	06:57
	16:39	17:31	22 09:21 (WEA-3 E-160)	18:22	29 08:38 (WEA-4 E-160)	20:15
8	08:39	08:02	08:59 (WEA-3 E-160)	07:05	08:11 (WEA-4 E-160)	06:54
	16:41	17:33	21 09:20 (WEA-3 E-160)	18:24	25 08:36 (WEA-4 E-160)	20:17
9	08:38	08:00	09:01 (WEA-3 E-160)	07:03	08:12 (WEA-4 E-160)	06:52
	16:42	17:35	17 09:18 (WEA-3 E-160)	18:26	23 08:35 (WEA-4 E-160)	20:19
10	08:37	07:59	09:03 (WEA-3 E-160)	07:01	08:14 (WEA-4 E-160)	06:50
	16:43	17:37	15 09:18 (WEA-3 E-160)	18:27	18 08:32 (WEA-4 E-160)	20:20
11	08:37	07:57	09:06 (WEA-3 E-160)	06:58	08:17 (WEA-4 E-160)	06:48
	16:45	17:39	8 09:14 (WEA-3 E-160)	18:29	11 08:28 (WEA-4 E-160)	20:22
12	08:36	07:55	06:56	06:56	06:45	05:46
	16:46	17:40	18:31	18:31	20:24	21:14
13	08:36	07:53	06:54	06:54	06:43	05:44
	16:48	17:42	18:33	18:33	20:25	21:15
14	08:35	07:51	06:52	06:52	06:41	05:43
	16:49	17:44	18:34	18:34	20:27	21:17
15	08:34	07:49	06:49	06:49	06:39	05:41
	16:51	17:46	18:36	18:36	20:29	21:18
16	08:33	07:47	06:47	06:47	06:37	05:40
	16:52	17:48	18:38	18:38	20:31	21:20
17	08:32	07:45	06:45	06:45	06:34	05:38
	16:54	17:50	4 08:25 (WEA-4 E-160)	18:40	20:32	21:21
18	08:31	07:43	08:29 (WEA-4 E-160)	18:40	20:32	21:21
	16:56	17:51	14 08:20 (WEA-4 E-160)	18:41	20:34	21:23
19	08:30	09:06 (WEA-3 E-160)	07:41	08:17 (WEA-4 E-160)	06:40	05:35
	16:57	2 09:08 (WEA-3 E-160)	17:53	20 08:37 (WEA-4 E-160)	18:43	20:36
20	08:29	09:01 (WEA-3 E-160)	07:39	08:14 (WEA-4 E-160)	06:38	05:34
	16:59	10 09:11 (WEA-3 E-160)	17:55	24 08:38 (WEA-4 E-160)	18:45	20:37
21	08:28	09:00 (WEA-3 E-160)	07:37	08:13 (WEA-4 E-160)	06:36	05:33
	17:01	14 09:14 (WEA-3 E-160)	17:57	26 08:39 (WEA-4 E-160)	18:46	20:39
22	08:27	08:59 (WEA-3 E-160)	07:35	08:12 (WEA-4 E-160)	06:33	05:31
	17:02	17 09:16 (WEA-3 E-160)	17:59	28 08:40 (WEA-4 E-160)	18:48	20:41
23	08:26	08:57 (WEA-3 E-160)	07:33	08:11 (WEA-4 E-160)	06:31	05:30
	17:04	19 09:16 (WEA-3 E-160)	18:01	30 08:41 (WEA-4 E-160)	18:50	20:42
24	08:25	08:57 (WEA-3 E-160)	07:31	08:10 (WEA-4 E-160)	06:29	05:29
	17:06	21 09:18 (WEA-3 E-160)	18:02	32 08:42 (WEA-4 E-160)	18:51	20:44
25	08:24	08:57 (WEA-3 E-160)	07:29	08:10 (WEA-4 E-160)	06:26	05:28
	17:07	22 09:19 (WEA-3 E-160)	18:04	33 08:43 (WEA-4 E-160)	18:53	20:46
26	08:22	08:56 (WEA-3 E-160)	07:27	08:09 (WEA-4 E-160)	06:24	05:27
	17:09	24 09:20 (WEA-3 E-160)	18:06	34 08:43 (WEA-4 E-160)	18:55	20:47
27	08:21	08:56 (WEA-3 E-160)	07:25	08:08 (WEA-4 E-160)	06:22	05:26
	17:11	25 09:21 (WEA-3 E-160)	18:08	35 08:43 (WEA-4 E-160)	18:57	20:49
28	08:20	08:56 (WEA-3 E-160)	07:23	08:08 (WEA-4 E-160)	06:19	05:24
	17:13	25 09:21 (WEA-3 E-160)	18:10	35 08:43 (WEA-4 E-160)	18:58	20:51
29	08:18	08:56 (WEA-3 E-160)	07:21	07:17	06:10	05:23
	17:15	26 09:22 (WEA-3 E-160)	18:11	20:00	20:52	21:38
30	08:17	08:55 (WEA-3 E-160)	07:20	07:15	06:08	05:22
	17:16	27 09:22 (WEA-3 E-160)	18:12	20:02	20:54	21:39
31	08:15	08:55 (WEA-3 E-160)	07:19	07:13	05:22	05:22
	17:18	27 09:22 (WEA-3 E-160)	18:13	20:03	21:40	21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	259	555	304			
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30			
Reduktion Betriebsdauer	0,84	0,84	0,84			
Reduktion Windrichtung	0,57	0,59	0,61			
Gesamte Reduktion	0,09	0,15	0,15			
Met.wahrsch.Beschattung	24	84	46			

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP206/1 - IP206/1 Dorstener Postweg 3a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

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

1	05:18	05:54	06:43	07:32		07:26		08:32 (WEA-3 E-160)	08:16
	21:55	21:24	20:22	19:13		17:07	15	08:47 (WEA-3 E-160)	16:27
2	05:18	05:56	06:45	07:34		08:58 (WEA-4 E-160)	07:27	08:30 (WEA-3 E-160)	08:18
	21:55	21:22	20:20	19:10	7	09:05 (WEA-4 E-160)	17:05	08:48 (WEA-3 E-160)	16:26
3	05:19	05:57	06:47	07:36		08:54 (WEA-4 E-160)	07:29	08:29 (WEA-3 E-160)	08:19
	21:55	21:20	20:17	19:08	15	09:09 (WEA-4 E-160)	17:03	08:50 (WEA-3 E-160)	16:25
4	05:20	05:59	06:48	07:37		08:50 (WEA-4 E-160)	07:31	08:28 (WEA-3 E-160)	08:21
	21:54	21:19	20:15	19:06	21	09:11 (WEA-4 E-160)	17:01	08:51 (WEA-3 E-160)	16:25
5	05:21	06:00	06:50	07:39		08:48 (WEA-4 E-160)	07:33	08:27 (WEA-3 E-160)	08:22
	21:54	21:17	20:13	19:04	25	09:13 (WEA-4 E-160)	17:00	08:52 (WEA-3 E-160)	16:24
6	05:22	06:02	06:52	07:41		08:47 (WEA-4 E-160)	07:35	08:27 (WEA-3 E-160)	08:23
	21:53	21:15	20:11	19:01	27	09:14 (WEA-4 E-160)	16:58	08:52 (WEA-3 E-160)	16:24
7	05:22	06:03	06:53	07:42		08:45 (WEA-4 E-160)	07:36	08:27 (WEA-3 E-160)	08:24
	21:53	21:13	20:08	18:59	29	09:14 (WEA-4 E-160)	16:56	08:53 (WEA-3 E-160)	16:24
8	05:23	06:05	06:55	07:44		08:44 (WEA-4 E-160)	07:38	08:27 (WEA-3 E-160)	08:26
	21:52	21:11	20:06	18:57	31	09:15 (WEA-4 E-160)	16:55	08:53 (WEA-3 E-160)	16:23
9	05:24	06:06	06:56	07:46		08:43 (WEA-4 E-160)	07:40	08:27 (WEA-3 E-160)	08:27
	21:51	21:10	20:04	18:54	33	09:16 (WEA-4 E-160)	16:53	08:54 (WEA-3 E-160)	16:23
10	05:25	06:08	06:58	07:47		08:43 (WEA-4 E-160)	07:42	08:27 (WEA-3 E-160)	08:28
	21:51	21:08	20:01	18:52	33	09:16 (WEA-4 E-160)	16:51	08:54 (WEA-3 E-160)	16:23
11	05:26	06:10	07:00	07:49		08:42 (WEA-4 E-160)	07:44	08:27 (WEA-3 E-160)	08:29
	21:50	21:06	19:59	18:50	34	09:16 (WEA-4 E-160)	16:50	08:54 (WEA-3 E-160)	16:23
12	05:27	06:11	07:01	07:51		08:41 (WEA-4 E-160)	07:45	08:27 (WEA-3 E-160)	08:30
	21:49	21:04	19:57	18:48	35	09:16 (WEA-4 E-160)	16:48	08:54 (WEA-3 E-160)	16:22
13	05:28	06:13	07:03	07:52		08:41 (WEA-4 E-160)	07:47	08:28 (WEA-3 E-160)	08:31
	21:48	21:02	19:54	18:46	35	09:16 (WEA-4 E-160)	16:47	08:54 (WEA-3 E-160)	16:22
14	05:30	06:14	07:04	07:54		08:41 (WEA-4 E-160)	07:49	08:28 (WEA-3 E-160)	08:32
	21:47	21:00	19:52	18:43	35	09:16 (WEA-4 E-160)	16:45	08:54 (WEA-3 E-160)	16:22
15	05:31	06:16	07:06	07:56		08:41 (WEA-4 E-160)	07:51	08:28 (WEA-3 E-160)	08:33
	21:46	20:58	19:50	18:41	35	09:16 (WEA-4 E-160)	16:44	08:53 (WEA-3 E-160)	16:22
16	05:32	06:18	07:08	07:58		08:41 (WEA-4 E-160)	07:52	08:29 (WEA-3 E-160)	08:34
	21:45	20:56	19:47	18:39	33	09:14 (WEA-4 E-160)	16:42	08:53 (WEA-3 E-160)	16:23
17	05:33	06:19	07:09	07:59		08:41 (WEA-4 E-160)	07:54	08:30 (WEA-3 E-160)	08:35
	21:44	20:54	19:45	18:37	33	09:14 (WEA-4 E-160)	16:41	08:52 (WEA-3 E-160)	16:23
18	05:34	06:21	07:11	08:01		08:42 (WEA-4 E-160)	07:56	08:31 (WEA-3 E-160)	08:35
	21:43	20:52	19:43	18:35	31	09:13 (WEA-4 E-160)	16:40	08:52 (WEA-3 E-160)	16:23
19	05:36	06:22	07:13	08:03		08:43 (WEA-4 E-160)	07:57	08:32 (WEA-3 E-160)	08:36
	21:42	20:50	19:40	18:33	29	09:12 (WEA-4 E-160)	16:38	08:51 (WEA-3 E-160)	16:23
20	05:37	06:24	07:14	08:04		08:44 (WEA-4 E-160)	07:59	08:34 (WEA-3 E-160)	08:37
	21:41	20:48	19:38	18:31	27	09:11 (WEA-4 E-160)	16:37	08:51 (WEA-3 E-160)	16:24
21	05:38	06:26	07:16	08:06		08:45 (WEA-4 E-160)	08:01	08:36 (WEA-3 E-160)	08:37
	21:39	20:46	19:36	18:28	25	09:10 (WEA-4 E-160)	16:36	08:50 (WEA-3 E-160)	16:24
22	05:40	06:27	07:17	08:08		08:45 (WEA-4 E-160)	08:02	08:37 (WEA-3 E-160)	08:38
	21:38	20:44	19:33	18:26	23	09:08 (WEA-4 E-160)	16:35	08:47 (WEA-3 E-160)	16:24
23	05:41	06:29	07:19	08:10		08:47 (WEA-4 E-160)	08:04	08:41 (WEA-3 E-160)	08:38
	21:37	20:42	19:31	18:24	19	09:06 (WEA-4 E-160)	16:34	08:44 (WEA-3 E-160)	16:25
24	05:42	06:31	07:21	08:11		08:50 (WEA-4 E-160)	08:06		08:39
	21:36	20:39	19:29	18:22	13	09:03 (WEA-4 E-160)	16:33		16:26
25	05:44	06:32	07:22	08:13			08:07		08:39
	21:34	20:37	19:27	18:20			16:32		16:26
26	05:45	06:34	07:24	08:15			08:09		08:40
	21:33	20:35	19:24	18:18			16:31		16:27
27	05:47	06:35	07:26	08:17			08:10		08:40
	21:31	20:33	19:22	18:16			16:30		16:28
28	05:48	06:37	07:27	08:19			08:12		08:40
	21:30	20:31	19:20	18:14			16:29		16:28
29	05:50	06:39	07:29	08:20			08:13		08:40
	21:28	20:29	19:17	18:12			16:28		16:29
30	05:51	06:40	07:31	08:22			08:15		08:40
	21:27	20:26	19:15	18:11			16:27		16:30
31	05:53	06:42	07:32	08:23		08:34 (WEA-3 E-160)			08:40
	21:25	20:24	19:13	18:09	10	08:44 (WEA-3 E-160)			16:31
Sonnenscheinstunden	501	453	381	332			267		244
astr.max.mögl.Beschattung				638		494			
Red.Sonnenscheinwahrsch.				0,32		0,23			
Reduktion Betriebsdauer				0,84		0,84			
Reduktion Windrichtung				0,61		0,57			
Gesamte Reduktion				0,16		0,11			
Met.wahrsch.Beschattung				103		54			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP207 - IP207 Dorstener Postweg 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	08:56 (WEA-3 E-160)	07:21	08:12 (WEA-4 E-160)	07:10
	16:32	17:20	25 09:21 (WEA-3 E-160)	18:11	31 08:43 (WEA-4 E-160)	20:05
2	08:40	08:12	08:56 (WEA-3 E-160)	07:18	08:13 (WEA-4 E-160)	07:08
	16:33	17:22	25 09:21 (WEA-3 E-160)	18:13	29 08:42 (WEA-4 E-160)	20:07
3	08:40	08:11	08:56 (WEA-3 E-160)	07:16	08:12 (WEA-4 E-160)	07:06
	16:35	17:24	25 09:21 (WEA-3 E-160)	18:15	28 08:40 (WEA-4 E-160)	20:08
4	08:40	08:09	08:57 (WEA-3 E-160)	07:14	08:13 (WEA-4 E-160)	07:03
	16:36	17:26	24 09:21 (WEA-3 E-160)	18:17	26 08:39 (WEA-4 E-160)	20:10
5	08:40	08:07	08:58 (WEA-3 E-160)	07:12	08:15 (WEA-4 E-160)	07:01
	16:37	17:27	22 09:20 (WEA-3 E-160)	18:19	23 08:38 (WEA-4 E-160)	20:12
6	08:39	08:06	08:59 (WEA-3 E-160)	07:10	08:16 (WEA-4 E-160)	06:59
	16:38	17:29	20 09:19 (WEA-3 E-160)	18:20	20 08:36 (WEA-4 E-160)	20:14
7	08:39	08:04	09:00 (WEA-3 E-160)	07:07	08:18 (WEA-4 E-160)	06:57
	16:39	17:31	18 09:18 (WEA-3 E-160)	18:22	15 08:33 (WEA-4 E-160)	20:15
8	08:39	08:02	09:01 (WEA-3 E-160)	07:05	08:23 (WEA-4 E-160)	06:54
	16:41	17:33	16 09:17 (WEA-3 E-160)	18:24	5 08:28 (WEA-4 E-160)	20:17
9	08:38	08:00	09:03 (WEA-3 E-160)	07:03	06:52	05:51
	16:42	17:35	11 09:14 (WEA-3 E-160)	18:26	20:19	21:09
10	08:37	07:59	07:01	06:50	06:50	05:49
	16:43	17:37	18:27	20:20	21:10	21:50
11	08:37	07:57	06:58	06:48	05:48	05:15
	16:45	17:39	18:29	20:22	21:12	21:51
12	08:36	07:55	06:56	06:45	05:46	05:14
	16:46	17:40	18:31	20:24	21:14	21:51
13	08:36	07:53	06:54	06:43	05:44	05:14
	16:48	17:42	18:33	20:25	21:15	21:52
14	08:35	07:51	06:52	06:41	05:43	05:14
	16:49	17:44	18:34	20:27	21:17	21:53
15	08:34	07:49	08:25 (WEA-4 E-160)	06:49	06:39	05:41
	16:51	17:46	8 08:33 (WEA-4 E-160)	18:36	20:29	21:18
16	08:33	07:47	08:21 (WEA-4 E-160)	06:47	06:37	05:40
	16:52	17:48	16 08:37 (WEA-4 E-160)	18:38	20:31	21:20
17	08:32	07:45	08:19 (WEA-4 E-160)	06:45	06:34	05:38
	16:54	17:50	20 08:39 (WEA-4 E-160)	18:40	20:32	21:21
18	08:31	07:43	08:17 (WEA-4 E-160)	06:42	06:32	05:37
	16:56	17:51	23 08:40 (WEA-4 E-160)	18:41	20:34	21:23
19	08:30	09:02 (WEA-3 E-160)	07:41	08:16 (WEA-4 E-160)	06:40	06:30
	16:57	8 09:10 (WEA-3 E-160)	17:53	26 08:42 (WEA-4 E-160)	18:43	20:36
20	08:29	08:59 (WEA-3 E-160)	07:39	08:14 (WEA-4 E-160)	06:38	06:28
	16:59	12 09:11 (WEA-3 E-160)	17:55	28 08:42 (WEA-4 E-160)	18:45	20:37
21	08:28	08:58 (WEA-3 E-160)	07:37	08:13 (WEA-4 E-160)	06:36	06:26
	17:01	15 09:13 (WEA-3 E-160)	17:57	30 08:43 (WEA-4 E-160)	18:46	20:39
22	08:27	08:58 (WEA-3 E-160)	07:35	08:13 (WEA-4 E-160)	06:33	06:24
	17:02	17 09:15 (WEA-3 E-160)	17:59	30 08:43 (WEA-4 E-160)	18:48	20:41
23	08:26	08:56 (WEA-3 E-160)	07:33	08:12 (WEA-4 E-160)	06:31	06:22
	17:04	20 09:16 (WEA-3 E-160)	18:01	32 08:44 (WEA-4 E-160)	18:50	20:42
24	08:25	08:56 (WEA-3 E-160)	07:31	08:12 (WEA-4 E-160)	06:29	06:20
	17:06	21 09:17 (WEA-3 E-160)	18:02	32 08:44 (WEA-4 E-160)	18:52	20:44
25	08:24	08:56 (WEA-3 E-160)	07:29	08:12 (WEA-4 E-160)	06:26	06:18
	17:07	23 09:19 (WEA-3 E-160)	18:04	32 08:44 (WEA-4 E-160)	18:53	20:46
26	08:22	08:55 (WEA-3 E-160)	07:27	08:12 (WEA-4 E-160)	06:24	06:16
	17:09	24 09:19 (WEA-3 E-160)	18:06	32 08:44 (WEA-4 E-160)	18:55	20:47
27	08:21	08:56 (WEA-3 E-160)	07:25	08:11 (WEA-4 E-160)	06:22	06:14
	17:11	24 09:20 (WEA-3 E-160)	18:08	32 08:43 (WEA-4 E-160)	18:57	20:49
28	08:20	08:55 (WEA-3 E-160)	07:23	08:11 (WEA-4 E-160)	06:19	06:12
	17:13	25 09:20 (WEA-3 E-160)	18:10	32 08:43 (WEA-4 E-160)	18:58	20:51
29	08:18	08:56 (WEA-3 E-160)	07:21	07:17	06:10	05:23
	17:15	25 09:21 (WEA-3 E-160)	18:10	20:00	20:52	21:38
30	08:17	08:55 (WEA-3 E-160)	07:19	07:15	06:08	05:22
	17:16	26 09:21 (WEA-3 E-160)	18:10	20:02	20:54	21:39
31	08:15	08:55 (WEA-3 E-160)	07:17	07:13	05:22	05:16
	17:18	26 09:21 (WEA-3 E-160)	18:10	20:03	21:40	21:40
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung	266	559	177			
Red.Sonnenscheinwahrsch.	0,20	0,30	0,30			
Reduktion Betriebsdauer	0,84	0,84	0,84			
Reduktion Windrichtung	0,57	0,60	0,61			
Gesamte Reduktion	0,09	0,15	0,15			
Met.wahrsch.Beschattung	25	85	27			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP207 - IP207 Dorstener Postweg 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

