

Projekt:
Friestad

Udskrevet/Side
18.03.2021 10:20 / 1
Brugerlicens:
Vindkraft Prosjektering AS
Ullandhaugveien 150
NO-4021 Stavanger
+47 88004802
Solvind Prosjekt AS
Beregnet:
18.03.2021 10:19/2.6.1.252

SHADOW - Hovedresultat

Beregning: 3 x E-48 skyggekast Friestad

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning
Medtag kun hvis mere end 20 % af solen er dækket af vingen
Se venligst mølletabellen

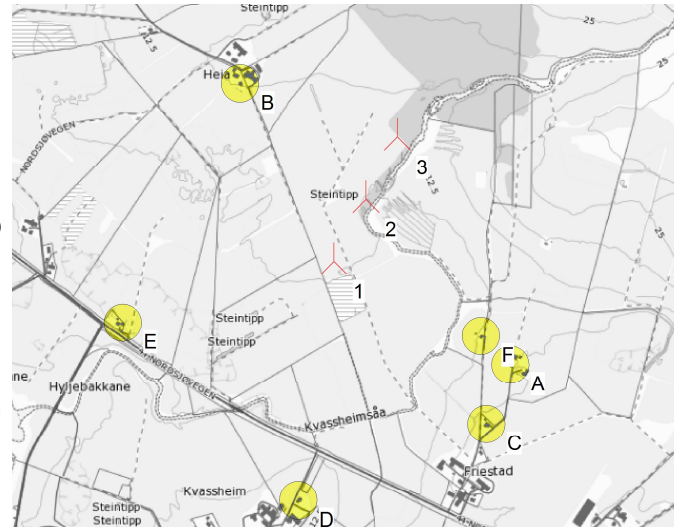
Minimum solhøjde over horisont med indflydelse 3 °
Dagstep for beregning 1 dage
Tidsskridt til beregning 1 minutter

Solskinnssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)
Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid
N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1420 1052 448 252 330 247 555 1519 6999

For at undgå skyggekast fra ikke synlig møller laves der en ZVI beregning for skyggekastberegningen. ZVI beregningen baseres på følgende forudsætninger

Højdelinier anvendt: Højdekoturer: SorRogaland_sammensatt.wpo (18)
Lægivere anvendt i beregning
Betragterhøjde: 1,5 m
Netopløsning: 10 m



Ny mølle Skyggemodtager

Møller

UTM WGS84 Zone: 32				Mølletype				Skyggedata			
Øst	Nord	Z	Rækkedata/Beskrivelse	Aktuel	Fabrikat	Type-generator	Power, rated	Rotordiameter	Navhøjde	Beregningsafstand	Omdr
UTM WGS84 Zone: 32			[m]				[kW]	[m]	[m]	[m]	[Omdr]
1	307 703	6 494 826	10,6 ENERCON E-48 800 48.0 !...	Ja	ENERCON	E-48-800	800	48,0	64,6	1 047	30,0
2	307 788	6 494 991	10,0 ENERCON E-48 800 48.0 !...	Ja	ENERCON	E-48-800	800	48,0	64,6	1 047	30,0
3	307 872	6 495 157	12,6 ENERCON E-48 800 48.0 !...	Ja	ENERCON	E-48-800	800	48,0	64,6	1 047	30,0

Skyggemodtager-Inddata

UTM WGS84 Zone: 32										
Nr.	Navn	Øst	Nord	Z	Bredde	Højde	Højde over jord	Grader fra syd med uret	Vinduets Retningsmetode hældning	
				[m]	[m]	[m]	[m]	[°]	[°]	
A	A	308 173	6 494 549	15,0	2,0	2,0	2,0	-180,0	90,0	"Drivhustilstand"
B	B	307 453	6 495 300	15,0	2,0	2,0	2,0	-180,0	90,0	"Drivhustilstand"
C	C	308 109	6 494 391	17,5	2,0	2,0	2,0	-180,0	90,0	"Drivhustilstand"
D	D	307 608	6 494 189	12,5	2,0	2,0	2,0	-180,0	90,0	"Drivhustilstand"
E	E	307 141	6 494 661	5,0	2,0	2,0	2,0	-180,0	90,0	"Drivhustilstand"
F	F	308 094	6 494 627	11,1	2,0	2,0	2,0	-180,0	90,0	"Drivhustilstand"