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

1	05:18	05:54	06:43	07:32	07:26	08:36 (WEA-3 E-160)	08:16		
	21:55	21:24	20:22	19:13	17:07	08:41 (WEA-3 E-160)	16:27		
2	05:18	05:56	06:45	07:34	07:27	08:32 (WEA-3 E-160)	08:18		
	21:55	21:22	20:20	19:10	17:05	08:44 (WEA-3 E-160)	16:26		
3	05:19	05:57	06:47	07:36	07:29	08:31 (WEA-3 E-160)	08:19		
	21:55	21:20	20:17	19:08	17:03	08:47 (WEA-3 E-160)	16:25		
4	05:20	05:59	06:48	07:37	07:31	08:29 (WEA-3 E-160)	08:21		
	21:54	21:19	20:15	19:06	17:01	08:48 (WEA-3 E-160)	16:25		
5	05:21	06:00	06:50	07:39	07:33	08:28 (WEA-3 E-160)	08:22		
	21:54	21:17	20:13	19:04	17:00	08:49 (WEA-3 E-160)	16:24		
6	05:22	06:02	06:52	07:41	08:57 (WEA-4 E-160)	07:35	08:28 (WEA-3 E-160)	08:23	
	21:53	21:15	20:11	19:01	11	09:08 (WEA-4 E-160)	16:58	08:50 (WEA-3 E-160)	16:24
7	05:22	06:03	06:53	07:42	08:53 (WEA-4 E-160)	07:36	08:27 (WEA-3 E-160)	08:24	
	21:53	21:13	20:08	18:59	17	09:10 (WEA-4 E-160)	16:56	08:51 (WEA-3 E-160)	16:24
8	05:23	06:05	06:55	07:44	08:51 (WEA-4 E-160)	07:38	08:27 (WEA-3 E-160)	08:26	
	21:52	21:11	20:06	18:57	21	09:12 (WEA-4 E-160)	16:55	08:51 (WEA-3 E-160)	16:23
9	05:24	06:06	06:56	07:46	08:49 (WEA-4 E-160)	07:40	08:27 (WEA-3 E-160)	08:27	
	21:51	21:10	20:04	18:54	25	09:14 (WEA-4 E-160)	16:53	08:52 (WEA-3 E-160)	16:23
10	05:25	06:08	06:58	07:47	08:48 (WEA-4 E-160)	07:42	08:27 (WEA-3 E-160)	08:28	
	21:51	21:08	20:01	18:52	27	09:15 (WEA-4 E-160)	16:51	08:52 (WEA-3 E-160)	16:23
11	05:26	06:10	07:00	07:49	08:46 (WEA-4 E-160)	07:44	08:27 (WEA-3 E-160)	08:29	
	21:50	21:06	19:59	18:50	29	09:15 (WEA-4 E-160)	16:50	08:53 (WEA-3 E-160)	16:23
12	05:27	06:11	07:01	07:51	08:45 (WEA-4 E-160)	07:45	08:27 (WEA-3 E-160)	08:30	
	21:49	21:04	19:57	18:48	30	09:15 (WEA-4 E-160)	16:48	08:53 (WEA-3 E-160)	16:22
13	05:28	06:13	07:03	07:52	08:45 (WEA-4 E-160)	07:47	08:27 (WEA-3 E-160)	08:31	
	21:48	21:02	19:54	18:46	31	09:16 (WEA-4 E-160)	16:47	08:53 (WEA-3 E-160)	16:22
14	05:30	06:14	07:04	07:54	08:45 (WEA-4 E-160)	07:49	08:28 (WEA-3 E-160)	08:32	
	21:47	21:00	19:52	18:43	31	09:16 (WEA-4 E-160)	16:45	08:53 (WEA-3 E-160)	16:22
15	05:31	06:16	07:06	07:56	08:44 (WEA-4 E-160)	07:51	08:28 (WEA-3 E-160)	08:33	
	21:46	20:58	19:50	18:41	33	09:17 (WEA-4 E-160)	16:44	08:52 (WEA-3 E-160)	16:22
16	05:32	06:18	07:08	07:58	08:43 (WEA-4 E-160)	07:52	08:28 (WEA-3 E-160)	08:34	
	21:45	20:56	19:47	18:39	33	09:16 (WEA-4 E-160)	16:42	08:52 (WEA-3 E-160)	16:23
17	05:33	06:19	07:09	07:59	08:43 (WEA-4 E-160)	07:54	08:29 (WEA-3 E-160)	08:35	
	21:44	20:54	19:45	18:37	33	09:16 (WEA-4 E-160)	16:41	08:51 (WEA-3 E-160)	16:23
18	05:34	06:21	07:11	08:01	08:44 (WEA-4 E-160)	07:56	08:30 (WEA-3 E-160)	08:35	
	21:43	20:52	19:43	18:35	31	09:15 (WEA-4 E-160)	16:40	08:51 (WEA-3 E-160)	16:23
19	05:36	06:22	07:13	08:03	08:44 (WEA-4 E-160)	07:57	08:31 (WEA-3 E-160)	08:36	
	21:42	20:50	19:40	18:33	31	09:15 (WEA-4 E-160)	16:38	08:51 (WEA-3 E-160)	16:23
20	05:37	06:24	07:14	08:04	08:44 (WEA-4 E-160)	07:59	08:33 (WEA-3 E-160)	08:37	
	21:41	20:48	19:38	18:31	30	09:14 (WEA-4 E-160)	16:37	08:50 (WEA-3 E-160)	16:24
21	05:38	06:26	07:16	08:06	08:45 (WEA-4 E-160)	08:01	08:34 (WEA-3 E-160)	08:37	
	21:40	20:46	19:36	18:28	29	09:14 (WEA-4 E-160)	16:36	08:49 (WEA-3 E-160)	16:24
22	05:40	06:27	07:17	08:08	08:45 (WEA-4 E-160)	08:02	08:35 (WEA-3 E-160)	08:38	
	21:38	20:44	19:33	18:26	27	09:12 (WEA-4 E-160)	16:35	08:47 (WEA-3 E-160)	16:24
23	05:41	06:29	07:19	08:10	08:46 (WEA-4 E-160)	08:04	08:38 (WEA-3 E-160)	08:38	
	21:37	20:42	19:31	18:24	25	09:11 (WEA-4 E-160)	16:34	08:46 (WEA-3 E-160)	16:25
24	05:42	06:31	07:21	08:11	08:47 (WEA-4 E-160)	08:06	08:39	08:39	
	21:36	20:39	19:29	18:22	22	09:09 (WEA-4 E-160)	16:33	16:26	
25	05:44	06:32	07:22	07:13	07:49 (WEA-4 E-160)	08:07	08:39	08:39	
	21:34	20:37	19:27	17:20	19	08:08 (WEA-4 E-160)	16:32	16:26	
26	05:45	06:34	07:24	07:15	07:52 (WEA-4 E-160)	08:09	08:40	08:40	
	21:33	20:35	19:24	17:18	13	08:05 (WEA-4 E-160)	16:31	16:27	
27	05:47	06:35	07:26	07:17	07:56 (WEA-4 E-160)	08:10	08:40	08:40	
	21:31	20:33	19:22	17:16	5	08:01 (WEA-4 E-160)	16:30	16:28	
28	05:48	06:37	07:27	07:19	08:12	08:40	08:40	08:40	
	21:30	20:31	19:20	17:14	16:29	16:28	16:28	16:28	
29	05:50	06:39	07:29	07:20	08:14	08:40	08:40	08:40	
	21:28	20:29	19:17	17:12	16:28	16:29	16:29	16:29	
30	05:51	06:40	07:31	07:22	08:15	08:40	08:40	08:40	
	21:27	20:26	19:15	17:11	16:27	16:30	16:30	16:30	
31	05:53	06:42	07:24	07:24	08:40	08:40	08:40	08:40	
	21:25	20:24	17:09	16:31	16:31	16:31	16:31	16:31	
Sonnenscheinstunden	501	453	381	332	267	244			
astr.max.mögl.Beschattung				553	459				
Red.Sonnenscheinwahrsch.				0,32	0,23				
Reduktion Betriebsdauer				0,84	0,84				
Reduktion Windrichtung				0,61	0,57				
Gesamte Reduktion				0,16	0,11				
Met.wahrsch.Beschattung				89	50				

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP208 - IP208 Dorstener Postweg 5

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	08:46 (WEA-3 E-160)	07:21	07:56 (WEA-4 E-160)	07:10
	16:32	17:20	09:07 (WEA-3 E-160)	18:11	08:18 (WEA-4 E-160)	20:05
2	08:40	08:12	08:45 (WEA-3 E-160)	07:18	07:54 (WEA-4 E-160)	07:08
	16:33	17:22	09:08 (WEA-3 E-160)	18:13	08:20 (WEA-4 E-160)	20:07
3	08:40	08:11	08:44 (WEA-3 E-160)	07:16	07:52 (WEA-4 E-160)	07:06
	16:35	17:24	09:08 (WEA-3 E-160)	18:15	08:20 (WEA-4 E-160)	20:08
4	08:40	08:09	08:44 (WEA-3 E-160)	07:14	07:51 (WEA-4 E-160)	07:03
	16:36	17:26	09:10 (WEA-3 E-160)	18:17	08:21 (WEA-4 E-160)	20:10
5	08:40	08:07	08:43 (WEA-3 E-160)	07:12	07:50 (WEA-4 E-160)	07:01
	16:37	17:27	09:10 (WEA-3 E-160)	18:19	08:22 (WEA-4 E-160)	20:12
6	08:39	08:06	08:43 (WEA-3 E-160)	07:10	07:50 (WEA-4 E-160)	06:59
	16:38	17:29	09:10 (WEA-3 E-160)	18:20	08:23 (WEA-4 E-160)	20:14
7	08:39	08:04	08:43 (WEA-3 E-160)	07:07	07:48 (WEA-4 E-160)	06:57
	16:39	17:31	09:10 (WEA-3 E-160)	18:22	08:23 (WEA-4 E-160)	20:15
8	08:38	08:02	08:42 (WEA-3 E-160)	07:05	07:48 (WEA-4 E-160)	06:54
	16:41	17:33	09:11 (WEA-3 E-160)	18:24	08:23 (WEA-4 E-160)	20:17
9	08:38	08:00	08:42 (WEA-3 E-160)	07:03	07:48 (WEA-4 E-160)	06:52
	16:42	17:35	09:10 (WEA-3 E-160)	18:26	08:23 (WEA-4 E-160)	20:19
10	08:37	07:59	08:44 (WEA-3 E-160)	07:01	07:48 (WEA-4 E-160)	06:50
	16:43	17:37	09:11 (WEA-3 E-160)	18:27	08:23 (WEA-4 E-160)	20:20
11	08:37	07:57	08:44 (WEA-3 E-160)	06:58	07:47 (WEA-4 E-160)	06:48
	16:45	17:39	09:11 (WEA-3 E-160)	18:29	08:22 (WEA-4 E-160)	20:22
12	08:36	07:55	08:44 (WEA-3 E-160)	06:56	07:47 (WEA-4 E-160)	06:45
	16:46	17:40	09:10 (WEA-3 E-160)	18:31	08:22 (WEA-4 E-160)	20:24
13	08:36	07:53	08:45 (WEA-3 E-160)	06:54	07:48 (WEA-4 E-160)	06:43
	16:48	17:42	09:10 (WEA-3 E-160)	18:33	08:21 (WEA-4 E-160)	20:25
14	08:35	07:51	08:46 (WEA-3 E-160)	06:52	07:47 (WEA-4 E-160)	06:41
	16:49	17:44	09:09 (WEA-3 E-160)	18:34	08:20 (WEA-4 E-160)	20:27
15	08:34	07:49	08:47 (WEA-3 E-160)	06:49	07:48 (WEA-4 E-160)	06:39
	16:51	17:46	09:08 (WEA-3 E-160)	18:36	08:19 (WEA-4 E-160)	20:29
16	08:33	07:47	08:48 (WEA-3 E-160)	06:47	07:49 (WEA-4 E-160)	06:37
	16:52	17:48	09:06 (WEA-3 E-160)	18:38	08:18 (WEA-4 E-160)	20:31
17	08:32	07:45	08:50 (WEA-3 E-160)	06:45	07:49 (WEA-4 E-160)	06:34
	16:54	17:50	09:04 (WEA-3 E-160)	18:40	08:16 (WEA-4 E-160)	20:32
18	08:31	07:43	08:53 (WEA-3 E-160)	06:42	07:50 (WEA-4 E-160)	06:32
	16:56	17:51	09:01 (WEA-3 E-160)	18:41	08:14 (WEA-4 E-160)	20:34
19	08:30	07:41		06:40	07:52 (WEA-4 E-160)	06:30
	16:57	17:53		18:43	08:12 (WEA-4 E-160)	20:36
20	08:29	07:39		06:38	07:54 (WEA-4 E-160)	06:28
	16:59	17:55		18:45	08:09 (WEA-4 E-160)	20:37
21	08:28	07:37		06:36		06:26
	17:01	17:57		18:46		20:39
22	08:27	07:35		06:33		06:24
	17:02	17:59		18:48		20:41
23	08:26	07:33		06:31		06:22
	17:04	18:01		18:50		20:42
24	08:25	07:31		06:29		06:20
	17:06	18:02		18:51		20:44
25	08:24	07:29		06:26		06:18
	17:07	18:04		18:53		20:46
26	08:22	07:27		06:24		06:16
	17:09	18:06		18:55		20:47
27	08:21	07:25	08:01 (WEA-4 E-160)	06:22		06:14
	17:11	18:08	12	08:13 (WEA-4 E-160)		20:49
28	08:20	07:23	08:57 (WEA-3 E-160)	06:19		06:12
	17:13	18:10	18	08:16 (WEA-4 E-160)		20:51
29	08:18	08:50 (WEA-3 E-160)		07:17		06:10
	17:15	12	09:02 (WEA-3 E-160)	20:00		20:52
30	08:17	08:48 (WEA-3 E-160)		07:15		06:08
	17:16	15	09:03 (WEA-3 E-160)	20:02		20:54
31	08:15	08:46 (WEA-3 E-160)		07:13		05:22
	17:18	19	09:05 (WEA-3 E-160)	20:03		21:40
Sonnenscheinstunden	259	278		367	416	498
astr.max.mögl.Beschattung	50	451		593		
Red.Sonnenscheinwahrsch.	0,20	0,30		0,30		
Reduktion Betriebsdauer	0,84	0,84		0,84		
Reduktion Windrichtung	0,58	0,59		0,62		
Gesamte Reduktion	0,10	0,15		0,15		
Met.wahrsch.Beschattung	5	67		92		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP208 - IP208 Dorstener Postweg 5

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember		
1	05:18	05:54	06:43	07:32	08:26 (WEA-4 E-160)	07:26	08:12 (WEA-3 E-160)	08:16
	21:55	21:24	20:22	19:13	35 09:01 (WEA-4 E-160)	17:07	28 08:40 (WEA-3 E-160)	16:27
2	05:18	05:56	06:45	07:34	08:26 (WEA-4 E-160)	07:27	08:12 (WEA-3 E-160)	08:18
	21:55	21:22	20:20	19:10	35 09:01 (WEA-4 E-160)	17:05	28 08:40 (WEA-3 E-160)	16:26
3	05:19	05:57	06:47	07:36	08:26 (WEA-4 E-160)	07:29	08:12 (WEA-3 E-160)	08:19
	21:55	21:20	20:17	19:08	35 09:01 (WEA-4 E-160)	17:03	28 08:40 (WEA-3 E-160)	16:25
4	05:20	05:59	06:48	07:37	08:25 (WEA-4 E-160)	07:31	08:12 (WEA-3 E-160)	08:21
	21:54	21:19	20:15	19:06	35 09:00 (WEA-4 E-160)	17:01	28 08:40 (WEA-3 E-160)	16:25
5	05:21	06:00	06:50	07:39	08:25 (WEA-4 E-160)	07:33	08:13 (WEA-3 E-160)	08:22
	21:54	21:17	20:13	19:04	35 09:00 (WEA-4 E-160)	17:00	27 08:40 (WEA-3 E-160)	16:24
6	05:22	06:02	06:52	07:41	08:25 (WEA-4 E-160)	07:35	08:13 (WEA-3 E-160)	08:23
	21:53	21:15	20:11	19:01	35 09:00 (WEA-4 E-160)	16:58	27 08:40 (WEA-3 E-160)	16:24
7	05:22	06:03	06:53	07:42	08:24 (WEA-4 E-160)	07:36	08:14 (WEA-3 E-160)	08:24
	21:53	21:13	20:08	18:59	34 08:58 (WEA-4 E-160)	16:56	25 08:39 (WEA-3 E-160)	16:24
8	05:23	06:05	06:55	07:44	08:25 (WEA-4 E-160)	07:38	08:15 (WEA-3 E-160)	08:26
	21:52	21:11	20:06	18:57	33 08:58 (WEA-4 E-160)	16:55	24 08:39 (WEA-3 E-160)	16:23
9	05:24	06:06	06:56	07:46	08:26 (WEA-4 E-160)	07:40	08:16 (WEA-3 E-160)	08:27
	21:51	21:10	20:04	18:54	31 08:57 (WEA-4 E-160)	16:53	22 08:38 (WEA-3 E-160)	16:23
10	05:25	06:08	06:58	07:47	08:26 (WEA-4 E-160)	07:42	08:17 (WEA-3 E-160)	08:28
	21:51	21:08	20:01	18:52	30 08:56 (WEA-4 E-160)	16:51	21 08:38 (WEA-3 E-160)	16:23
11	05:26	06:10	07:00	07:49	08:27 (WEA-4 E-160)	07:44	08:18 (WEA-3 E-160)	08:29
	21:50	21:06	19:59	18:50	27 08:54 (WEA-4 E-160)	16:50	19 08:37 (WEA-3 E-160)	16:23
12	05:27	06:11	07:01	07:51	08:28 (WEA-4 E-160)	07:45	08:20 (WEA-3 E-160)	08:30
	21:49	21:04	19:57	18:48	24 08:52 (WEA-4 E-160)	16:48	15 08:35 (WEA-3 E-160)	16:22
13	05:28	06:13	07:03	07:52	08:30 (WEA-4 E-160)	07:47	08:22 (WEA-3 E-160)	08:31
	21:48	21:02	19:54	18:46	21 08:51 (WEA-4 E-160)	16:47	11 08:33 (WEA-3 E-160)	16:22
14	05:30	06:14	07:04	07:54	08:32 (WEA-4 E-160)	07:49	08:26 (WEA-3 E-160)	08:32
	21:47	21:00	19:52	18:43	16 08:48 (WEA-4 E-160)	16:45	4 08:30 (WEA-3 E-160)	16:22
15	05:31	06:16	07:06	07:56	08:37 (WEA-4 E-160)	07:51		08:33
	21:46	20:58	19:50	18:41	7 08:44 (WEA-4 E-160)	16:44		16:22
16	05:32	06:18	07:08	07:58		07:52		08:34
	21:45	20:56	19:47	18:39		16:42		16:23
17	05:33	06:19	07:09	07:59		07:54		08:35
	21:44	20:54	19:45	18:37		16:41		16:23
18	05:34	06:21	07:11	08:01		07:56		08:35
	21:43	20:52	19:43	18:35		16:40		16:23
19	05:36	06:22	07:13	08:03		07:57		08:36
	21:42	20:50	19:40	18:33		16:38		16:23
20	05:37	06:24	07:14	08:04		07:59		08:37
	21:41	20:48	19:38	18:31		16:37		16:24
21	05:38	06:26	07:16	08:06		08:01		08:37
	21:39	20:46	19:36	18:28		16:36		16:24
22	05:40	06:27	07:17	08:08		08:02		08:38
	21:38	20:44	19:33	18:26		16:35		16:25
23	05:41	06:29	07:19	08:10		08:04		08:38
	21:37	20:42	19:31	12 08:52 (WEA-4 E-160)		18:24		16:25
24	05:42	06:31	07:21	08:37 (WEA-4 E-160)		08:11		08:39
	21:36	20:39	19:29	18 08:55 (WEA-4 E-160)		18:22	11 09:21 (WEA-3 E-160)	16:26
25	05:44	06:32	07:22	08:34 (WEA-4 E-160)		07:13		08:39
	21:34	20:37	19:27	22 08:56 (WEA-4 E-160)		17:20	16 08:35 (WEA-3 E-160)	16:26
26	05:45	06:34	07:24	08:32 (WEA-4 E-160)		07:15		08:40
	21:33	20:35	19:24	26 08:58 (WEA-4 E-160)		17:18	19 08:36 (WEA-3 E-160)	16:27
27	05:47	06:35	07:26	08:31 (WEA-4 E-160)		07:17		08:40
	21:31	20:33	19:22	29 09:00 (WEA-4 E-160)		17:16	22 08:38 (WEA-3 E-160)	16:28
28	05:48	06:37	07:27	08:29 (WEA-4 E-160)		07:19		08:40
	21:30	20:31	19:20	31 09:00 (WEA-4 E-160)		17:14	24 08:39 (WEA-3 E-160)	16:28
29	05:50	06:39	07:29	08:28 (WEA-4 E-160)		07:20		08:40
	21:28	20:29	19:17	32 09:00 (WEA-4 E-160)		17:12	25 08:39 (WEA-3 E-160)	16:29
30	05:51	06:40	07:31	08:28 (WEA-4 E-160)		07:22		08:40
	21:27	20:26	19:15	33 09:01 (WEA-4 E-160)		17:11	26 08:40 (WEA-3 E-160)	16:30
31	05:53	06:42		07:24		07:24		08:40
	21:25	20:24		17:09	28 08:40 (WEA-3 E-160)			16:31
Sonnenscheinstunden	501	453	381	332		267		244
astr.max.mögl.Beschattung			203	604		307		
Red.Sonnenscheinwahrsch.			0,36	0,32		0,23		
Reduktion Betriebsdauer			0,84	0,84		0,84		
Reduktion Windrichtung			0,62	0,61		0,58		
Gesamte Reduktion			0,19	0,16		0,11		
Met.wahrsch.Beschattung			38	98		34		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP208/1 - IP208/1 Dorstener Postweg 5a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40 16:32	08:14 17:20	08:45 (WEA-3 E-160) 07:21 18:11	07:57 (WEA-4 E-160) 07:10 20:05	06:06 20:56	05:21 21:41
2	08:40 16:34	08:12 17:22	08:43 (WEA-3 E-160) 07:18 18:13	07:54 (WEA-4 E-160) 07:08 20:07	06:04 20:57	05:20 21:42
3	08:40 16:35	08:11 17:24	08:42 (WEA-3 E-160) 07:16 18:15	07:51 (WEA-4 E-160) 07:06 20:08	06:02 20:59	05:19 21:43
4	08:40 16:36	08:09 17:26	08:42 (WEA-3 E-160) 07:14 18:17	07:49 (WEA-4 E-160) 07:03 20:10	06:00 21:01	05:18 21:44
5	08:40 16:37	08:07 17:27	08:41 (WEA-3 E-160) 07:12 18:19	07:48 (WEA-4 E-160) 07:01 20:12	05:58 21:02	05:18 21:45
6	08:39 16:38	08:06 17:29	08:41 (WEA-3 E-160) 07:10 18:20	07:47 (WEA-4 E-160) 06:59 20:14	05:56 21:04	05:17 21:46
7	08:39 16:39	08:04 17:31	08:40 (WEA-3 E-160) 07:07 18:22	07:45 (WEA-4 E-160) 06:57 20:15	05:55 21:06	05:16 21:47
8	08:38 16:41	08:02 17:33	08:40 (WEA-3 E-160) 07:05 18:24	07:45 (WEA-4 E-160) 06:54 20:17	05:53 21:07	05:16 21:48
9	08:38 16:42	08:00 17:35	08:40 (WEA-3 E-160) 07:03 18:26	07:45 (WEA-4 E-160) 06:52 20:19	05:51 21:09	05:15 21:49
10	08:37 16:43	07:59 17:37	08:41 (WEA-3 E-160) 07:01 18:27	07:44 (WEA-4 E-160) 06:50 20:20	05:49 21:10	05:15 21:50
11	08:37 16:45	07:57 17:39	08:41 (WEA-3 E-160) 06:58 18:29	07:43 (WEA-4 E-160) 06:48 20:22	05:48 21:12	05:15 21:51
12	08:36 16:46	07:55 17:40	08:41 (WEA-3 E-160) 06:56 18:31	07:43 (WEA-4 E-160) 06:45 20:24	05:46 21:14	05:14 21:51
13	08:36 16:48	07:53 17:42	08:41 (WEA-3 E-160) 06:54 18:33	07:43 (WEA-4 E-160) 06:43 20:25	05:44 21:15	05:14 21:52
14	08:35 16:49	07:51 17:44	08:42 (WEA-3 E-160) 06:52 18:34	07:43 (WEA-4 E-160) 06:41 20:27	05:43 21:17	05:14 21:53
15	08:34 16:51	07:49 17:46	08:42 (WEA-3 E-160) 06:49 18:36	07:43 (WEA-4 E-160) 06:39 20:29	05:41 21:18	05:14 21:53
16	08:33 16:52	07:47 17:48	08:43 (WEA-3 E-160) 06:47 18:38	07:44 (WEA-4 E-160) 06:37 20:31	05:40 21:20	05:13 21:54
17	08:32 16:54	07:45 17:50	08:45 (WEA-3 E-160) 06:45 18:40	07:44 (WEA-4 E-160) 06:34 20:32	05:38 21:21	05:13 21:54
18	08:31 16:56	07:43 17:51	08:46 (WEA-3 E-160) 06:42 18:41	07:45 (WEA-4 E-160) 06:32 20:34	05:37 21:23	05:13 21:55
19	08:30 16:57	07:41 17:53	09:02 (WEA-3 E-160) 06:40 18:43	08:13 (WEA-4 E-160) 06:30 20:36	05:35 21:24	05:13 21:55
20	08:29 16:59	07:39 17:55	09:00 (WEA-3 E-160) 06:38 18:45	08:12 (WEA-4 E-160) 06:28 20:37	05:34 21:26	05:14 21:55
21	08:28 17:01	07:37 17:57	06:36 18:46	08:09 (WEA-4 E-160) 06:26 20:39	05:33 21:27	05:14 21:55
22	08:27 17:02	07:35 17:59	06:33 18:48	07:52 (WEA-4 E-160) 06:24 20:41	05:31 21:29	05:14 21:56
23	08:26 17:04	07:33 18:01	06:31 18:50	08:04 (WEA-4 E-160) 06:22 20:42	05:30 21:30	05:14 21:56
24	08:25 17:06	07:31 18:02	06:29 18:51	06:20 20:44	05:29 21:31	05:14 21:56
25	08:24 17:07	07:29 18:04	06:26 18:53	06:18 20:46	05:28 21:33	05:15 21:56
26	08:22 17:09	07:27 18:06	06:24 18:55	06:16 20:47	05:27 21:34	05:15 21:56
27	08:21 17:11	07:25 18:08	06:22 18:57	06:14 20:49	05:26 21:35	05:16 21:56
28	08:20 17:13	07:23 18:10	06:19 18:58	08:07 (WEA-4 E-160) 06:12 20:51	05:24 21:37	05:16 21:56
29	08:18 17:15		07:17 20:00	06:10 20:52	05:23 21:38	05:17 21:56
30	08:17 17:16	08:49 (WEA-3 E-160) 8 08:57 (WEA-3 E-160)	07:15 20:02	06:08 20:54	05:22 21:39	05:17 21:55
31	08:15 17:18	08:46 (WEA-3 E-160) 13 08:59 (WEA-3 E-160)	07:13 20:03		05:22 21:40	
	Sonnenscheinstunden 259		278	367	416	498
	astr.max.mögl.Beschattung 21		442	622		
	Red.Sonnenscheinwahrsch. 0,20		0,30	0,30		
	Reduktion Betriebsdauer 0,84		0,84	0,84		
	Reduktion Windrichtung 0,59		0,59	0,62		
	Gesamte Reduktion 0,10		0,15	0,16		
	Met.wahrsch.Beschattung 2		66	96		

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP208/1 - IP208/1 Dorstener Postweg 5a

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember		
1	05:18	05:54	06:43	07:32	08:22 (WEA-4 E-160)	07:26	08:09 (WEA-3 E-160)	08:16
	21:55	21:24	20:22	19:13	35 08:57 (WEA-4 E-160)	17:07	28 08:37 (WEA-3 E-160)	16:27
2	05:18	05:56	06:45	07:34	08:22 (WEA-4 E-160)	07:27	08:09 (WEA-3 E-160)	08:18
	21:55	21:22	20:20	19:10	35 08:57 (WEA-4 E-160)	17:05	28 08:37 (WEA-3 E-160)	16:26
3	05:19	05:57	06:47	07:36	08:22 (WEA-4 E-160)	07:29	08:10 (WEA-3 E-160)	08:19
	21:55	21:20	20:17	19:08	35 08:57 (WEA-4 E-160)	17:03	27 08:37 (WEA-3 E-160)	16:25
4	05:20	05:59	06:48	07:37	08:21 (WEA-4 E-160)	07:31	08:10 (WEA-3 E-160)	08:21
	21:54	21:19	20:15	19:06	35 08:56 (WEA-4 E-160)	17:01	27 08:37 (WEA-3 E-160)	16:25
5	05:21	06:00	06:50	07:39	08:22 (WEA-4 E-160)	07:33	08:10 (WEA-3 E-160)	08:22
	21:54	21:17	20:13	19:04	34 08:56 (WEA-4 E-160)	17:00	27 08:37 (WEA-3 E-160)	16:24
6	05:22	06:02	06:52	07:41	08:22 (WEA-4 E-160)	07:35	08:11 (WEA-3 E-160)	08:23
	21:53	21:15	20:11	19:01	33 08:55 (WEA-4 E-160)	16:58	25 08:36 (WEA-3 E-160)	16:24
7	05:22	06:03	06:53	07:42	08:22 (WEA-4 E-160)	07:36	08:12 (WEA-3 E-160)	08:24
	21:53	21:13	20:08	18:59	32 08:54 (WEA-4 E-160)	16:56	24 08:36 (WEA-3 E-160)	16:24
8	05:23	06:05	06:55	07:44	08:23 (WEA-4 E-160)	07:38	08:13 (WEA-3 E-160)	08:26
	21:52	21:11	20:06	18:57	30 08:53 (WEA-4 E-160)	16:55	22 08:35 (WEA-3 E-160)	16:23
9	05:24	06:06	06:56	07:46	08:24 (WEA-4 E-160)	07:40	08:14 (WEA-3 E-160)	08:27
	21:51	21:10	20:04	18:54	28 08:52 (WEA-4 E-160)	16:53	20 08:34 (WEA-3 E-160)	16:23
10	05:25	06:08	06:58	07:47	08:25 (WEA-4 E-160)	07:42	08:16 (WEA-3 E-160)	08:28
	21:51	21:08	20:01	18:52	25 08:50 (WEA-4 E-160)	16:51	17 08:33 (WEA-3 E-160)	16:23
11	05:26	06:10	07:00	07:49	08:26 (WEA-4 E-160)	07:44	08:18 (WEA-3 E-160)	08:29
	21:50	21:06	19:59	18:50	22 08:48 (WEA-4 E-160)	16:50	13 08:31 (WEA-3 E-160)	16:23
12	05:27	06:11	07:01	07:51	08:28 (WEA-4 E-160)	07:45	08:21 (WEA-3 E-160)	08:30
	21:49	21:04	19:57	18:48	17 08:45 (WEA-4 E-160)	16:48	7 08:28 (WEA-3 E-160)	16:22
13	05:28	06:13	07:03	07:52	08:33 (WEA-4 E-160)	07:47	08:31	08:31
	21:48	21:02	19:54	18:46	10 08:42 (WEA-4 E-160)	16:47	16:22	16:22
14	05:30	06:14	07:04	07:54	07:49	07:49	08:32	08:32
	21:47	21:00	19:52	18:43	16:45	16:45	16:22	16:22
15	05:31	06:16	07:06	07:56	07:51	07:51	08:33	08:33
	21:46	20:58	19:50	18:41	16:44	16:44	16:22	16:22
16	05:32	06:18	07:08	07:58	07:52	07:52	08:34	08:34
	21:45	20:56	19:47	18:39	16:42	16:42	16:23	16:23
17	05:33	06:19	07:09	07:59	07:54	07:54	08:35	08:35
	21:44	20:54	19:45	18:37	16:41	16:41	16:23	16:23
18	05:34	06:21	07:11	08:01	07:56	07:56	08:35	08:35
	21:43	20:52	19:43	18:35	16:40	16:40	16:23	16:23
19	05:36	06:22	07:13	08:03	07:57	07:57	08:36	08:36
	21:42	20:50	19:40	18:33	16:38	16:38	16:23	16:23
20	05:37	06:24	07:14	08:04	07:59	07:59	08:37	08:37
	21:41	20:48	19:38	18:31	16:37	16:37	16:24	16:24
21	05:38	06:26	07:16	08:39 (WEA-4 E-160)	08:06	08:01	08:37	08:37
	21:39	20:46	19:36	9 08:48 (WEA-4 E-160)	18:28	16:36	16:24	16:24
22	05:40	06:27	07:17	08:34 (WEA-4 E-160)	08:08	09:22 (WEA-3 E-160)	08:02	08:38
	21:38	20:44	19:33	17 08:51 (WEA-4 E-160)	18:26	3 09:25 (WEA-3 E-160)	16:35	16:25
23	05:41	06:29	07:19	08:32 (WEA-4 E-160)	08:10	09:17 (WEA-3 E-160)	08:04	08:38
	21:37	20:42	19:31	21 08:53 (WEA-4 E-160)	18:24	13 09:30 (WEA-3 E-160)	16:34	16:25
24	05:42	06:31	07:21	08:30 (WEA-4 E-160)	08:11	09:15 (WEA-3 E-160)	08:06	08:39
	21:36	20:39	19:29	25 08:55 (WEA-4 E-160)	18:22	17 09:32 (WEA-3 E-160)	16:33	16:26
25	05:44	06:32	07:22	08:28 (WEA-4 E-160)	07:13	08:14 (WEA-3 E-160)	08:07	08:39
	21:34	20:37	19:27	27 08:55 (WEA-4 E-160)	17:20	20 08:34 (WEA-3 E-160)	16:32	16:26
26	05:45	06:34	07:24	08:27 (WEA-4 E-160)	07:15	08:13 (WEA-3 E-160)	08:09	08:40
	21:33	20:35	19:24	30 08:57 (WEA-4 E-160)	17:18	22 08:35 (WEA-3 E-160)	16:31	16:27
27	05:47	06:35	07:26	08:26 (WEA-4 E-160)	07:17	08:12 (WEA-3 E-160)	08:10	08:40
	21:31	20:33	19:22	32 08:58 (WEA-4 E-160)	17:16	24 08:36 (WEA-3 E-160)	16:30	16:28
28	05:48	06:37	07:27	08:24 (WEA-4 E-160)	07:19	08:11 (WEA-3 E-160)	08:12	08:40
	21:30	20:31	19:20	33 08:57 (WEA-4 E-160)	17:14	26 08:37 (WEA-3 E-160)	16:29	16:28
29	05:50	06:39	07:29	08:24 (WEA-4 E-160)	07:20	08:11 (WEA-3 E-160)	08:13	08:40
	21:28	20:29	19:17	34 08:58 (WEA-4 E-160)	17:12	26 08:37 (WEA-3 E-160)	16:28	16:29
30	05:51	06:40	07:31	08:23 (WEA-4 E-160)	07:22	08:10 (WEA-3 E-160)	08:15	08:40
	21:27	20:26	19:15	35 08:58 (WEA-4 E-160)	17:11	28 08:38 (WEA-3 E-160)	16:27	16:30
31	05:53	06:42	07:32	07:24	08:09 (WEA-3 E-160)	08:09 (WEA-3 E-160)	08:40	08:40
	21:25	20:24	19:14	17:09	28 08:37 (WEA-3 E-160)	16:27	16:31	16:31
Sonnenscheinstunden	501	453	381	332	267	244		
astr.max.mögl.Beschattung			263	578	265			
Red.Sonnenscheinwahrsch.			0,36	0,32	0,23			
Reduktion Betriebsdauer			0,84	0,84	0,84			
Reduktion Windrichtung			0,62	0,61	0,59			
Gesamte Reduktion			0,19	0,16	0,11			
Met.wahrsch.Beschattung			49	93	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 (WEA mit erstem Schatten)	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
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Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP208/2 - IP208/2 Dorstener Postweg

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	08:46 (WEA-3 E-160)	07:21	07:56 (WEA-4 E-160)	07:10
	16:32	17:20	09:07 (WEA-3 E-160)	18:11	08:17 (WEA-4 E-160)	20:05
2	08:40	08:12	08:45 (WEA-3 E-160)	07:18	07:55 (WEA-4 E-160)	07:08
	16:33	17:22	09:08 (WEA-3 E-160)	18:13	08:19 (WEA-4 E-160)	20:07
3	08:40	08:11	08:44 (WEA-3 E-160)	07:16	07:52 (WEA-4 E-160)	07:06
	16:35	17:24	09:09 (WEA-3 E-160)	18:15	08:20 (WEA-4 E-160)	20:08
4	08:40	08:09	08:44 (WEA-3 E-160)	07:14	07:51 (WEA-4 E-160)	07:03
	16:36	17:26	09:10 (WEA-3 E-160)	18:17	08:21 (WEA-4 E-160)	20:10
5	08:40	08:07	08:44 (WEA-3 E-160)	07:12	07:50 (WEA-4 E-160)	07:01
	16:37	17:27	09:11 (WEA-3 E-160)	18:19	08:22 (WEA-4 E-160)	20:12
6	08:39	08:06	08:43 (WEA-3 E-160)	07:10	07:49 (WEA-4 E-160)	06:59
	16:38	17:29	09:11 (WEA-3 E-160)	18:20	08:23 (WEA-4 E-160)	20:14
7	08:39	08:04	08:43 (WEA-3 E-160)	07:07	07:48 (WEA-4 E-160)	06:57
	16:39	17:31	09:11 (WEA-3 E-160)	18:22	08:22 (WEA-4 E-160)	20:15
8	08:38	08:02	08:43 (WEA-3 E-160)	07:05	07:47 (WEA-4 E-160)	06:54
	16:41	17:33	09:11 (WEA-3 E-160)	18:24	08:23 (WEA-4 E-160)	20:17
9	08:38	08:00	08:43 (WEA-3 E-160)	07:03	07:47 (WEA-4 E-160)	06:52
	16:42	17:35	09:11 (WEA-3 E-160)	18:26	08:23 (WEA-4 E-160)	20:19
10	08:37	07:59	08:44 (WEA-3 E-160)	07:01	07:47 (WEA-4 E-160)	06:50
	16:43	17:37	09:12 (WEA-3 E-160)	18:27	08:23 (WEA-4 E-160)	20:20
11	08:37	07:57	08:44 (WEA-3 E-160)	06:58	07:46 (WEA-4 E-160)	06:48
	16:45	17:39	09:12 (WEA-3 E-160)	18:29	08:22 (WEA-4 E-160)	20:22
12	08:36	07:55	08:44 (WEA-3 E-160)	06:56	07:46 (WEA-4 E-160)	06:45
	16:46	17:40	09:11 (WEA-3 E-160)	18:31	08:22 (WEA-4 E-160)	20:24
13	08:36	07:53	08:45 (WEA-3 E-160)	06:54	07:47 (WEA-4 E-160)	06:43
	16:48	17:42	09:11 (WEA-3 E-160)	18:33	08:22 (WEA-4 E-160)	20:25
14	08:35	07:51	08:46 (WEA-3 E-160)	06:52	07:46 (WEA-4 E-160)	06:41
	16:49	17:44	09:10 (WEA-3 E-160)	18:34	08:20 (WEA-4 E-160)	20:27
15	08:34	07:49	08:47 (WEA-3 E-160)	06:49	07:47 (WEA-4 E-160)	06:39
	16:51	17:46	09:09 (WEA-3 E-160)	18:36	08:20 (WEA-4 E-160)	20:29
16	08:33	07:47	08:48 (WEA-3 E-160)	06:47	07:47 (WEA-4 E-160)	06:37
	16:52	17:48	09:07 (WEA-3 E-160)	18:38	08:19 (WEA-4 E-160)	20:31
17	08:32	07:45	08:50 (WEA-3 E-160)	06:45	07:47 (WEA-4 E-160)	06:34
	16:54	17:50	09:06 (WEA-3 E-160)	18:40	08:17 (WEA-4 E-160)	20:32
18	08:31	07:43	08:52 (WEA-3 E-160)	06:42	07:49 (WEA-4 E-160)	06:32
	16:56	17:51	09:03 (WEA-3 E-160)	18:41	08:16 (WEA-4 E-160)	20:34
19	08:30	07:41		06:40	07:50 (WEA-4 E-160)	06:30
	16:57	17:53		18:43	08:14 (WEA-4 E-160)	20:36
20	08:29	07:39		06:38	07:51 (WEA-4 E-160)	06:28
	16:59	17:55		18:45	08:11 (WEA-4 E-160)	20:37
21	08:28	07:37		06:36	07:54 (WEA-4 E-160)	06:26
	17:01	17:57		18:46	08:08 (WEA-4 E-160)	20:39
22	08:27	07:35		06:33		06:24
	17:02	17:59		18:48		20:41
23	08:26	07:33		06:31		06:22
	17:04	18:01		18:50		20:42
24	08:25	07:31		06:29		06:20
	17:06	18:02		18:51		20:44
25	08:24	07:29		06:26		06:18
	17:07	18:04		18:53		20:46
26	08:22	07:27		06:24		06:16
	17:09	18:06		18:55		20:47
27	08:21	07:25	08:04 (WEA-4 E-160)	06:22		06:14
	17:11	18:08	5	08:09 (WEA-4 E-160)		20:49
28	08:20	07:23	08:57 (WEA-3 E-160)	06:19		06:12
	17:13	18:10	15	08:14 (WEA-4 E-160)		20:51
29	08:18	08:50 (WEA-3 E-160)		07:17		06:10
	17:15	19:02 (WEA-3 E-160)		20:00		20:52
30	08:17	08:48 (WEA-3 E-160)		07:15		06:08
	17:16	19:04 (WEA-3 E-160)		20:02		20:54
31	08:15	08:47 (WEA-3 E-160)		07:13		
	17:18	19:05 (WEA-3 E-160)		20:03		21:40
Sonnenscheinstunden	259	278		367	416	485
astr.max.mögl.Beschattung	49	455		632		
Red.Sonnenscheinwahrsch.	0,20	0,30		0,30		
Reduktion Betriebsdauer	0,84	0,84		0,84		
Reduktion Windrichtung	0,58	0,59		0,62		
Gesamte Reduktion	0,10	0,15		0,15		
Met.wahrsch.Beschattung	5	68		98		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP208/2 - IP208/2 Dorstener Postweg