Beregningsresultater

Skyggemodtager					
Skygge, worst case			Skygge, forventede værdier		
Nr.	Navn	Skyggetimer pr. år	Skyggedage pr. år	Maks. skygge-timer pr dag	Skyggetimer pr. år
		[h/år]	[dage/år]	[h/dag]	[h/år]
A	A	14:14	49	0:23	4:37
B	B	44:12	147	0:26	11:58
C	C	0:00	0	0:00	0:00
D	D	0:00	0	0:00	0:00
E	E	28:35	116	0:21	5:46
F	F	21:58	62	0:28	7:04

Projekt:

Friestad

Udskrevet/Side

18.03.2021 10:20 / 2

Brugerlicens:

Vindkraft Prosjektering AS

Ullandhaugveien 150

NO-4021 Stavanger

+47 88004802

Solvind Prosjekt AS

Beregnet:

18.03.2021 10:19/2.6.1.252

SHADOW - Hovedresultat**Beregning:** 3 x E-48 skyggekast Friestad

Samlet skyggekast på skyggemottagerne fra hver enkelt mølle

Nr.	Navn	Worst case
		[h/år]
1	ENERCON E-48 800 48.0 !O! nav: 75,6 m (30.1)	61:46
2	ENERCON E-48 800 48.0 !O! nav: 64,6 m (30.2)	20:58
3	ENERCON E-48 800 48.0 !O! nav: 64,6 m (30.3)	22:28

Projekt:
Friestad

Udskrevet/Side
18.03.2021 10:20 / 3

Brugerlicens:
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Ullandhaugveien 150
NO-4021 Stavanger
+47 88004802
Solvind Projekt AS
Beregnet:
18.03.2021 10:19/2.6.1.252