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember		
1	05:18	05:54	06:43	07:32	08:25 (WEA-4 E-160)	07:26	08:12 (WEA-3 E-160)	08:16
	21:55	21:24	20:22	19:13	36 09:01 (WEA-4 E-160)	17:07	29 08:41 (WEA-3 E-160)	16:27
2	05:18	05:56	06:45	07:34	08:25 (WEA-4 E-160)	07:27	08:12 (WEA-3 E-160)	08:18
	21:55	21:22	20:20	19:10	36 09:01 (WEA-4 E-160)	17:05	29 08:41 (WEA-3 E-160)	16:26
3	05:19	05:57	06:47	07:36	08:25 (WEA-4 E-160)	07:29	08:12 (WEA-3 E-160)	08:19
	21:55	21:20	20:17	19:08	36 09:01 (WEA-4 E-160)	17:03	29 08:41 (WEA-3 E-160)	16:25
4	05:20	05:59	06:48	07:37	08:24 (WEA-4 E-160)	07:31	08:13 (WEA-3 E-160)	08:21
	21:54	21:19	20:15	19:06	36 09:00 (WEA-4 E-160)	17:01	28 08:41 (WEA-3 E-160)	16:25
5	05:21	06:00	06:50	07:39	08:24 (WEA-4 E-160)	07:33	08:13 (WEA-3 E-160)	08:22
	21:54	21:17	20:13	19:04	36 09:00 (WEA-4 E-160)	17:00	28 08:41 (WEA-3 E-160)	16:24
6	05:22	06:02	06:52	07:41	08:25 (WEA-4 E-160)	07:35	08:14 (WEA-3 E-160)	08:23
	21:53	21:15	20:11	19:01	34 08:59 (WEA-4 E-160)	16:58	26 08:40 (WEA-3 E-160)	16:24
	05:22	06:03	06:53	07:42	08:24 (WEA-4 E-160)	07:36	08:14 (WEA-3 E-160)	08:24
	21:53	21:13	20:08	18:59	34 08:58 (WEA-4 E-160)	16:56	26 08:40 (WEA-3 E-160)	16:24
8	05:23	06:05	06:55	07:44	08:25 (WEA-4 E-160)	07:38	08:15 (WEA-3 E-160)	08:26
	21:52	21:11	20:06	18:57	32 08:57 (WEA-4 E-160)	16:55	25 08:40 (WEA-3 E-160)	16:23
9	05:24	06:06	06:56	07:46	08:26 (WEA-4 E-160)	07:40	08:16 (WEA-3 E-160)	08:27
	21:51	21:10	20:04	18:54	30 08:56 (WEA-4 E-160)	16:53	23 08:39 (WEA-3 E-160)	16:23
10	05:25	06:08	06:58	07:47	08:27 (WEA-4 E-160)	07:42	08:17 (WEA-3 E-160)	08:28
	21:51	21:08	20:01	18:52	28 08:55 (WEA-4 E-160)	16:51	21 08:38 (WEA-3 E-160)	16:23
11	05:26	06:10	07:00	07:49	08:27 (WEA-4 E-160)	07:44	08:18 (WEA-3 E-160)	08:29
	21:50	21:06	19:59	18:50	26 08:53 (WEA-4 E-160)	16:50	19 08:37 (WEA-3 E-160)	16:23
12	05:27	06:11	07:01	07:51	08:28 (WEA-4 E-160)	07:45	08:20 (WEA-3 E-160)	08:30
	21:49	21:04	19:57	18:48	23 08:51 (WEA-4 E-160)	16:48	16 08:36 (WEA-3 E-160)	16:22
13	05:28	06:13	07:03	07:52	08:31 (WEA-4 E-160)	07:47	08:23 (WEA-3 E-160)	08:31
	21:48	21:02	19:54	18:46	18 08:49 (WEA-4 E-160)	16:47	11 08:34 (WEA-3 E-160)	16:22
14	05:30	06:14	07:04	07:54	08:34 (WEA-4 E-160)	07:49	08:27 (WEA-3 E-160)	08:32
	21:47	21:00	19:52	18:43	12 08:46 (WEA-4 E-160)	16:45	3 08:30 (WEA-3 E-160)	16:22
15	05:31	06:16	07:06	07:56	08:35 (WEA-4 E-160)	07:51	08:33 (WEA-3 E-160)	08:33
	21:46	20:58	19:50	18:41	16:44	07:52	16:22	16:22
16	05:32	06:18	07:08	07:58	08:36 (WEA-4 E-160)	07:52	08:34 (WEA-3 E-160)	08:34
	21:45	20:56	19:47	18:39	16:42	07:53	16:23	16:23
17	05:33	06:19	07:09	07:59	08:37 (WEA-4 E-160)	07:54	08:35 (WEA-3 E-160)	08:35
	21:44	20:54	19:45	18:37	16:41	07:55	16:23	16:23
18	05:34	06:21	07:11	08:01	08:38 (WEA-4 E-160)	07:56	08:36 (WEA-3 E-160)	08:36
	21:43	20:52	19:43	18:35	16:40	07:57	16:23	16:23
19	05:36	06:22	07:13	08:03	08:39 (WEA-4 E-160)	07:57	08:37 (WEA-3 E-160)	08:37
	21:42	20:50	19:40	18:33	16:38	07:58	16:23	16:23
20	05:37	06:24	07:14	08:04	08:40 (WEA-4 E-160)	07:59	08:38 (WEA-3 E-160)	08:38
	21:41	20:48	19:38	18:31	16:37	08:00	16:24	16:24
21	05:38	06:26	07:16	08:06	08:41 (WEA-4 E-160)	08:01	08:39 (WEA-3 E-160)	08:39
	21:39	20:46	19:36	18:28	16:36	08:02	16:24	16:24
22	05:40	06:27	07:17	08:08	08:42 (WEA-4 E-160)	08:02	08:40 (WEA-3 E-160)	08:40
	21:38	20:44	19:33	18:26	16:35	08:03	16:25	16:25
23	05:41	06:29	07:19	08:36 (WEA-4 E-160)	08:10	08:04	08:41 (WEA-3 E-160)	08:41
	21:37	20:42	19:31	19 08:55 (WEA-4 E-160)	18:24	16:34	16:25	16:25
24	05:42	06:31	07:21	08:34 (WEA-4 E-160)	08:11	08:06	08:42 (WEA-3 E-160)	08:42
	21:36	20:39	19:29	23 08:57 (WEA-4 E-160)	18:22	12 09:33 (WEA-3 E-160)	16:33	16:33
25	05:44	06:32	07:22	08:32 (WEA-4 E-160)	07:13	08:07	08:43 (WEA-3 E-160)	08:43
	21:34	20:37	19:27	26 08:58 (WEA-4 E-160)	17:20	17 08:36 (WEA-3 E-160)	16:32	16:32
26	05:45	06:34	07:24	08:30 (WEA-4 E-160)	07:15	08:09	08:44 (WEA-3 E-160)	08:44
	21:33	20:35	19:24	29 08:59 (WEA-4 E-160)	17:18	20 08:37 (WEA-3 E-160)	16:31	16:31
27	05:47	06:35	07:26	08:29 (WEA-4 E-160)	07:17	08:10	08:45 (WEA-3 E-160)	08:45
	21:31	20:33	19:22	31 09:00 (WEA-4 E-160)	17:16	23 08:39 (WEA-3 E-160)	16:30	16:30
28	05:48	06:37	07:27	08:28 (WEA-4 E-160)	07:19	08:12	08:46 (WEA-3 E-160)	08:46
	21:30	20:31	19:20	32 09:00 (WEA-4 E-160)	17:14	25 08:40 (WEA-3 E-160)	16:29	16:29
29	05:50	06:39	07:29	08:27 (WEA-4 E-160)	07:20	08:13	08:47 (WEA-3 E-160)	08:47
	21:28	20:29	19:17	34 09:01 (WEA-4 E-160)	17:12	26 08:40 (WEA-3 E-160)	16:28	16:28
30	05:51	06:40	07:31	08:26 (WEA-4 E-160)	07:22	08:15	08:48 (WEA-3 E-160)	08:48
	21:27	20:26	19:15	35 09:01 (WEA-4 E-160)	17:11	27 08:41 (WEA-3 E-160)	16:27	16:27
31	05:53	06:42	07:32	07:24	08:13 (WEA-4 E-160)	08:13 (WEA-3 E-160)	08:49 (WEA-3 E-160)	08:49
	21:25	20:24	19:13	17:09	27 08:40 (WEA-3 E-160)	16:27	16:31	16:31
Sonnenscheinstunden	501	453	381	332	267	244		
astr.max.mögl.Beschattung			241	594	313			
Red.Sonnenscheinwahrsch.			0,36	0,32	0,23			
Reduktion Betriebsdauer			0,84	0,84	0,84			
Reduktion Windrichtung			0,62	0,61	0,58			
Gesamte Reduktion			0,19	0,16	0,11			
Met.wahrsch.Beschattung			45	96	35			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP209 - IP209 Dorstener Postweg 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni
1	08:40	08:14	07:21	07:10	06:06	07:03 (WEA-4 E-160) 05:21
	16:32	17:20	18:11	20:05	20:56	26 07:29 (WEA-4 E-160) 21:41
2	08:40	08:12	07:18	07:08	06:04	07:04 (WEA-4 E-160) 05:20
	16:34	17:22	18:13	20:07	20:57	23 07:27 (WEA-4 E-160) 21:42
3	08:40	08:11	07:16	07:06	06:02	07:05 (WEA-4 E-160) 05:19
	16:35	17:24	18:15	20:08	20:59	21 07:26 (WEA-4 E-160) 21:43
4	08:40	08:09	07:14	07:03	06:00	07:07 (WEA-4 E-160) 05:18
	16:36	17:26	18:17	20:10	21:01	18 07:25 (WEA-4 E-160) 21:44
5	08:40	08:07	07:12	07:01	05:58	07:09 (WEA-4 E-160) 05:18
	16:37	17:27	18:19	20:12	21:02	13 07:22 (WEA-4 E-160) 21:45
6	08:39	08:06	07:10	06:59	05:56	07:12 (WEA-4 E-160) 05:17
	16:38	17:29	18:20	20:14	21:04	6 07:18 (WEA-4 E-160) 21:46
7	08:39	08:04	07:07	06:57	05:55	05:16
	16:39	17:31	18:22	20:15	21:06	21:47
8	08:38	08:02	07:05	06:54	05:53	05:16
	16:41	17:33	18:24	20:17	21:07	21:48
9	08:38	08:00	08:27 (WEA-1) 07:03	06:52	05:51	05:15
	16:42	17:35	9 08:36 (WEA-1) 18:26	20:19	21:09	21:49
10	08:37	07:59	08:26 (WEA-1) 07:01	06:50	05:49	05:15
	16:43	17:37	13 08:39 (WEA-1) 18:27	20:20	21:10	05:15
11	08:37	07:57	08:25 (WEA-1) 06:58	06:48	05:48	05:15
	16:45	17:39	16 08:41 (WEA-1) 18:29	12 07:38 (WEA-3 E-160) 20:22	21:12	21:51
12	08:36	07:55	08:24 (WEA-1) 06:56	06:45	05:46	05:14
	16:46	17:40	17 08:41 (WEA-1) 18:31	17 07:41 (WEA-3 E-160) 20:24	21:14	21:51
13	08:36	07:53	08:23 (WEA-1) 06:54	06:43	05:45	05:14
	16:48	17:42	19 08:42 (WEA-1) 18:33	20 07:42 (WEA-3 E-160) 20:25	10 07:25 (WEA-4 E-160) 21:15	21:52
14	08:35	07:51	08:22 (WEA-1) 06:52	06:41	05:43	05:14
	16:49	17:44	21 08:43 (WEA-1) 18:34	23 07:43 (WEA-3 E-160) 20:27	16 07:28 (WEA-4 E-160) 21:17	21:53
15	08:34	07:49	08:22 (WEA-1) 06:49	06:39	05:41	05:14
	16:51	17:46	21 08:43 (WEA-1) 18:36	25 07:44 (WEA-3 E-160) 20:29	20 07:30 (WEA-4 E-160) 21:18	21:53
16	08:33	07:47	08:22 (WEA-1) 06:47	06:37	05:40	05:14
	16:52	17:48	21 08:43 (WEA-1) 18:38	26 07:44 (WEA-3 E-160) 20:31	23 07:31 (WEA-4 E-160) 21:20	21:54
17	08:32	07:45	08:22 (WEA-1) 06:45	06:34	05:38	05:13
	16:54	17:50	21 08:43 (WEA-1) 18:40	27 07:44 (WEA-3 E-160) 20:32	25 07:32 (WEA-4 E-160) 21:21	21:54
18	08:31	07:43	08:23 (WEA-1) 06:42	06:32	05:37	05:13
	16:56	17:51	19 08:42 (WEA-1) 18:41	28 07:44 (WEA-3 E-160) 20:34	27 07:32 (WEA-4 E-160) 21:23	21:55
19	08:30	07:41	08:23 (WEA-1) 06:40	06:30	05:35	05:13
	16:57	17:53	19 08:42 (WEA-1) 18:43	28 07:44 (WEA-3 E-160) 20:36	29 07:33 (WEA-4 E-160) 21:24	21:55
20	08:29	07:39	08:23 (WEA-1) 06:38	06:28	05:34	05:14
	16:59	17:55	17 08:40 (WEA-1) 18:45	28 07:43 (WEA-3 E-160) 20:37	30 07:33 (WEA-4 E-160) 21:26	21:55
21	08:28	07:37	08:25 (WEA-1) 06:36	06:26	05:33	05:14
	17:01	17:57	13 08:38 (WEA-1) 18:46	27 07:43 (WEA-3 E-160) 20:39	31 07:33 (WEA-4 E-160) 21:27	21:55
22	08:27	07:35	08:27 (WEA-1) 06:33	06:24	05:31	05:14
	17:02	17:59	9 08:36 (WEA-1) 18:48	26 07:42 (WEA-3 E-160) 20:41	31 07:33 (WEA-4 E-160) 21:29	21:56
23	08:26	07:33	06:31	06:22	05:30	05:14
	17:04	18:01	18:50	25 07:41 (WEA-3 E-160) 20:42	32 07:33 (WEA-4 E-160) 21:30	21:56
24	08:25	07:31	06:29	06:20	05:29	05:14
	17:06	18:02	18:52	23 07:40 (WEA-3 E-160) 20:44	32 07:33 (WEA-4 E-160) 21:31	21:56
25	08:24	07:29	06:26	06:18	05:28	05:15
	17:07	18:04	18:53	21 07:39 (WEA-3 E-160) 20:46	32 07:33 (WEA-4 E-160) 21:33	21:56
26	08:22	07:27	06:24	06:16	05:27	05:15
	17:09	18:06	18:55	17 07:37 (WEA-3 E-160) 20:47	31 07:32 (WEA-4 E-160) 21:34	21:56
27	08:21	07:25	06:22	06:14	05:26	05:16
	17:11	18:08	18:57	12 07:33 (WEA-3 E-160) 20:49	31 07:32 (WEA-4 E-160) 21:35	21:56
28	08:20	07:23	06:19	06:12	05:25	05:16
	17:13	18:10	18:58	30 07:32 (WEA-4 E-160) 21:37	07:02 (WEA-4 E-160) 05:23	21:57
29	08:18		07:17	06:10	05:23	05:17
	17:15		20:00	29 07:31 (WEA-4 E-160) 21:38		21:56
30	08:17		07:15	06:08	05:23	05:17
	17:16		20:02	27 07:30 (WEA-4 E-160) 21:39		21:55
31	08:15		07:13		05:22	
	17:18		20:03		21:40	
Sonnenscheinstunden	259	278	367	416	485	498
astr.max.mögl.Beschattung		235	385	486	107	
Red.Sonnenscheinwahrsch.		0,30	0,30	0,41	0,46	
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	
Reduktion Windrichtung		0,60	0,64	0,69	0,69	
Gesamte Reduktion		0,15	0,16	0,24	0,27	
Met.wahrsch.Beschattung		36	61	115	28	

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP209 - IP209 Dorstener Postweg 15

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember
1	05:18	05:54	06:44	07:32		
	21:55	21:24	20:22	19:13	18 08:02 (WEA-3 E-160)	07:26
2	05:18	05:56	06:45	07:34	18 08:20 (WEA-3 E-160)	17:07
	21:55	21:22	20:20	19:10	14 08:04 (WEA-3 E-160)	07:27
3	05:19	05:57	06:47	07:36	14 08:18 (WEA-3 E-160)	17:05
	21:55	21:20	20:17	19:08	6 08:08 (WEA-3 E-160)	07:29
4	05:20	05:59	06:48	07:37	6 08:14 (WEA-3 E-160)	17:03
	21:54	21:19	20:15	19:06		07:31
5	05:21	06:00	06:50	07:39		17:01
	21:54	21:17	20:13	19:04		07:33
6	05:22	06:02	06:52	07:41		17:00
	21:53	21:15	20:11	19:01		07:35
7	05:22	06:03	07:20 (WEA-4 E-160)	06:53		16:58
	21:53	21:13	20:08	18:59		07:36
8	05:23	06:05	07:17 (WEA-4 E-160)	06:55		16:56
	21:52	21:11	20:06	18:57		07:38
9	05:24	06:06	07:15 (WEA-4 E-160)	06:56		16:55
	21:51	21:10	20:04	18:54		07:40
10	05:25	06:08	07:14 (WEA-4 E-160)	06:58		16:53
	21:51	21:08	20:01	18:52		07:42
11	05:26	06:10	07:12 (WEA-4 E-160)	07:00		16:51
	21:50	21:06	20:00	18:50		16:51
12	05:27	06:11	07:12 (WEA-4 E-160)	07:01		16:50
	21:49	21:04	20:00	18:48		16:50
13	05:29	06:13	07:10 (WEA-4 E-160)	07:03		16:48
	21:48	21:02	20:00	18:46		16:48
14	05:30	06:14	07:10 (WEA-4 E-160)	07:04		16:47
	21:47	21:00	20:00	18:43		16:47
15	05:31	06:16	07:09 (WEA-4 E-160)	07:06		16:45
	21:46	20:58	20:00	18:41		16:45
16	05:32	06:18	07:09 (WEA-4 E-160)	07:08	08:11 (WEA-3 E-160)	07:58
	21:45	20:56	20:00	18:39	11 08:22 (WEA-3 E-160)	18:39
17	05:33	06:19	07:08 (WEA-4 E-160)	07:09	17 08:07 (WEA-3 E-160)	07:59
	21:44	20:54	20:00	18:37	17 08:24 (WEA-3 E-160)	18:37
18	05:34	06:21	07:08 (WEA-4 E-160)	07:11	20 08:06 (WEA-3 E-160)	08:01
	21:43	20:52	20:00	18:35	20 08:26 (WEA-3 E-160)	18:35
19	05:36	06:22	07:08 (WEA-4 E-160)	07:13	23 08:04 (WEA-3 E-160)	08:03
	21:42	20:50	20:00	18:33	2 09:02 (WEA-1)	07:57
20	05:37	06:24	07:07 (WEA-4 E-160)	07:14	24 08:27 (WEA-3 E-160)	18:33
	21:41	20:48	20:00	18:31	10 08:03 (WEA-3 E-160)	08:04
21	05:38	06:26	07:08 (WEA-4 E-160)	07:16	14 08:27 (WEA-3 E-160)	18:31
	21:39	20:46	20:00	18:28	14 08:02 (WEA-3 E-160)	08:06
22	05:40	06:27	07:07 (WEA-4 E-160)	07:17	18 08:28 (WEA-3 E-160)	18:28
	21:38	20:44	20:00	18:26	16 08:00 (WEA-3 E-160)	08:08
23	05:41	06:29	07:08 (WEA-4 E-160)	07:19	18 08:27 (WEA-3 E-160)	18:26
	21:37	20:42	20:00	18:24	18 08:00 (WEA-3 E-160)	08:10
24	05:42	06:31	07:07 (WEA-4 E-160)	07:21	20 08:28 (WEA-3 E-160)	18:24
	21:36	20:39	20:00	18:22	20 08:00 (WEA-3 E-160)	08:11
25	05:44	06:32	07:08 (WEA-4 E-160)	07:22	20 08:28 (WEA-3 E-160)	18:22
	21:34	20:37	20:00	18:20	20 07:59 (WEA-3 E-160)	07:13
26	05:45	06:34	07:09 (WEA-4 E-160)	07:24	20 08:27 (WEA-3 E-160)	18:20
	21:33	20:35	20:00	18:18	20 07:59 (WEA-3 E-160)	07:15
27	05:47	06:35	07:10 (WEA-4 E-160)	07:26	20 08:27 (WEA-3 E-160)	18:18
	21:31	20:33	20:00	18:16	20 08:00 (WEA-3 E-160)	07:17
28	05:48	06:37	07:11 (WEA-4 E-160)	07:27	20 08:26 (WEA-3 E-160)	18:16
	21:30	20:31	20:00	18:14	20 07:59 (WEA-3 E-160)	07:19
29	05:50	06:39	07:13 (WEA-4 E-160)	07:29	20 08:25 (WEA-3 E-160)	18:14
	21:28	20:29	20:00	18:12	20 08:00 (WEA-3 E-160)	07:20
30	05:51	06:40	07:15 (WEA-4 E-160)	07:31	19 08:24 (WEA-3 E-160)	18:12
	21:27	20:26	20:00	18:11	19 08:01 (WEA-3 E-160)	07:22
31	05:53	06:42	19:15	17:11	18 08:23 (WEA-3 E-160)	18:11
	21:25	20:24		17:09	16 07:53 (WEA-1)	16:27
Sonnenscheinstunden	501	453	381	332	267	244
astr.max.mögl.Beschattung		601	358	251	22	
Red.Sonnenscheinwahrsch.		0,43	0,36	0,32	0,23	
Reduktion Betriebsdauer		0,84	0,84	0,84	0,84	
Reduktion Windrichtung		0,69	0,64	0,61	0,60	
Gesamte Reduktion		0,25	0,19	0,16	0,12	
Met.wahrsch.Beschattung		149	68	40	3	

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

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

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP218 - IP218 Helle 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:21 (WEA-4 E-160)	08:14	19	09:31 (WEA-4 E-160)	07:21	07:10	06:06	05:21		
	16:32	38	10:04 (WEA-3 E-160)	17:20		09:50 (WEA-4 E-160)	18:11	20:05	20:56	21:41	
2	08:40	09:21 (WEA-4 E-160)	08:12	15	09:33 (WEA-4 E-160)	07:18	07:08	06:04	05:20		
	16:33	38	10:03 (WEA-3 E-160)	17:22		09:48 (WEA-4 E-160)	18:13	20:07	20:57	21:42	
3	08:40	09:21 (WEA-4 E-160)	08:11	10	09:35 (WEA-4 E-160)	07:16	07:06	06:02	05:19		
	16:35	39	10:04 (WEA-3 E-160)	17:24		09:45 (WEA-4 E-160)	18:15	20:08	20:59	21:43	
4	08:40	09:21 (WEA-4 E-160)	08:09			07:14	07:03	06:00	05:18		
	16:36	38	10:04 (WEA-3 E-160)	17:26		18:17	20:10	21:01	21:45		
5	08:40	09:21 (WEA-4 E-160)	08:07			07:12	07:01	05:58	05:18		
	16:37	37	10:03 (WEA-3 E-160)	17:27		18:19	20:12	21:02	21:46		
6	08:39	09:21 (WEA-4 E-160)	08:06			07:10	06:59	05:56	05:17		
	16:38	37	10:03 (WEA-3 E-160)	17:29		18:20	20:14	21:04	21:46		
7	08:39	09:20 (WEA-4 E-160)	08:04			07:07	06:57	05:55	05:16		
	16:39	36	10:02 (WEA-3 E-160)	17:31		18:22	20:15	21:06	21:47		
8	08:39	09:21 (WEA-4 E-160)	08:02			07:05	06:54	05:53	05:16		
	16:41	35	10:02 (WEA-3 E-160)	17:33		18:24	20:17	21:07	21:48		
9	08:38	09:21 (WEA-4 E-160)	08:00			07:03	06:52	05:51	05:15		
	16:42	32	10:01 (WEA-3 E-160)	17:35		18:26	20:19	21:09	21:49		
10	08:38	09:20 (WEA-4 E-160)	07:59			07:01	06:50	05:49	05:15		
	16:43	28	09:48 (WEA-4 E-160)	17:37		18:27	20:20	21:10	21:50		
11	08:37	09:20 (WEA-4 E-160)	07:57			06:58	06:48	05:48	05:15		
	16:45	28	09:48 (WEA-4 E-160)	17:38		18:29	20:22	21:12	21:51		
12	08:36	09:21 (WEA-4 E-160)	07:55			06:56	06:45	05:46	05:14		
	16:46	29	09:50 (WEA-4 E-160)	17:40		18:31	20:24	21:14	21:51		
13	08:36	09:21 (WEA-4 E-160)	07:53			06:54	06:43	05:44	05:14		
	16:48	29	09:50 (WEA-4 E-160)	17:42		18:33	20:25	21:15	21:52		
14	08:35	09:21 (WEA-4 E-160)	07:51			06:52	06:41	05:43	05:14		
	16:49	30	09:51 (WEA-4 E-160)	17:44		18:34	20:27	21:17	21:53		
15	08:34	09:21 (WEA-4 E-160)	07:49			06:49	06:39	05:41	05:14		
	16:51	30	09:51 (WEA-4 E-160)	17:46		18:36	20:29	21:18	21:53		
16	08:33	09:21 (WEA-4 E-160)	07:47			06:47	06:37	05:40	05:13		
	16:52	31	09:52 (WEA-4 E-160)	17:48		18:38	20:31	21:20	21:54		
17	08:32	09:21 (WEA-4 E-160)	07:45			06:45	06:34	05:38	05:13		
	16:54	32	09:53 (WEA-4 E-160)	17:50		18:39	20:32	21:21	21:54		
18	08:31	09:22 (WEA-4 E-160)	07:43			06:42	06:32	05:37	05:13		
	16:56	31	09:53 (WEA-4 E-160)	17:51		18:41	20:34	21:23	21:55		
19	08:30	09:22 (WEA-4 E-160)	07:41			06:40	06:30	05:35	05:13		
	16:57	32	09:54 (WEA-4 E-160)	17:53		18:43	20:36	21:24	21:55		
20	08:29	09:22 (WEA-4 E-160)	07:39			06:38	06:28	05:34	05:13		
	16:59	31	09:53 (WEA-4 E-160)	17:55		18:45	20:37	21:26	21:55		
21	08:28	09:22 (WEA-4 E-160)	07:37			06:36	06:26	05:33	05:14		
	17:01	32	09:54 (WEA-4 E-160)	17:57		18:46	20:39	21:27	21:55		
22	08:27	09:23 (WEA-4 E-160)	07:35			06:33	06:24	05:31	05:14		
	17:02	31	09:54 (WEA-4 E-160)	17:59		18:48	20:41	21:29	21:56		
23	08:26	09:22 (WEA-4 E-160)	07:33			06:31	06:22	05:30	05:14		
	17:04	32	09:54 (WEA-4 E-160)	18:01		18:50	20:42	21:30	21:56		
24	08:25	09:23 (WEA-4 E-160)	07:31			06:29	06:20	05:29	05:14		
	17:06	31	09:54 (WEA-4 E-160)	18:02		18:51	20:44	21:31	21:56		
25	08:24	09:24 (WEA-4 E-160)	07:29			06:26	06:18	05:28	05:15		
	17:07	31	09:55 (WEA-4 E-160)	18:04		18:53	20:46	21:33	21:56		
26	08:22	09:24 (WEA-4 E-160)	07:27			06:24	06:16	05:27	05:15		
	17:09	30	09:54 (WEA-4 E-160)	18:06		18:55	20:47	21:34	21:56		
27	08:21	09:25 (WEA-4 E-160)	07:25			06:22	06:14	05:25	05:15		
	17:11	29	09:54 (WEA-4 E-160)	18:08		18:57	20:49	21:35	21:56		
28	08:20	09:26 (WEA-4 E-160)	07:23			06:19	06:12	05:24	05:16		
	17:13	27	09:53 (WEA-4 E-160)	18:10		18:58	20:51	21:37	21:56		
29	08:18	09:27 (WEA-4 E-160)				07:17	06:10	05:23	05:17		
	17:15	26	09:53 (WEA-4 E-160)			20:00	20:52	21:38	21:56		
30	08:17	09:28 (WEA-4 E-160)				07:15	06:08	05:22	05:17		
	17:16	24	09:52 (WEA-4 E-160)			20:02	20:54	21:39	21:55		
31	08:15	09:29 (WEA-4 E-160)				07:13		05:22			
	17:18	22	09:51 (WEA-4 E-160)			20:03		21:40			
Sonnenscheinstunden	259		278			367	416	485	498		
astr.max.mögl.Beschattung	976		44								
Red.Sonnenscheinwahrsch.	0,20		0,30								
Reduktion Betriebsdauer	0,84		0,84								
Reduktion Windrichtung	0,56		0,56								
Gesamte Reduktion	0,09		0,14								
Met.wahrsch.Beschattung	90		6								

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP218 - IP218 Helle 4

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1	05:18	05:54	06:43	07:32	07:26	08:16	
	21:55	21:24	20:22	19:13	17:07	16:27	28
2	05:18	05:56	06:45	07:34	07:27	08:18	
	21:55	21:22	20:20	19:10	17:05	16:26	28
3	05:19	05:57	06:47	07:36	07:29	08:19	
	21:55	21:20	20:17	19:08	17:03	16:25	31
4	05:20	05:59	06:48	07:37	07:31	08:21	
	21:54	21:19	20:15	19:06	17:01	16:25	35
5	05:21	06:00	06:50	07:39	07:33	08:22	
	21:54	21:17	20:13	19:03	17:00	16:24	35
6	05:22	06:02	06:52	07:41	07:35	08:23	
	21:53	21:15	20:11	19:01	16:58	16:24	37
7	05:22	06:03	06:53	07:42	07:36	08:24	
	21:53	21:13	20:08	18:59	16:56	16:23	37
8	05:23	06:05	06:55	07:44	07:38	09:06 (WEA-4 E-160)	08:26
	21:52	21:11	20:06	18:57	16:55	11 09:17 (WEA-4 E-160)	16:23
9	05:24	06:06	06:56	07:46	07:40	09:03 (WEA-4 E-160)	08:27
	21:51	21:10	20:04	18:54	16:53	16 09:19 (WEA-4 E-160)	16:23
10	05:25	06:08	06:58	07:47	07:42	09:02 (WEA-4 E-160)	08:28
	21:51	21:08	20:01	18:52	16:51	19 09:21 (WEA-4 E-160)	16:23
11	05:26	06:10	07:00	07:49	07:44	09:01 (WEA-4 E-160)	08:29
	21:50	21:06	19:59	18:50	16:50	22 09:23 (WEA-4 E-160)	16:22
12	05:27	06:11	07:01	07:51	07:45	09:00 (WEA-4 E-160)	08:30
	21:49	21:04	19:57	18:48	16:48	24 09:24 (WEA-4 E-160)	16:22
13	05:28	06:13	07:03	07:52	07:47	08:59 (WEA-4 E-160)	08:31
	21:48	21:02	19:54	18:46	16:47	26 09:25 (WEA-4 E-160)	16:22
14	05:30	06:14	07:04	07:54	07:49	08:59 (WEA-4 E-160)	08:32
	21:47	21:00	19:52	18:43	16:45	27 09:26 (WEA-4 E-160)	16:22
15	05:31	06:16	07:06	07:56	07:51	08:57 (WEA-4 E-160)	08:33
	21:46	20:58	19:50	18:41	16:44	29 09:26 (WEA-4 E-160)	16:22
16	05:32	06:18	07:08	07:58	07:52	08:57 (WEA-4 E-160)	08:34
	21:45	20:56	19:47	18:39	16:42	30 09:27 (WEA-4 E-160)	16:23
17	05:33	06:19	07:09	07:59	07:54	08:57 (WEA-4 E-160)	08:35
	21:44	20:54	19:45	18:37	16:41	31 09:28 (WEA-4 E-160)	16:23
18	05:34	06:21	07:11	08:01	07:56	08:57 (WEA-4 E-160)	08:35
	21:43	20:52	19:43	18:35	16:40	31 09:28 (WEA-4 E-160)	16:23
19	05:36	06:22	07:13	08:03	07:57	08:57 (WEA-4 E-160)	08:36
	21:42	20:50	19:40	18:33	16:38	32 09:29 (WEA-4 E-160)	16:23
20	05:37	06:24	07:14	08:04	07:59	08:58 (WEA-4 E-160)	08:37
	21:41	20:48	19:38	18:31	16:37	31 09:29 (WEA-4 E-160)	16:24
21	05:38	06:26	07:16	08:06	08:01	08:58 (WEA-4 E-160)	08:37
	21:40	20:46	19:36	18:28	16:36	32 09:30 (WEA-4 E-160)	16:24
22	05:40	06:27	07:17	08:08	08:02	08:58 (WEA-4 E-160)	08:38
	21:38	20:44	19:33	18:26	16:35	31 09:29 (WEA-4 E-160)	16:24
23	05:41	06:29	07:19	08:10	08:04	08:58 (WEA-4 E-160)	08:38
	21:37	20:42	19:31	18:24	16:34	32 09:30 (WEA-4 E-160)	16:25
24	05:42	06:31	07:21	08:11	08:06	08:59 (WEA-4 E-160)	08:39
	21:36	20:39	19:29	18:22	16:33	31 09:30 (WEA-4 E-160)	16:26
25	05:44	06:32	07:22	07:13	08:07	08:59 (WEA-4 E-160)	08:39
	21:34	20:37	19:27	17:20	16:32	32 09:31 (WEA-4 E-160)	16:26
26	05:45	06:34	07:24	07:15	08:09	08:59 (WEA-4 E-160)	08:40
	21:33	20:35	19:24	17:18	16:31	31 09:30 (WEA-4 E-160)	16:27
27	05:47	06:35	07:26	07:17	08:10	09:00 (WEA-4 E-160)	08:40
	21:31	20:33	19:22	17:16	16:30	30 09:30 (WEA-4 E-160)	16:28
28	05:48	06:37	07:27	07:19	08:12	09:01 (WEA-4 E-160)	08:40
	21:30	20:31	19:20	17:14	16:29	30 09:31 (WEA-4 E-160)	16:28
29	05:50	06:39	07:29	07:20	08:14	09:01 (WEA-4 E-160)	08:40
	21:28	20:29	19:17	17:12	16:28	29 09:30 (WEA-4 E-160)	16:29
30	05:51	06:40	07:31	07:22	08:15	09:02 (WEA-4 E-160)	08:40
	21:27	20:26	19:15	17:11	16:27	29 09:31 (WEA-4 E-160)	16:30
31	05:53	06:42	07:32	07:24	08:16	09:03 (WEA-4 E-160)	08:40
	21:25	20:24	19:09	17:09	16:31	37 10:03 (WEA-3 E-160)	
Sonnenscheinstunden	501	453	381	332	267	244	
astr.max.mögl.Beschattung					636		1089
Red.Sonnenscheinwahrsch.					0,23		0,15
Reduktion Betriebsdauer					0,84		0,84
Reduktion Windrichtung					0,56		0,56
Gesamte Reduktion					0,11		0,07
Met.wahrsch.Beschattung					68		76

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP219 - IP219 Helle 8

Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	09:26 (WEA-4 E-160)	08:14	09:37 (WEA-4 E-160)	07:21	07:10	06:06	05:21			
	16:32	43 10:11 (WEA-3 E-160)	17:20	25 10:02 (WEA-4 E-160)	18:11	20:05	20:56	21:41			
2	08:40	09:26 (WEA-4 E-160)	08:12	09:38 (WEA-4 E-160)	07:18	07:08	06:04	05:20			
	16:33	44 10:12 (WEA-3 E-160)	17:22	22 10:00 (WEA-4 E-160)	18:13	20:07	20:57	21:42			
3	08:40	09:27 (WEA-4 E-160)	08:11	09:39 (WEA-4 E-160)	07:16	07:06	06:02	05:19			
	16:35	43 10:12 (WEA-3 E-160)	17:24	19 09:58 (WEA-4 E-160)	18:15	20:08	20:59	21:43			
4	08:40	09:27 (WEA-4 E-160)	08:09	09:43 (WEA-4 E-160)	07:14	07:03	06:00	05:18			
	16:36	43 10:12 (WEA-3 E-160)	17:26	14 09:57 (WEA-4 E-160)	18:17	20:10	21:01	21:45			
5	08:40	09:27 (WEA-4 E-160)	08:07	09:47 (WEA-4 E-160)	07:12	07:01	05:58	05:18			
	16:37	41 10:11 (WEA-3 E-160)	17:27	5 09:52 (WEA-4 E-160)	18:19	20:12	21:02	21:46			
6	08:39	09:27 (WEA-4 E-160)	08:06		07:10	06:59	05:56	05:17			
	16:38	42 10:12 (WEA-3 E-160)	17:29		18:20	20:14	21:04	21:46			
7	08:39	09:27 (WEA-4 E-160)	08:04		07:07	06:57	05:55	05:16			
	16:39	39 10:10 (WEA-3 E-160)	17:31		18:22	20:15	21:06	21:47			
8	08:39	09:27 (WEA-4 E-160)	08:02		07:05	06:54	05:53	05:16			
	16:41	38 10:10 (WEA-3 E-160)	17:33		18:24	20:17	21:07	21:48			
9	08:38	09:27 (WEA-4 E-160)	08:00		07:03	06:52	05:51	05:15			
	16:42	31 09:58 (WEA-4 E-160)	17:35		18:26	20:19	21:09	21:49			
10	08:37	09:27 (WEA-4 E-160)	07:59		07:01	06:50	05:49	05:15			
	16:43	31 09:58 (WEA-4 E-160)	17:37		18:27	20:20	21:10	21:50			
11	08:37	09:27 (WEA-4 E-160)	07:57		06:58	06:48	05:48	05:15			
	16:45	32 09:59 (WEA-4 E-160)	17:38		18:29	20:22	21:12	21:51			
12	08:36	09:28 (WEA-4 E-160)	07:55		06:56	06:45	05:46	05:14			
	16:46	32 10:00 (WEA-4 E-160)	17:40		18:31	20:24	21:14	21:51			
13	08:36	09:28 (WEA-4 E-160)	07:53		06:54	06:43	05:44	05:14			
	16:48	33 10:01 (WEA-4 E-160)	17:42		18:33	20:25	21:15	21:52			
14	08:35	09:28 (WEA-4 E-160)	07:51		06:52	06:41	05:43	05:14			
	16:49	33 10:01 (WEA-4 E-160)	17:44		18:34	20:27	21:17	21:53			
15	08:34	09:28 (WEA-4 E-160)	07:49		06:49	06:39	05:41	05:14			
	16:51	34 10:02 (WEA-4 E-160)	17:46		18:36	20:29	21:18	21:53			
16	08:33	09:28 (WEA-4 E-160)	07:47		06:47	06:37	05:40	05:13			
	16:52	35 10:03 (WEA-4 E-160)	17:48		18:38	20:31	21:20	21:54			
17	08:32	09:28 (WEA-4 E-160)	07:45		06:45	06:34	05:38	05:13			
	16:54	35 10:03 (WEA-4 E-160)	17:50		18:39	20:32	21:21	21:54			
18	08:31	09:28 (WEA-4 E-160)	07:43		06:42	06:32	05:37	05:13			
	16:56	36 10:04 (WEA-4 E-160)	17:51		18:41	20:34	21:23	21:55			
19	08:30	09:29 (WEA-4 E-160)	07:41		06:40	06:30	05:35	05:13			
	16:57	35 10:04 (WEA-4 E-160)	17:53		18:43	20:36	21:24	21:55			
20	08:29	09:28 (WEA-4 E-160)	07:39		06:38	06:28	05:34	05:13			
	16:59	36 10:04 (WEA-4 E-160)	17:55		18:45	20:37	21:26	21:55			
21	08:28	09:29 (WEA-4 E-160)	07:37		06:36	06:26	05:33	05:14			
	17:01	35 10:04 (WEA-4 E-160)	17:57		18:46	20:39	21:27	21:55			
22	08:27	09:29 (WEA-4 E-160)	07:35		06:33	06:24	05:31	05:14			
	17:02	36 10:05 (WEA-4 E-160)	17:59		18:48	20:41	21:29	21:56			
23	08:26	09:29 (WEA-4 E-160)	07:33		06:31	06:22	05:30	05:14			
	17:04	35 10:04 (WEA-4 E-160)	18:01		18:50	20:42	21:30	21:56			
24	08:25	09:30 (WEA-4 E-160)	07:31		06:29	06:20	05:29	05:14			
	17:06	35 10:05 (WEA-4 E-160)	18:02		18:51	20:44	21:31	21:56			
25	08:24	09:31 (WEA-4 E-160)	07:29		06:26	06:18	05:28	05:15			
	17:07	34 10:05 (WEA-4 E-160)	18:04		18:53	20:46	21:33	21:56			
26	08:22	09:31 (WEA-4 E-160)	07:27		06:24	06:16	05:27	05:15			
	17:09	34 10:05 (WEA-4 E-160)	18:06		18:55	20:47	21:34	21:56			
27	08:21	09:32 (WEA-4 E-160)	07:25		06:22	06:14	05:25	05:15			
	17:11	33 10:05 (WEA-4 E-160)	18:08		18:57	20:49	21:35	21:56			
28	08:20	09:32 (WEA-4 E-160)	07:23		06:19	06:12	05:24	05:16			
	17:13	32 10:04 (WEA-4 E-160)	18:10		18:58	20:51	21:37	21:56			
29	08:18	09:34 (WEA-4 E-160)			07:17	06:10	05:23	05:17			
	17:15	30 10:04 (WEA-4 E-160)			20:00	20:52	21:38	21:56			
30	08:17	09:34 (WEA-4 E-160)			07:15	06:08	05:22	05:17			
	17:16	29 10:03 (WEA-4 E-160)			20:02	20:54	21:39	21:55			
31	08:15	09:35 (WEA-4 E-160)			07:12		05:22				
	17:18	27 10:02 (WEA-4 E-160)			20:03		21:40				
	Sonnenscheinstunden	259	278	367	416	485	498				
	astr.max.mögl.Beschattung	1096	85								
	Red.Sonnenscheinwahrsch.	0,20	0,30								
	Reduktion Betriebsdauer	0,84	0,84								
	Reduktion Windrichtung	0,56	0,56								
	Gesamte Reduktion	0,09	0,14								
	Met.wahrsch.Beschattung	101	12								

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP219 - IP219 Helle 8

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1	05:18	05:54	06:43	07:32	07:26	08:16	09:09 (WEA-4 E-160)
	21:55	21:24	20:22	19:13	17:07	16:27	32 09:41 (WEA-4 E-160)
2	05:18	05:56	06:45	07:34	07:27	08:18	09:10 (WEA-4 E-160)
	21:55	21:22	20:20	19:10	17:05	16:26	31 09:41 (WEA-4 E-160)
3	05:19	05:57	06:47	07:36	07:29	08:19	09:10 (WEA-4 E-160)
	21:55	21:20	20:17	19:08	17:03	16:25	31 09:41 (WEA-4 E-160)
4	05:20	05:59	06:48	07:37	07:31	08:21	09:11 (WEA-4 E-160)
	21:54	21:19	20:15	19:06	17:01	16:25	39 09:54 (WEA-3 E-160)
5	05:21	06:00	06:50	07:39	07:33	08:22	09:12 (WEA-4 E-160)
	21:54	21:17	20:13	19:03	17:00	16:24	39 09:55 (WEA-3 E-160)
6	05:22	06:02	06:52	07:41	07:35	09:16 (WEA-4 E-160)	08:23 09:13 (WEA-4 E-160)
	21:53	21:15	20:11	19:01	16:58	7 09:23 (WEA-4 E-160)	42 09:58 (WEA-3 E-160)
7	05:22	06:03	06:53	07:42	07:36	09:12 (WEA-4 E-160)	08:24 09:14 (WEA-4 E-160)
	21:53	21:13	20:08	18:59	16:56	15 09:27 (WEA-4 E-160)	42 09:58 (WEA-3 E-160)
8	05:23	06:05	06:55	07:44	07:38	09:10 (WEA-4 E-160)	08:26 09:14 (WEA-4 E-160)
	21:52	21:11	20:06	18:57	16:55	19 09:29 (WEA-4 E-160)	43 09:59 (WEA-3 E-160)
9	05:24	06:06	06:56	07:46	07:40	09:09 (WEA-4 E-160)	08:27 09:15 (WEA-4 E-160)
	21:51	21:10	20:04	18:54	16:53	22 09:31 (WEA-4 E-160)	43 10:00 (WEA-3 E-160)
10	05:25	06:08	06:58	07:47	07:42	09:07 (WEA-4 E-160)	08:28 09:17 (WEA-4 E-160)
	21:51	21:08	20:01	18:52	16:51	26 09:33 (WEA-4 E-160)	43 10:02 (WEA-3 E-160)
11	05:26	06:10	07:00	07:49	07:44	09:07 (WEA-4 E-160)	08:29 09:17 (WEA-4 E-160)
	21:50	21:06	19:59	18:50	16:50	27 09:34 (WEA-4 E-160)	44 10:03 (WEA-3 E-160)
12	05:27	06:11	07:01	07:51	07:45	09:06 (WEA-4 E-160)	08:30 09:18 (WEA-4 E-160)
	21:49	21:04	19:57	18:48	16:48	29 09:35 (WEA-4 E-160)	43 10:03 (WEA-3 E-160)
13	05:28	06:13	07:03	07:52	07:47	09:05 (WEA-4 E-160)	08:31 09:19 (WEA-4 E-160)
	21:48	21:02	19:54	18:46	16:47	31 09:36 (WEA-4 E-160)	43 10:04 (WEA-3 E-160)
14	05:30	06:14	07:04	07:54	07:49	09:05 (WEA-4 E-160)	08:32 09:20 (WEA-4 E-160)
	21:47	21:00	19:52	18:43	16:45	32 09:37 (WEA-4 E-160)	43 10:05 (WEA-3 E-160)
15	05:31	06:16	07:06	07:56	07:51	09:04 (WEA-4 E-160)	08:33 09:20 (WEA-4 E-160)
	21:46	20:58	19:50	18:41	16:44	33 09:37 (WEA-4 E-160)	42 10:05 (WEA-3 E-160)
16	05:32	06:18	07:08	07:57	07:52	09:04 (WEA-4 E-160)	08:34 09:20 (WEA-4 E-160)
	21:45	20:56	19:47	18:39	16:42	33 09:37 (WEA-4 E-160)	43 10:05 (WEA-3 E-160)
17	05:33	06:19	07:09	07:59	07:54	09:04 (WEA-4 E-160)	08:35 09:21 (WEA-4 E-160)
	21:44	20:54	19:45	18:37	16:41	34 09:38 (WEA-4 E-160)	42 10:06 (WEA-3 E-160)
18	05:34	06:21	07:11	08:01	07:56	09:04 (WEA-4 E-160)	08:35 09:22 (WEA-4 E-160)
	21:43	20:52	19:43	18:35	16:40	35 09:39 (WEA-4 E-160)	43 10:07 (WEA-3 E-160)
19	05:36	06:22	07:13	08:03	07:57	09:04 (WEA-4 E-160)	08:36 09:23 (WEA-4 E-160)
	21:42	20:50	19:40	18:33	16:38	35 09:39 (WEA-4 E-160)	42 10:08 (WEA-3 E-160)
20	05:37	06:24	07:14	08:04	07:59	09:04 (WEA-4 E-160)	08:37 09:23 (WEA-4 E-160)
	21:41	20:48	19:38	18:31	16:37	36 09:40 (WEA-4 E-160)	42 10:08 (WEA-3 E-160)
21	05:38	06:26	07:16	08:06	08:01	09:05 (WEA-4 E-160)	08:37 09:24 (WEA-4 E-160)
	21:39	20:46	19:36	18:28	16:36	35 09:40 (WEA-4 E-160)	42 10:09 (WEA-3 E-160)
22	05:40	06:27	07:17	08:08	08:02	09:04 (WEA-4 E-160)	08:38 09:24 (WEA-4 E-160)
	21:38	20:44	19:33	18:26	16:35	36 09:40 (WEA-4 E-160)	42 10:09 (WEA-3 E-160)
23	05:41	06:29	07:19	08:10	08:04	09:05 (WEA-4 E-160)	08:38 09:25 (WEA-4 E-160)
	21:37	20:42	19:31	18:24	16:34	35 09:40 (WEA-4 E-160)	42 10:10 (WEA-3 E-160)
24	05:42	06:31	07:21	08:11	08:06	09:05 (WEA-4 E-160)	08:39 09:25 (WEA-4 E-160)
	21:36	20:39	19:29	18:22	16:33	36 09:41 (WEA-4 E-160)	42 10:10 (WEA-3 E-160)
25	05:44	06:32	07:22	07:13	08:07	09:06 (WEA-4 E-160)	08:39 09:25 (WEA-4 E-160)
	21:34	20:37	19:27	17:20	16:32	35 09:41 (WEA-4 E-160)	43 10:10 (WEA-3 E-160)
26	05:45	06:34	07:24	07:15	08:09	09:06 (WEA-4 E-160)	08:40 09:26 (WEA-4 E-160)
	21:33	20:35	19:24	17:18	16:31	35 09:41 (WEA-4 E-160)	43 10:11 (WEA-3 E-160)
27	05:47	06:35	07:26	07:17	08:10	09:07 (WEA-4 E-160)	08:40 09:26 (WEA-4 E-160)
	21:31	20:33	19:22	17:16	16:30	34 09:41 (WEA-4 E-160)	43 10:11 (WEA-3 E-160)
28	05:48	06:37	07:27	07:19	08:12	09:08 (WEA-4 E-160)	08:40 09:26 (WEA-4 E-160)
	21:30	20:31	19:20	17:14	16:29	33 09:41 (WEA-4 E-160)	43 10:11 (WEA-3 E-160)
29	05:50	06:39	07:29	07:20	08:13	09:08 (WEA-4 E-160)	08:40 09:26 (WEA-4 E-160)
	21:28	20:29	19:17	17:12	16:28	33 09:41 (WEA-4 E-160)	44 10:12 (WEA-3 E-160)
30	05:51	06:40	07:31	07:22	08:15	09:09 (WEA-4 E-160)	08:40 09:27 (WEA-4 E-160)
	21:27	20:26	19:15	17:11	16:27	32 09:41 (WEA-4 E-160)	43 10:12 (WEA-3 E-160)
31	05:52	06:42	07:32	07:24	08:16	09:10 (WEA-4 E-160)	08:40 09:27 (WEA-4 E-160)
	21:25	20:24	19:09	17:09	16:31	43 10:12 (WEA-3 E-160)	
Sonnenscheinstunden	501	453	381	332	267	244	
astr.max.mögl.Beschattung					758		1282
Red.Sonnenscheinwahrsch.					0,23		0,15
Reduktion Betriebsdauer					0,84		0,84
Reduktion Windrichtung					0,56		0,56
Gesamte Reduktion					0,11		0,07
Met.wahrsch.Beschattung					82		89

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP220 - IP220 Helle 14

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

Januar		Februar		März		April		Mai		Juni	
1	08:40	10:07 (WEA-4 E-160)	08:14	07:21		07:10		07:44 (WEA-5 E-160)	06:06	05:21	
	16:32	43 10:50 (WEA-4 E-160)	17:20	18:11		20:05	22	08:06 (WEA-5 E-160)	20:56	21:41	
2	08:40	10:07 (WEA-4 E-160)	08:12	07:18		07:08		07:43 (WEA-5 E-160)	06:04	05:20	
	16:33	44 10:51 (WEA-4 E-160)	17:22	18:13		20:07	22	08:05 (WEA-5 E-160)	20:57	21:42	
3	08:40	10:08 (WEA-4 E-160)	08:11	07:16		07:06		07:44 (WEA-5 E-160)	06:02	05:19	
	16:35	44 10:52 (WEA-4 E-160)	17:24	18:15		20:08	20	08:04 (WEA-5 E-160)	20:59	21:43	
4	08:40	10:09 (WEA-4 E-160)	08:09	07:14		07:03		07:45 (WEA-5 E-160)	06:00	05:18	
	16:36	44 10:53 (WEA-4 E-160)	17:25	18:17		20:10	18	08:03 (WEA-5 E-160)	21:01	21:44	
5	08:40	10:09 (WEA-4 E-160)	08:07	07:12		07:01		07:47 (WEA-5 E-160)	05:58	05:18	
	16:37	43 10:52 (WEA-4 E-160)	17:27	18:18		20:12	14	08:01 (WEA-5 E-160)	21:02	21:45	
6	08:39	10:10 (WEA-4 E-160)	08:06	07:10		06:59		07:48 (WEA-5 E-160)	05:56	05:17	
	16:38	43 10:53 (WEA-4 E-160)	17:29	18:20		20:14	9	07:57 (WEA-5 E-160)	21:04	21:46	
7	08:39	10:10 (WEA-4 E-160)	08:04	07:07		06:57			05:55	05:16	
	16:39	43 10:53 (WEA-4 E-160)	17:31	18:22		20:15			21:06	21:47	
8	08:38	10:11 (WEA-4 E-160)	08:02	07:05		06:54			05:53	05:16	
	16:41	43 10:54 (WEA-4 E-160)	17:33	18:24		20:17			21:07	21:48	
9	08:38	10:11 (WEA-4 E-160)	08:00	07:03		06:52			05:51	05:15	
	16:42	43 10:54 (WEA-4 E-160)	17:35	18:26		20:19			21:09	21:49	
10	08:37	10:11 (WEA-4 E-160)	07:59	07:01		06:50			05:49	05:15	
	16:43	43 10:54 (WEA-4 E-160)	17:37	18:27		20:20			21:10	21:50	
11	08:37	10:11 (WEA-4 E-160)	07:57	06:58		06:48			05:48	05:15	
	16:45	43 10:54 (WEA-4 E-160)	17:38	18:29		20:22			21:12	21:51	
12	08:36	10:13 (WEA-4 E-160)	07:55	06:56		06:45			05:46	05:14	
	16:46	42 10:55 (WEA-4 E-160)	17:40	18:31		20:24			21:14	21:51	
13	08:36	10:13 (WEA-4 E-160)	07:53	06:54		06:43			05:44	05:14	
	16:48	42 10:55 (WEA-4 E-160)	17:42	18:33		20:25			21:15	21:52	
14	08:35	10:14 (WEA-4 E-160)	07:51	06:52		06:41			05:43	05:14	
	16:49	41 10:55 (WEA-4 E-160)	17:44	18:34		20:27			21:17	21:53	
15	08:34	10:14 (WEA-4 E-160)	07:49	06:49		06:39			05:41	05:14	
	16:51	41 10:55 (WEA-4 E-160)	17:46	18:36		20:29			21:18	21:53	
16	08:33	10:15 (WEA-4 E-160)	07:47	06:47		06:37			05:40	05:13	
	16:52	40 10:55 (WEA-4 E-160)	17:48	18:38		20:30			21:20	21:54	
17	08:32	10:16 (WEA-4 E-160)	07:45	06:45		06:34			05:38	05:13	
	16:54	39 10:55 (WEA-4 E-160)	17:50	18:39		20:32			21:21	21:54	
18	08:31	10:16 (WEA-4 E-160)	07:43	06:42		06:32			05:37	05:13	
	16:56	39 10:55 (WEA-4 E-160)	17:51	18:41		20:34			21:23	21:55	
19	08:30	10:17 (WEA-4 E-160)	07:41	06:40		06:30			05:35	05:13	
	16:57	38 10:55 (WEA-4 E-160)	17:53	18:43		20:36			21:24	21:55	
20	08:29	10:18 (WEA-4 E-160)	07:39	06:38		06:28			05:34	05:13	
	16:59	36 10:54 (WEA-4 E-160)	17:55	18:45		20:37			21:26	21:55	
21	08:28	10:19 (WEA-4 E-160)	07:37	06:36		06:26			05:33	05:14	
	17:01	35 10:54 (WEA-4 E-160)	17:57	18:46		20:39			21:27	21:55	
22	08:27	10:20 (WEA-4 E-160)	07:35	06:33		06:24			05:31	05:14	
	17:02	34 10:54 (WEA-4 E-160)	17:59	18:48		20:41			21:29	21:56	
23	08:26	10:21 (WEA-4 E-160)	07:33	06:31		06:22		06:57 (WEA-5 E-160)	05:30	05:14	
	17:04	31 10:52 (WEA-4 E-160)	18:01	18:50	1	20:42		06:58 (WEA-5 E-160)	21:30	21:56	
24	08:25	10:22 (WEA-4 E-160)	07:31	06:29		06:20		06:51 (WEA-5 E-160)	05:29	05:14	
	17:06	30 10:52 (WEA-4 E-160)	18:02	18:51	12	20:44		07:03 (WEA-5 E-160)	21:31	21:56	
25	08:23	10:24 (WEA-4 E-160)	07:29	06:26		06:18		06:49 (WEA-5 E-160)	05:28	05:15	
	17:07	27 10:51 (WEA-4 E-160)	18:04	18:53	16	20:46		07:05 (WEA-5 E-160)	21:33	21:56	
26	08:22	10:25 (WEA-4 E-160)	07:27	06:24		06:16		06:47 (WEA-5 E-160)	05:27	05:15	
	17:09	25 10:50 (WEA-4 E-160)	18:06	18:55	18	20:47		07:05 (WEA-5 E-160)	21:34	21:56	
27	08:21	10:28 (WEA-4 E-160)	07:25	06:22		06:14		06:46 (WEA-5 E-160)	05:25	05:15	
	17:11	20 10:48 (WEA-4 E-160)	18:08	18:57	20	20:49		07:06 (WEA-5 E-160)	21:35	21:56	
28	08:20	10:30 (WEA-4 E-160)	07:23	06:19		06:12		06:45 (WEA-5 E-160)	05:24	05:16	
	17:13	16 10:46 (WEA-4 E-160)	18:10	18:58	22	20:51		07:07 (WEA-5 E-160)	21:37	21:56	
29	08:18	10:35 (WEA-4 E-160)		07:17		06:10		07:45 (WEA-5 E-160)	05:23	05:16	
	17:15	7 10:42 (WEA-4 E-160)		20:00	22	20:52		08:07 (WEA-5 E-160)	21:38	21:56	
30	08:17			07:15		06:08		07:44 (WEA-5 E-160)	05:22	05:17	
	17:16			20:02	23	20:54		08:07 (WEA-5 E-160)	21:39	21:55	
31	08:15			07:12				07:44 (WEA-5 E-160)	05:22		
	17:18			20:03	22			08:06 (WEA-5 E-160)	21:40		
Sonnenscheinstunden	259		278	367		416			485	498	
astr.max.mögl.Beschattung	1059			156		105					
Red.Sonnenscheinwahrsch.	0,20			0,30		0,41					
Reduktion Betriebsdauer	0,84			0,84		0,84					
Reduktion Windrichtung	0,57			0,67		0,67					
Gesamte Reduktion	0,09			0,17		0,23					
Met.wahrsch.Beschattung	97			26		24					

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP220 - IP220 Helle 14

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan	Feb	Mär	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
1,64	3,01	3,53	5,65	7,16	6,01	6,70	6,24	4,57	3,38	2,03	1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember	
1	05:18	05:54	06:43	07:32	07:26	08:16	09:53 (WEA-4 E-160)
	21:55	21:24	20:22	19:13	17:07	16:27	43 10:36 (WEA-4 E-160)
2	05:18	05:56	06:45	07:34	07:27	08:18	09:54 (WEA-4 E-160)
	21:55	21:22	20:20	19:10	17:05	16:26	43 10:37 (WEA-4 E-160)
3	05:19	05:57	06:47	07:35	07:29	08:19	09:54 (WEA-4 E-160)
	21:55	21:20	20:17	19:08	17:03	16:25	43 10:37 (WEA-4 E-160)
4	05:20	05:59	06:48	07:37	07:31	08:21	09:55 (WEA-4 E-160)
	21:54	21:19	20:15	19:06	17:01	16:25	43 10:38 (WEA-4 E-160)
5	05:21	06:00	06:50	07:39	07:33	08:22	09:55 (WEA-4 E-160)
	21:54	21:17	20:13	19:03	17:00	16:24	43 10:38 (WEA-4 E-160)
6	05:21	06:02	06:52	07:44 (WEA-5 E-160)	07:40	07:35	08:23
	21:53	21:15	20:11	9 07:53 (WEA-5 E-160)	19:01	16:58	43 10:39 (WEA-4 E-160)
7	05:22	06:03	06:53	07:42 (WEA-5 E-160)	07:42	07:36	08:24
	21:53	21:13	20:08	14 07:56 (WEA-5 E-160)	18:59	16:56	44 10:40 (WEA-4 E-160)
8	05:23	06:05	06:55	07:39 (WEA-5 E-160)	07:44	07:38	08:26
	21:52	21:11	20:06	18 07:57 (WEA-5 E-160)	18:57	16:54	44 10:40 (WEA-4 E-160)
9	05:24	06:06	06:56	07:38 (WEA-5 E-160)	07:46	07:40	08:27
	21:51	21:10	20:04	20 07:58 (WEA-5 E-160)	18:54	16:53	44 10:40 (WEA-4 E-160)
10	05:25	06:08	06:58	07:37 (WEA-5 E-160)	07:47	07:42	08:28
	21:51	21:08	20:01	21 07:58 (WEA-5 E-160)	18:52	16:51	44 10:41 (WEA-4 E-160)
11	05:26	06:10	07:00	07:36 (WEA-5 E-160)	07:49	07:44	08:29
	21:50	21:06	19:59	22 07:58 (WEA-5 E-160)	18:50	16:50	44 10:42 (WEA-4 E-160)
12	05:27	06:11	07:01	07:36 (WEA-5 E-160)	07:51	07:45	08:30
	21:49	21:04	19:57	23 07:59 (WEA-5 E-160)	18:48	16:48	44 10:42 (WEA-4 E-160)
13	05:28	06:13	07:03	07:35 (WEA-5 E-160)	07:52	07:47	08:31
	21:48	21:02	19:54	23 07:58 (WEA-5 E-160)	18:46	16:47	44 10:42 (WEA-4 E-160)
14	05:30	06:14	07:04	07:35 (WEA-5 E-160)	07:54	07:49	08:32
	21:47	21:00	19:52	23 07:58 (WEA-5 E-160)	18:43	16:45	44 10:43 (WEA-4 E-160)
15	05:31	06:16	07:06	07:35 (WEA-5 E-160)	07:56	07:51	08:33
	21:46	20:58	19:50	21 07:56 (WEA-5 E-160)	18:41	16:44	44 10:43 (WEA-4 E-160)
16	05:32	06:18	07:08	07:35 (WEA-5 E-160)	07:57	07:52	08:34
	21:45	20:56	19:47	21 07:56 (WEA-5 E-160)	18:39	16:42	44 10:43 (WEA-4 E-160)
17	05:33	06:19	07:09	07:35 (WEA-5 E-160)	07:59	07:54	08:35
	21:44	20:54	19:45	19 07:54 (WEA-5 E-160)	18:37	16:41	44 10:44 (WEA-4 E-160)
18	05:34	06:21	07:11	07:36 (WEA-5 E-160)	08:01	07:56	08:35
	21:43	20:52	19:43	17 07:53 (WEA-5 E-160)	18:35	16:40	43 10:44 (WEA-4 E-160)
19	05:36	06:22	07:13	07:38 (WEA-5 E-160)	08:03	07:57	08:36
	21:42	20:50	19:40	13 07:51 (WEA-5 E-160)	18:33	16:38	44 10:45 (WEA-4 E-160)
20	05:37	06:24	07:14	07:41 (WEA-5 E-160)	08:04	07:59	08:37
	21:41	20:48	19:38	6 07:47 (WEA-5 E-160)	18:31	16:37	44 10:45 (WEA-4 E-160)
21	05:38	06:26	07:16	08:06	08:01	07:55	08:37
	21:39	20:46	19:36	18:28	16:36	35 10:30 (WEA-4 E-160)	44 10:46 (WEA-4 E-160)
22	05:40	06:27	07:17	08:08	08:02	07:54	08:38
	21:38	20:44	19:33	18:26	16:35	36 10:30 (WEA-4 E-160)	44 10:46 (WEA-4 E-160)
23	05:41	06:29	07:19	08:10	08:04	07:53	08:38
	21:37	20:42	19:31	18:24	16:34	38 10:31 (WEA-4 E-160)	44 10:47 (WEA-4 E-160)
24	05:42	06:30	07:21	08:11	08:06	07:54	08:39
	21:36	20:39	19:29	18:22	16:33	38 10:32 (WEA-4 E-160)	44 10:47 (WEA-4 E-160)
25	05:44	06:32	07:22	07:13	08:07	07:54	08:39
	21:34	20:37	19:26	17:20	16:32	39 10:33 (WEA-4 E-160)	44 10:47 (WEA-4 E-160)
26	05:45	06:34	07:24	07:15	08:09	07:53	08:39
	21:33	20:35	19:24	17:18	16:31	40 10:33 (WEA-4 E-160)	43 10:48 (WEA-4 E-160)
27	05:47	06:35	07:26	07:17	08:10	07:53	08:40
	21:31	20:33	19:22	17:16	16:30	41 10:34 (WEA-4 E-160)	44 10:49 (WEA-4 E-160)
28	05:48	06:37	07:27	07:19	08:12	07:54	08:40
	21:30	20:31	19:20	17:14	16:29	41 10:35 (WEA-4 E-160)	44 10:49 (WEA-4 E-160)
29	05:50	06:39	07:29	07:20	08:13	07:53	08:40
	21:28	20:28	19:17	17:12	16:28	42 10:35 (WEA-4 E-160)	44 10:50 (WEA-4 E-160)
30	05:51	06:40	07:31	07:22	08:15	07:54	08:40
	21:27	20:26	19:15	17:11	16:27	42 10:36 (WEA-4 E-160)	44 10:50 (WEA-4 E-160)
31	05:52	06:42		07:24		08:40	10:07 (WEA-4 E-160)
	21:25	20:24		17:09		16:31	44 10:51 (WEA-4 E-160)
Sonnenscheinstunden	501	453	381	332	267	244	
astr. max. mögl. Beschattung			270		583		1356
Red. Sonnenscheinwahrsch.			0,36		0,23		0,15
Reduktion Betriebsdauer			0,84		0,84		0,84
Reduktion Windrichtung			0,67		0,57		0,57
Gesamte Reduktion			0,20		0,11		0,07
Met. wahrsch. Beschattung			54		62		94

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP227 - IP227 Steenkuhlenweg 41

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März	April	Mai	Juni		
1	08:40	08:14	07:21	07:10	07:46 (WEA-1)	06:06	05:21	06:07 (WEA-3 E-160)
	16:33	17:20	18:11	20:05	27 08:13 (WEA-1)	20:56	21:41	34 06:41 (WEA-3 E-160)
2	08:40	08:12	07:18	07:08	07:45 (WEA-1)	06:04	05:20	06:08 (WEA-3 E-160)
	16:34	17:22	18:13	20:07	27 08:12 (WEA-1)	20:57	21:42	34 06:42 (WEA-3 E-160)
3	08:40	08:11	07:16	07:06	07:44 (WEA-1)	06:02	05:19	06:08 (WEA-3 E-160)
	16:35	17:24	18:15	20:08	29 08:13 (WEA-1)	20:59	21:43	34 06:42 (WEA-3 E-160)
4	08:40	08:09	07:14	07:03	07:44 (WEA-1)	06:00	05:18	06:07 (WEA-3 E-160)
	16:36	17:26	18:17	20:10	29 08:13 (WEA-1)	21:01	21:44	35 06:42 (WEA-3 E-160)
5	08:40	08:07	07:12	07:01	07:26 (WEA-2 E-138)	05:58	05:18	06:08 (WEA-3 E-160)
	16:37	17:27	18:19	20:12	33 08:13 (WEA-1)	21:02	21:45	35 06:43 (WEA-3 E-160)
6	08:39	08:06	07:10	06:59	07:22 (WEA-2 E-138)	05:56	05:17	06:08 (WEA-3 E-160)
	16:38	17:29	18:20	20:14	39 08:11 (WEA-1)	21:04	21:46	35 06:43 (WEA-3 E-160)
7	08:39	08:04	07:07	06:57	07:20 (WEA-2 E-138)	05:55	05:17	06:08 (WEA-3 E-160)
	16:39	17:31	18:22	20:15	41 08:11 (WEA-1)	21:06	21:47	35 06:43 (WEA-3 E-160)
8	08:38	08:02	07:05	06:54	07:19 (WEA-2 E-138)	05:53	05:16	06:08 (WEA-3 E-160)
	16:41	17:33	18:24	20:17	42 08:10 (WEA-1)	21:07	21:48	35 06:43 (WEA-3 E-160)
9	08:38	08:00	07:03	06:52	07:18 (WEA-2 E-138)	05:51	05:16	06:09 (WEA-3 E-160)
	16:42	17:35	18:26	20:19	42 08:09 (WEA-1)	21:09	21:49	34 06:43 (WEA-3 E-160)
10	08:37	07:59	07:01	06:50	07:17 (WEA-2 E-138)	05:49	05:15	06:09 (WEA-3 E-160)
	16:43	17:37	18:27	20:20	41 08:08 (WEA-1)	21:10	21:50	35 06:44 (WEA-3 E-160)
11	08:37	07:57	06:58	06:48	07:16 (WEA-2 E-138)	05:48	05:15	06:09 (WEA-3 E-160)
	16:45	17:39	18:29	20:22	39 08:06 (WEA-1)	21:12	21:51	34 06:43 (WEA-3 E-160)
12	08:36	07:55	06:56	06:45	07:16 (WEA-2 E-138)	05:46	05:14	06:09 (WEA-3 E-160)
	16:46	17:40	18:31	20:24	35 08:04 (WEA-1)	21:14	21:51	35 06:44 (WEA-3 E-160)
13	08:36	07:53	06:54	06:43	07:16 (WEA-2 E-138)	05:45	05:14	06:10 (WEA-3 E-160)
	16:48	17:42	18:33	20:25	30 08:01 (WEA-1)	21:15	21:52	34 06:44 (WEA-3 E-160)
14	08:35	07:51	06:52	06:41	07:16 (WEA-2 E-138)	05:43	05:14	06:10 (WEA-3 E-160)
	16:49	17:44	18:34	20:27	18 07:34 (WEA-2 E-138)	21:17	21:53	34 06:44 (WEA-3 E-160)
15	08:34	07:49	06:49	06:39	07:17 (WEA-2 E-138)	05:41	05:14	06:10 (WEA-3 E-160)
	16:51	17:46	18:36	20:29	16 07:33 (WEA-2 E-138)	21:18	10 06:28 (WEA-3 E-160)	21:53 35 06:45 (WEA-3 E-160)
16	08:33	07:47	06:47	06:37	07:18 (WEA-2 E-138)	05:40	05:14	06:11 (WEA-3 E-160)
	16:52	17:48	18:38	20:30	14 07:32 (WEA-2 E-138)	21:20	15 06:31 (WEA-3 E-160)	21:54 34 06:45 (WEA-3 E-160)
17	08:32	07:45	06:45	06:34	07:20 (WEA-2 E-138)	05:38	05:13	06:11 (WEA-3 E-160)
	16:54	17:50	18:40	20:32	10 07:30 (WEA-2 E-138)	21:21	19 06:33 (WEA-3 E-160)	21:54 34 06:45 (WEA-3 E-160)
18	08:31	07:43	06:42	06:32	05:37	05:37	05:13	06:11 (WEA-3 E-160)
	16:56	17:51	18:41	20:34	21:23	22 06:34 (WEA-3 E-160)	21:54 34 06:45 (WEA-3 E-160)	
19	08:30	07:41	06:40	06:30	05:36	05:36	05:13	06:11 (WEA-3 E-160)
	16:57	17:53	18:43	20:36	21:24	23 06:35 (WEA-3 E-160)	21:55 34 06:45 (WEA-3 E-160)	
20	08:29	07:39	06:38	06:28	05:34	05:34	05:14	06:11 (WEA-3 E-160)
	16:59	17:55	18:45	20:37	21:26	25 06:36 (WEA-3 E-160)	21:55 34 06:45 (WEA-3 E-160)	
21	08:28	07:37	06:36	06:26	05:33	05:33	05:14	06:11 (WEA-3 E-160)
	17:01	17:57	18:46	20:39	21:27	27 06:37 (WEA-3 E-160)	21:55 34 06:45 (WEA-3 E-160)	
22	08:27	07:35	06:33	06:24	05:31	05:31	05:14	06:11 (WEA-3 E-160)
	17:02	17:59	18:48	20:41	21:29	28 06:38 (WEA-3 E-160)	21:56 34 06:45 (WEA-3 E-160)	
23	08:26	07:33	06:31	06:22	05:30	05:30	05:14	06:12 (WEA-3 E-160)
	17:04	18:01	18:50	20:42	21:30	29 06:38 (WEA-3 E-160)	21:56 34 06:46 (WEA-3 E-160)	
24	08:25	07:31	06:29	06:20	05:29	05:29	05:14	06:12 (WEA-3 E-160)
	17:06	18:02	18:51	20:44	21:31	30 06:38 (WEA-3 E-160)	21:56 34 06:46 (WEA-3 E-160)	
25	08:23	07:29	06:26	06:18	05:28	05:28	05:15	06:12 (WEA-3 E-160)
	17:08	18:04	18:53	20:46	21:33	31 06:39 (WEA-3 E-160)	21:56 34 06:46 (WEA-3 E-160)	
26	08:22	07:27	06:24	06:16	05:27	05:27	05:15	06:13 (WEA-3 E-160)
	17:09	18:06	18:55	20:47	21:34	31 06:39 (WEA-3 E-160)	21:56 34 06:47 (WEA-3 E-160)	
27	08:21	07:25	06:22	06:14	05:26	05:26	05:16	06:12 (WEA-3 E-160)
	17:11	18:08	18:57	12 07:07 (WEA-1)	20:49	21:35	33 06:40 (WEA-3 E-160)	21:56 35 06:47 (WEA-3 E-160)
28	08:19	07:23	06:19	06:12	05:25	05:25	05:16	06:13 (WEA-3 E-160)
	17:13	18:10	18:58	17 07:09 (WEA-1)	20:51	21:36	33 06:40 (WEA-3 E-160)	21:56 34 06:47 (WEA-3 E-160)
29	08:18	07:17	06:10	06:10	05:24	05:24	05:17	06:13 (WEA-3 E-160)
	17:15	18:12	19:00	21 08:11 (WEA-1)	20:52	21:38	33 06:41 (WEA-3 E-160)	21:56 34 06:47 (WEA-3 E-160)
30	08:17	07:15	06:08	06:08	05:23	05:23	05:17	06:13 (WEA-3 E-160)
	17:16	18:12	19:00	23 08:11 (WEA-1)	20:54	21:39	33 06:41 (WEA-3 E-160)	21:55 35 06:48 (WEA-3 E-160)
31	08:15	07:13	06:07	06:07	05:22	05:22	05:17	06:13 (WEA-3 E-160)
	17:18	18:14	19:02	25 08:12 (WEA-1)	20:56	21:40	33 06:41 (WEA-3 E-160)	21:56 35 06:48 (WEA-3 E-160)
Sonnenscheinstunden	260	278	367	416	485	498		
astr.max.mögl.Beschattung			98	512	455	1030		
Red.Sonnenscheinwahrsch.			0,30	0,41	0,46	0,36		
Reduktion Betriebsdauer			0,84	0,84	0,84	0,84		
Reduktion Windrichtung			0,67	0,68	0,72	0,72		
Gesamte Reduktion			0,17	0,23	0,28	0,22		
Met.wahrsch.Beschattung			17	119	126	225		

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP227 - IP227 Steenkühlenweg 41

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	July	August	September	Oktober	November	Dezember			
1	05:18	06:13 (WEA-3 E-160)	05:54	06:44	07:15 (WEA-2 E-138)	07:32	07:26	08:16	
	21:55	34 06:47 (WEA-3 E-160)	21:24	20:22	39 08:05 (WEA-1)	19:13	17:07	16:27	
2	05:18	06:13 (WEA-3 E-160)	05:56	06:45	07:15 (WEA-2 E-138)	07:34	07:27	08:18	
	21:55	35 06:48 (WEA-3 E-160)	21:22	20:20	41 08:06 (WEA-1)	19:10	17:05	16:26	
3	05:19	06:14 (WEA-3 E-160)	05:57	06:47	07:16 (WEA-2 E-138)	07:36	07:29	08:19	
	21:54	35 06:49 (WEA-3 E-160)	21:20	20:17	42 08:07 (WEA-1)	19:08	17:03	16:25	
4	05:20	06:13 (WEA-3 E-160)	05:59	06:48	07:16 (WEA-2 E-138)	07:37	07:31	08:21	
	21:54	35 06:48 (WEA-3 E-160)	21:19	20:15	42 08:07 (WEA-1)	19:06	17:01	16:25	
5	05:21	06:14 (WEA-3 E-160)	06:00	06:50	07:17 (WEA-2 E-138)	07:39	07:33	08:22	
	21:54	34 06:48 (WEA-3 E-160)	21:17	20:13	41 08:08 (WEA-1)	19:04	17:00	16:24	
6	05:22	06:14 (WEA-3 E-160)	06:02	06:52	07:18 (WEA-2 E-138)	07:41	07:35	08:23	
	21:53	35 06:49 (WEA-3 E-160)	21:15	20:11	38 08:07 (WEA-1)	19:01	16:58	16:24	
7	05:22	06:14 (WEA-3 E-160)	06:03	06:53	07:21 (WEA-2 E-138)	07:42	07:36	08:24	
	21:52	35 06:49 (WEA-3 E-160)	21:13	20:08	34 08:08 (WEA-1)	18:59	16:56	16:24	
8	05:23	06:15 (WEA-3 E-160)	06:05	06:55	07:38 (WEA-1)	07:44	07:38	08:26	
	21:52	34 06:49 (WEA-3 E-160)	21:11	20:06	29 08:07 (WEA-1)	18:57	16:55	16:23	
9	05:24	06:15 (WEA-3 E-160)	06:06	06:56	07:39 (WEA-1)	07:46	07:40	08:27	
	21:51	35 06:50 (WEA-3 E-160)	21:10	20:04	28 08:07 (WEA-1)	18:54	16:53	16:23	
10	05:25	06:15 (WEA-3 E-160)	06:08	06:58	07:38 (WEA-1)	07:47	07:42	08:28	
	21:50	35 06:50 (WEA-3 E-160)	21:08	20:01	28 08:06 (WEA-1)	18:52	16:51	16:23	
11	05:26	06:16 (WEA-3 E-160)	06:10	07:00	07:39 (WEA-1)	07:49	07:43	08:29	
	21:50	34 06:50 (WEA-3 E-160)	21:06	19:59	26 08:05 (WEA-1)	18:50	16:50	16:23	
12	05:27	06:16 (WEA-3 E-160)	06:11	07:01	07:39 (WEA-1)	07:51	07:45	08:30	
	21:49	34 06:50 (WEA-3 E-160)	21:04	19:57	26 08:05 (WEA-1)	18:48	16:48	16:22	
13	05:29	06:16 (WEA-3 E-160)	06:13	07:03	07:39 (WEA-1)	07:52	07:47	08:31	
	21:48	34 06:50 (WEA-3 E-160)	21:02	19:54	24 08:03 (WEA-1)	18:46	16:47	16:22	
14	05:30	06:16 (WEA-3 E-160)	06:14	07:04	07:41 (WEA-1)	07:54	07:49	08:32	
	21:47	34 06:50 (WEA-3 E-160)	21:00	19:52	21 08:02 (WEA-1)	18:43	16:45	16:22	
15	05:31	06:17 (WEA-3 E-160)	06:16	07:06	07:41 (WEA-1)	07:56	07:51	08:33	
	21:46	33 06:50 (WEA-3 E-160)	20:58	19:50	18 07:59 (WEA-1)	18:41	16:44	16:22	
16	05:32	06:17 (WEA-3 E-160)	06:18	07:08	07:44 (WEA-1)	07:57	07:52	08:34	
	21:45	32 06:49 (WEA-3 E-160)	20:56	19:47	13 07:57 (WEA-1)	18:39	16:42	16:23	
17	05:33	06:17 (WEA-3 E-160)	06:19	07:09	07:48 (WEA-1)	07:59	07:54	08:35	
	21:44	32 06:49 (WEA-3 E-160)	20:54	19:45	3 07:51 (WEA-1)	18:37	16:41	16:23	
18	05:34	06:17 (WEA-3 E-160)	06:21	07:11		08:01	07:56	08:35	
	21:43	32 06:49 (WEA-3 E-160)	20:52	19:43		18:35	16:40	16:23	
19	05:36	06:18 (WEA-3 E-160)	06:22	07:13		08:03	07:57	08:36	
	21:42	30 06:48 (WEA-3 E-160)	20:50	19:40		18:33	16:38	16:23	
20	05:37	06:19 (WEA-3 E-160)	06:24	07:14		08:04	07:59	08:37	
	21:41	30 06:49 (WEA-3 E-160)	20:48	19:38		18:31	16:37	16:24	
21	05:38	06:19 (WEA-3 E-160)	06:26	07:16		08:06	08:01	08:37	
	21:39	29 06:48 (WEA-3 E-160)	20:46	19:36		18:28	16:36	16:24	
22	05:40	06:20 (WEA-3 E-160)	06:27	07:17		08:08	08:02	08:38	
	21:38	27 06:47 (WEA-3 E-160)	20:44	19:33		18:26	16:35	16:25	
23	05:41	06:20 (WEA-3 E-160)	06:29	07:19		08:10	08:04	08:38	
	21:37	26 06:46 (WEA-3 E-160)	20:42	19:31		18:24	16:34	16:25	
24	05:42	06:22 (WEA-3 E-160)	06:31	07:21		08:11	08:06	08:39	
	21:36	24 06:46 (WEA-3 E-160)	20:39	19:29		18:22	16:33	16:26	
25	05:44	06:22 (WEA-3 E-160)	06:32	07:22	07:26 (WEA-2 E-138)	07:13	08:07	08:39	
	21:34	23 06:45 (WEA-3 E-160)	20:37	3 07:29 (WEA-2 E-138)	19:27	17:20	16:32	16:26	
26	05:45	06:23 (WEA-3 E-160)	06:34	07:24	07:21 (WEA-2 E-138)	07:15	08:09	08:39	
	21:33	20 06:43 (WEA-3 E-160)	20:35	11 07:32 (WEA-2 E-138)	19:24	17:18	16:31	16:27	
27	05:47	06:25 (WEA-3 E-160)	06:35	07:26	07:20 (WEA-2 E-138)	07:17	08:10	08:40	
	21:31	18 06:43 (WEA-3 E-160)	20:33	14 07:34 (WEA-2 E-138)	19:22	17:16	16:30	16:28	
28	05:48	06:27 (WEA-3 E-160)	06:37	07:27	07:18 (WEA-2 E-138)	07:19	08:12	08:40	
	21:30	13 06:40 (WEA-3 E-160)	20:31	16 07:34 (WEA-2 E-138)	19:20	17:14	16:29	16:29	
29	05:50	06:31 (WEA-3 E-160)	06:39	07:29	07:17 (WEA-2 E-138)	07:20	08:13	08:40	
	21:28	6 06:37 (WEA-3 E-160)	20:28	18 07:35 (WEA-2 E-138)	19:17	17:12	16:28	16:29	
30	05:51		06:40	07:31	07:16 (WEA-2 E-138)	07:22	08:15	08:40	
	21:27		20:26	30 08:01 (WEA-1)	19:15	17:11	16:27	16:30	
31	05:53		06:42	07:16 (WEA-2 E-138)		07:24	08:16	08:40	
	21:25		20:24	36 08:04 (WEA-1)		17:09		16:31	
Sonnenscheinstunden	501		453		381		332	267	244
astr.max.mögl.Beschattung		858		128		493			
Red.Sonnenscheinwahrsch.		0,41		0,43		0,36			
Reduktion Betriebsdauer		0,84		0,84		0,84			
Reduktion Windrichtung		0,72		0,69		0,68			
Gesamte Reduktion		0,25		0,25		0,20			
Met.wahrsch.Beschattung		214		32		101			

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

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

Projekt:

Borken-Marbeck Schatten
WEA-2,-3,-4,-5

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP242 - IP242 Grote Rotte 8

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Januar	Februar	März		April		Mai		Juni		
1	08:40	08:14	07:21		07:10		08:21 (WEA-3 E-160)	06:06	06:49 (WEA-4 E-160)	05:21	
	16:32	17:20	18:11		20:05			20:56	35	07:24 (WEA-4 E-160)	21:41
2	08:40	08:12	07:18		07:08	8	08:29 (WEA-3 E-160)	06:04		06:48 (WEA-4 E-160)	05:20
	16:34	17:22	18:13		20:07			20:57	36	07:24 (WEA-4 E-160)	21:42
3	08:40	08:11	07:16		07:06			06:02		06:48 (WEA-4 E-160)	05:19
	16:35	17:24	18:15		20:08			20:59	36	07:24 (WEA-4 E-160)	21:43
4	08:40	08:09	07:14		07:03			06:00		06:48 (WEA-4 E-160)	05:18
	16:36	17:26	18:17		20:10			21:01	36	07:24 (WEA-4 E-160)	21:44
5	08:40	08:07	07:12		07:01			05:58		06:48 (WEA-4 E-160)	05:18
	16:37	17:27	18:19		20:12			21:02	36	07:24 (WEA-4 E-160)	21:45
6	08:39	08:06	07:10		06:59			05:56		06:48 (WEA-4 E-160)	05:17
	16:38	17:29	18:20		20:14			21:04	35	07:23 (WEA-4 E-160)	21:46
7	08:39	08:04	08:35 (WEA-1)	07:07	06:57			05:55		06:48 (WEA-4 E-160)	05:16
	16:39	17:31	08:39 (WEA-1)	18:22	20:15			21:06	36	07:24 (WEA-4 E-160)	21:47
8	08:38	08:02	08:31 (WEA-1)	07:05	06:54			05:53		06:48 (WEA-4 E-160)	05:16
	16:41	17:33	11 08:42 (WEA-1)	18:24	20:17			21:07	35	07:23 (WEA-4 E-160)	21:48
9	08:38	08:00	08:29 (WEA-1)	07:03	06:52			05:51		06:48 (WEA-4 E-160)	05:15
	16:42	17:35	15 08:44 (WEA-1)	18:26	20:19			21:09	34	07:22 (WEA-4 E-160)	21:49
10	08:37	07:59	08:29 (WEA-1)	07:01	06:50			05:49		06:49 (WEA-4 E-160)	05:15
	16:43	17:37	17 08:46 (WEA-1)	18:27	20:20			21:10	33	07:22 (WEA-4 E-160)	21:50
11	08:37	07:57	08:28 (WEA-1)	06:58	06:48			05:48		06:49 (WEA-4 E-160)	05:15
	16:45	17:39	19 08:47 (WEA-1)	18:29	20:22			21:12	32	07:21 (WEA-4 E-160)	21:51
12	08:36	07:55	08:27 (WEA-1)	06:56	06:45			05:46		06:50 (WEA-4 E-160)	05:14
	16:46	17:40	21 08:48 (WEA-1)	18:31	20:24			21:14	31	07:21 (WEA-4 E-160)	21:51
13	08:36	07:53	08:27 (WEA-1)	06:54	06:43			05:45		06:50 (WEA-4 E-160)	05:14
	16:48	17:42	22 08:49 (WEA-1)	18:33	11 07:37 (WEA-3 E-160)	20:25		21:15	30	07:20 (WEA-4 E-160)	21:52
14	08:35	07:51	08:26 (WEA-1)	06:52	07:22 (WEA-3 E-160)	06:41		05:43		06:51 (WEA-4 E-160)	05:14
	16:49	17:44	23 08:49 (WEA-1)	18:34	17 07:39 (WEA-3 E-160)	20:27		21:17	28	07:19 (WEA-4 E-160)	21:53
15	08:34	07:49	08:26 (WEA-1)	06:49	07:20 (WEA-3 E-160)	06:39		05:41		06:52 (WEA-4 E-160)	05:14
	16:51	17:46	23 08:49 (WEA-1)	18:36	21 07:41 (WEA-3 E-160)	20:29		21:18	26	07:18 (WEA-4 E-160)	21:53
16	08:33	07:47	08:26 (WEA-1)	06:47	07:18 (WEA-3 E-160)	06:37		05:40		06:53 (WEA-4 E-160)	05:14
	16:52	17:48	23 08:49 (WEA-1)	18:38	25 07:43 (WEA-3 E-160)	20:31		21:20	24	07:17 (WEA-4 E-160)	21:54
17	08:32	07:45	08:27 (WEA-1)	06:45	07:16 (WEA-3 E-160)	06:34		05:38		06:54 (WEA-4 E-160)	05:13
	16:54	17:50	22 08:49 (WEA-1)	18:40	27 07:43 (WEA-3 E-160)	20:32		21:21	22	07:16 (WEA-4 E-160)	21:54
18	08:31	07:43	08:27 (WEA-1)	06:42	07:15 (WEA-3 E-160)	06:32		05:37		06:55 (WEA-4 E-160)	05:13
	16:56	17:51	21 08:48 (WEA-1)	18:41	29 07:44 (WEA-3 E-160)	20:34		21:23	19	07:14 (WEA-4 E-160)	21:55
19	08:30	07:41	08:28 (WEA-1)	06:40	07:15 (WEA-3 E-160)	06:30		05:35		06:57 (WEA-4 E-160)	05:13
	16:57	17:53	20 08:48 (WEA-1)	18:43	29 07:44 (WEA-3 E-160)	20:36		21:24	16	07:13 (WEA-4 E-160)	21:55
20	08:29	07:39	08:28 (WEA-1)	06:38	07:13 (WEA-3 E-160)	06:28		05:34		06:59 (WEA-4 E-160)	05:14
	16:59	17:55	18 08:46 (WEA-1)	18:45	31 07:44 (WEA-3 E-160)	20:37		21:26	12	07:11 (WEA-4 E-160)	21:55
21	08:28	07:37	08:29 (WEA-1)	06:36	07:13 (WEA-3 E-160)	06:26		05:33		07:03 (WEA-4 E-160)	05:14
	17:01	17:57	15 08:44 (WEA-1)	18:46	31 07:44 (WEA-3 E-160)	20:39	14	07:15 (WEA-4 E-160)	5	07:08 (WEA-4 E-160)	21:55
22	08:27	07:35	08:31 (WEA-1)	06:33	07:13 (WEA-3 E-160)	06:24		06:58 (WEA-4 E-160)	05:31		05:14
	17:02	17:59	11 08:42 (WEA-1)	18:48	31 07:44 (WEA-3 E-160)	20:41	19	07:17 (WEA-4 E-160)	21:29		21:56
23	08:26	07:33	08:36 (WEA-1)	06:31	07:12 (WEA-3 E-160)	06:22		06:56 (WEA-4 E-160)	05:30		05:14
	17:04	18:01	1 08:37 (WEA-1)	18:50	31 07:43 (WEA-3 E-160)	20:42	23	07:19 (WEA-4 E-160)	21:30		21:56
24	08:25	07:31		06:29	07:12 (WEA-3 E-160)	06:20		06:54 (WEA-4 E-160)	05:29		05:14
	17:06	18:02		18:51	31 07:43 (WEA-3 E-160)	20:44	26	07:20 (WEA-4 E-160)	21:31		21:56
25	08:23	07:29		06:26	07:12 (WEA-3 E-160)	06:18		06:53 (WEA-4 E-160)	05:28		05:15
	17:07	18:04		18:53	31 07:43 (WEA-3 E-160)	20:46	28	07:21 (WEA-4 E-160)	21:33		21:56
26	08:22	07:27		06:24	07:13 (WEA-3 E-160)	06:16		06:52 (WEA-4 E-160)	05:27		05:15
	17:09	18:06		18:55	29 07:42 (WEA-3 E-160)	20:47	30	07:22 (WEA-4 E-160)	21:34		21:56
27	08:21	07:25		06:22	07:13 (WEA-3 E-160)	06:14		06:51 (WEA-4 E-160)	05:26		05:16
	17:11	18:08		18:57	27 07:40 (WEA-3 E-160)	20:49	32	07:23 (WEA-4 E-160)	21:35		21:56
28	08:20	07:23		06:19	07:13 (WEA-3 E-160)	06:12		06:51 (WEA-4 E-160)	05:25		05:16
	17:13	18:10		18:58	26 07:39 (WEA-3 E-160)	20:51	33	07:24 (WEA-4 E-160)	21:37		21:56
29	08:18			07:17	08:15 (WEA-3 E-160)	06:10		06:50 (WEA-4 E-160)	05:23		05:17
	17:15			20:00	23 08:38 (WEA-3 E-160)	20:52	34	07:24 (WEA-4 E-160)	21:38		21:56
30	08:17			07:15	08:15 (WEA-3 E-160)	06:08		06:49 (WEA-4 E-160)	05:23		05:17
	17:16			20:02	20 08:35 (WEA-3 E-160)	20:54	35	07:24 (WEA-4 E-160)	21:39		21:55
31	08:15			07:13	08:17 (WEA-3 E-160)				05:22		
	17:18			20:03	16 08:33 (WEA-3 E-160)				21:40		
Sonnenscheinstunden	259	278	367		416			485		498	
astr.max.mögl.Beschattung		286	486		282			597			
Red.Sonnenscheinwahrsch.		0,30	0,30		0,41			0,46			
Reduktion Betriebsdauer		0,84	0,84		0,84			0,84			
Reduktion Windrichtung		0,60	0,64		0,69			0,70			
Gesamte Reduktion		0,15	0,16		0,24			0,27			
Met.wahrsch.Beschattung		44	77		67			159			

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

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

Projekt:

**Borken-Marbeck Schatten
WEA-2,-3,-4,-5**

Lizenzierter Anwender:

reko GmbH & Co. KG
Sander Bruch Str. 10
DE-33106 Paderborn
+49 (0) 5254/9528129



Berechnet:

13.05.2022 08:56/3.4.424

SHADOW - Kalender

Berechnung: Gesamtbelastung **Schattenrezeptor:** IP242 - IP242 Grote Rotte 8

Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [BOCHOLT]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,64 3,01 3,53 5,65 7,16 6,01 6,70 6,24 4,57 3,38 2,03 1,16

Betriebsdauer je Sektor

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

	Juli		August		September		Oktober		November		Dezember	
1	05:18		05:54	07:00 (WEA-4 E-160)	06:44		07:32		07:26	07:58 (WEA-1)	08:16	
	21:55		21:24	32 07:32 (WEA-4 E-160)	20:22		19:13		17:07	17	08:15 (WEA-1)	16:27
2	05:18		05:56	06:59 (WEA-4 E-160)	06:45		07:34		07:27		07:59 (WEA-1)	08:18
	21:55		21:22	33 07:32 (WEA-4 E-160)	20:20		19:10		17:05	15	08:14 (WEA-1)	16:26
3	05:19		05:57	06:59 (WEA-4 E-160)	06:47		07:36		07:29		08:01 (WEA-1)	08:19
	21:55		21:20	34 07:33 (WEA-4 E-160)	20:17		19:08		17:03	11	08:12 (WEA-1)	16:25
4	05:20		05:59	06:58 (WEA-4 E-160)	06:48		07:37		07:31			08:21
	21:54		21:19	35 07:33 (WEA-4 E-160)	20:15		19:06		17:01			16:25
5	05:21		06:00	06:58 (WEA-4 E-160)	06:50		07:39		07:33			08:22
	21:54		21:17	35 07:33 (WEA-4 E-160)	20:13		19:04		17:00			16:24
6	05:22		06:02	06:58 (WEA-4 E-160)	06:52		07:41		07:35			08:23
	21:53		21:15	35 07:33 (WEA-4 E-160)	20:11		19:01		16:58			16:24
7	05:22		06:03	06:57 (WEA-4 E-160)	06:53		07:42		07:38			08:24
	21:53		21:13	36 07:33 (WEA-4 E-160)	20:08		18:59		16:56			16:24
8	05:23		06:05	06:57 (WEA-4 E-160)	06:55		07:44		07:44			08:26
	21:52		21:11	37 07:34 (WEA-4 E-160)	20:06		18:57		16:55			16:23
9	05:24		06:06	06:57 (WEA-4 E-160)	06:56		07:46		07:46			08:27
	21:51		21:10	36 07:33 (WEA-4 E-160)	20:04		18:54		16:53			16:23
10	05:25		06:08	06:57 (WEA-4 E-160)	06:58		07:47		07:47			08:28
	21:51		21:08	36 07:33 (WEA-4 E-160)	20:01		18:52		16:51			16:23
11	05:26		06:10	06:57 (WEA-4 E-160)	07:00	08:14 (WEA-3 E-160)	07:49		07:49			08:29
	21:50		21:06	36 07:33 (WEA-4 E-160)	19:59	7 08:21 (WEA-3 E-160)	18:50		16:50			16:23
12	05:27		06:11	06:57 (WEA-4 E-160)	07:01	08:10 (WEA-3 E-160)	07:51		07:45			08:30
	21:49		21:04	36 07:33 (WEA-4 E-160)	19:57	15 08:25 (WEA-3 E-160)	18:48		16:48			16:22
13	05:29		06:13	06:57 (WEA-4 E-160)	07:03	08:07 (WEA-3 E-160)	07:52		07:47			08:31
	21:48		21:02	35 07:32 (WEA-4 E-160)	19:54	19 08:26 (WEA-3 E-160)	18:46		16:47			16:22
14	05:30		06:14	06:58 (WEA-4 E-160)	07:04	08:05 (WEA-3 E-160)	07:54		07:49			08:32
	21:47		21:00	34 07:32 (WEA-4 E-160)	19:52	23 08:28 (WEA-3 E-160)	18:43		16:45			16:22
15	05:31		06:16	06:58 (WEA-4 E-160)	07:06	08:03 (WEA-3 E-160)	07:56		07:51			08:33
	21:46		20:58	32 07:30 (WEA-4 E-160)	19:50	25 08:28 (WEA-3 E-160)	18:41		16:44			16:22
16	05:32		06:18	06:59 (WEA-4 E-160)	07:08	08:02 (WEA-3 E-160)	07:58		07:52			08:34
	21:45		20:56	31 07:30 (WEA-4 E-160)	19:47	27 08:29 (WEA-3 E-160)	18:39		16:42			16:23
17	05:33		06:19	06:59 (WEA-4 E-160)	07:09	08:00 (WEA-3 E-160)	07:59		07:54			08:35
	21:44		20:54	29 07:28 (WEA-4 E-160)	19:45	29 08:29 (WEA-3 E-160)	18:37		16:41			16:23
18	05:34		06:21	07:00 (WEA-4 E-160)	07:11	08:00 (WEA-3 E-160)	08:01		07:56			08:35
	21:43		20:52	28 07:28 (WEA-4 E-160)	19:43	30 08:30 (WEA-3 E-160)	18:35		16:40			16:23
19	05:36		06:22	07:01 (WEA-4 E-160)	07:13	08:00 (WEA-3 E-160)	08:03	09:05 (WEA-1)	07:57			08:36
	21:42		20:50	26 07:27 (WEA-4 E-160)	19:40	30 08:30 (WEA-3 E-160)	18:33	6 09:11 (WEA-1)	16:38			16:23
20	05:37		06:24	07:02 (WEA-4 E-160)	07:14	07:58 (WEA-3 E-160)	08:04	09:02 (WEA-1)	07:59			08:37
	21:41		20:48	22 07:24 (WEA-4 E-160)	19:38	32 08:30 (WEA-3 E-160)	18:31	12 09:14 (WEA-1)	16:37			16:24
21	05:38		06:26	07:04 (WEA-4 E-160)	07:16	07:58 (WEA-3 E-160)	08:06	09:00 (WEA-1)	08:01			08:37
	21:39		20:46	19 07:23 (WEA-4 E-160)	19:36	32 08:30 (WEA-3 E-160)	18:28	16 09:16 (WEA-1)	16:36			16:24
22	05:40		06:27	07:07 (WEA-4 E-160)	07:17	07:57 (WEA-3 E-160)	08:08	08:58 (WEA-1)	08:02			08:38
	21:38		20:44	12 07:19 (WEA-4 E-160)	19:33	32 08:29 (WEA-3 E-160)	18:26	18 09:16 (WEA-1)	16:35			16:25
23	05:41	07:11 (WEA-4 E-160)	06:29		07:19	07:58 (WEA-3 E-160)	08:10	08:57 (WEA-1)	08:04			08:38
	21:37	8 07:19 (WEA-4 E-160)	20:42		19:31	30 08:28 (WEA-3 E-160)	18:24	20 09:17 (WEA-1)	16:34			16:25
24	05:42	07:09 (WEA-4 E-160)	06:31		07:21	07:58 (WEA-3 E-160)	08:11	08:56 (WEA-1)	08:06			08:39
	21:36	14 07:23 (WEA-4 E-160)	20:39		19:29	30 08:28 (WEA-3 E-160)	18:22	22 09:18 (WEA-1)	16:33			16:26
25	05:44	07:07 (WEA-4 E-160)	06:32		07:22	07:58 (WEA-3 E-160)	07:13	07:56 (WEA-1)	08:07			08:39
	21:34	17 07:24 (WEA-4 E-160)	20:37		19:27	29 08:27 (WEA-3 E-160)	17:20	22 08:18 (WEA-1)	16:32			16:26
26	05:45	07:05 (WEA-4 E-160)	06:34		07:24	07:59 (WEA-3 E-160)	07:15	07:56 (WEA-1)	08:09			08:39
	21:33	20 07:25 (WEA-4 E-160)	20:35		19:24	27 08:26 (WEA-3 E-160)	17:18	22 08:18 (WEA-1)	16:31			16:27
27	05:47	07:04 (WEA-4 E-160)	06:35		07:26	08:00 (WEA-3 E-160)	07:17	07:56 (WEA-1)	08:10			08:40
	21:31	23 07:27 (WEA-4 E-160)	20:33		19:22	25 08:25 (WEA-3 E-160)	17:16	22 08:18 (WEA-1)	16:30			16:28
28	05:48	07:03 (WEA-4 E-160)	06:37		07:27	08:00 (WEA-3 E-160)	07:19	07:56 (WEA-1)	08:12			08:40
	21:30	25 07:28 (WEA-4 E-160)	20:31		19:20	22 08:22 (WEA-3 E-160)	17:14	22 08:18 (WEA-1)	16:29			16:28
29	05:50	07:03 (WEA-4 E-160)	06:39		07:29	08:02 (WEA-3 E-160)	07:20	07:56 (WEA-1)	08:13			08:40
	21:28	27 07:30 (WEA-4 E-160)	20:29		19:17	19 08:21 (WEA-3 E-160)	17:12	22 08:18 (WEA-1)	16:28			16:29
30	05:51	07:01 (WEA-4 E-160)	06:40		07:31	08:04 (WEA-3 E-160)	07:22	07:57 (WEA-1)	08:15			08:40
	21:27	29 07:30 (WEA-4 E-160)	20:26		19:15	14 08:18 (WEA-3 E-160)	17:11	21 08:18 (WEA-1)	16:27			16:30
31	05:53	07:00 (WEA-4 E-160)	06:42				07:24	07:57 (WEA-1)				08:40
	21:25	31 07:31 (WEA-4 E-160)	20:24				17:09	19 08:16 (WEA-1)				16:31
Sonnenscheinstunden	501		453		381		332		267			244
astr.max.mögl.Beschattung	194		689		497		244		43			
Red. Sonnenscheinwahrsch.	0,41		0,43		0,36		0,32		0,23			
Reduktion Betriebsdauer	0,84		0,84		0,84		0,84		0,84			
Reduktion Windrichtung	0,70		0,70		0,64		0,60		0,60			
Gesamte Reduktion	0,24		0,25		0,19		0,16		0,11			
Met. wahrsch. Beschattung	47		171		96		39		5			

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	