SHADOW - Kalender

Beregning: 3 x E-48 skyggekast Friestad Skyggemodtager: A - A

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning 1 500 m Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)
Minimum solhøjde over horisont med indflydelse 3 ° Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
Dagstep for beregning 1 dage Driftstid
Tidskridt til beregning 1 minutter N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	Januar	Februar	Marts	April	Maj	Juni	Juli	August	September	Oktober	November	December			
1	09:28	08:46	07:36	07:08	05:45	04:41	04:34	05:26	20:58 (1)	06:34	07:40	07:52	09:00		
	15:54	16:57	18:06	20:17	21:26	22:30	22:48	22:01	19	21:17 (1)	20:40	19:14	16:50	15:53	
2	09:28	08:44	07:33	07:05	05:43	04:40	04:35	05:28	20:58 (1)	06:36	07:42	07:54	09:02		
	15:56	17:00	18:08	20:20	21:29	22:32	22:48	21:59	19	21:17 (1)	20:37	19:11	16:48	15:52	
3	09:27	08:42	07:30	07:02	05:40	04:39	04:36	05:30	20:59 (1)	06:39	07:45	07:57	09:04		
	15:57	17:02	18:10	20:22	21:31	22:34	22:47	21:56	17	21:16 (1)	20:35	19:08	16:45	15:51	
4	09:27	08:39	07:28	06:59	05:38	04:38	04:37	05:32	21:00 (1)	06:41	07:47	07:59	09:05		
	15:59	17:05	18:13	20:24	21:33	22:35	22:46	21:54	14	21:14 (1)	20:32	19:05	16:43	15:50	
5	09:26	08:37	07:25	06:56	05:35	04:37	04:38	05:34	21:02 (1)	06:43	07:49	08:01	09:07		
	16:00	17:07	18:15	20:27	21:35	22:37	22:46	21:52	11	21:13 (1)	20:29	19:02	16:40	15:49	
6	09:25	08:35	07:22	06:53	05:33	04:35	04:39	05:36	21:04 (1)	06:45	07:51	08:04	09:09		
	16:02	17:10	18:18	20:29	21:38	22:38	22:45	21:49	6	21:10 (1)	20:26	19:00	16:38	15:48	
7	09:25	08:33	07:19	06:51	05:30	20:53 (1)	04:34	05:39		06:47	07:54	08:06	09:10		
	16:03	17:12	18:20	20:31	21:40	8	21:01 (1)	22:39		21:47	20:23	18:57	16:36	15:47	
8	09:24	08:30	07:16	06:48	05:28	20:51 (1)	04:34	05:41		06:50	07:56	08:09	09:12		
	16:05	17:15	18:22	20:33	21:42	12	21:03 (1)	22:40		21:44	20:20	18:54	16:33	15:46	
9	09:23	08:28	07:14	06:45	05:25	20:50 (1)	04:33	05:43		06:52	07:58	08:11	09:13		
	16:07	17:17	18:25	20:36	21:45	15	21:05 (1)	22:42		21:42	20:17	18:51	16:31	15:46	
10	09:22	08:25	07:11	06:42	05:23	20:49 (1)	04:32	05:45		06:54	08:00	08:13	09:15		
	16:09	17:19	18:27	20:38	21:47	17	21:06 (1)	22:43		21:40	20:15	18:48	16:29	15:45	
11	09:21	08:23	07:08	06:39	05:21	20:48 (1)	04:31	05:47		06:56	08:03	08:16	09:16		
	16:10	17:22	18:29	20:40	21:49	19	21:07 (1)	22:44		21:37	20:12	18:46	16:27	15:45	
12	09:20	08:21	07:05	06:36	05:19	20:47 (1)	04:31	05:50		06:58	08:05	08:18	09:18		
	16:12	17:24	18:32	20:43	21:51	20	21:07 (1)	22:45		21:34	20:09	18:43	16:25	15:44	
13	09:19	08:18	07:02	06:34	05:16	20:47 (1)	04:30	05:52		07:01	08:07	08:20	09:19		
	16:14	17:27	18:34	20:45	21:53	21	21:08 (1)	22:46	5	21:10 (1)	21:32	20:06	18:40	16:23	15:44
14	09:17	08:16	06:59	06:31	05:14	20:46 (1)	04:30	05:51		21:03 (1)	05:54	07:03	08:09	08:23	09:20
	16:16	17:29	18:36	20:47	21:56	22	21:08 (1)	22:46	8	21:11 (1)	21:29	20:03	18:37	16:21	15:44
15	09:16	08:13	06:57	06:28	05:12	20:46 (1)	04:29	05:52		21:01 (1)	05:56	07:05	08:12	08:25	09:21
	16:18	17:32	18:39	20:49	21:58	22	21:08 (1)	22:47	11	21:12 (1)	21:27	20:00	18:34	16:19	15:44
16	09:15	08:11	06:54	06:25	05:10	20:46 (1)	04:29	05:54		21:00 (1)	05:59	07:07	08:14	08:27	09:22
	16:20	17:34	18:41	20:52	22:00	22	21:08 (1)	22:48	14	21:14 (1)	21:24	19:57	18:32	16:17	15:44
17	09:13	08:08	06:51	06:22	05:08	20:46 (1)	04:29	05:56		21:00 (1)	06:01	07:09	08:16	08:30	09:23
	16:23	17:37	18:43	20:54	22:02	22	21:08 (1)	22:48	15	21:15 (1)	21:21	19:54	18:29	16:15	15:44
18	09:12	08:05	06:48	06:20	05:06	20:46 (1)	04:29	05:58		20:59 (1)	06:03	07:11	08:19	08:32	09:24
	16:25	17:39	18:45	20:56	22:04	23	21:09 (1)	22:49	16	21:15 (1)	21:19	19:51	18:26	16:13	15:44
19	09:10	08:03	06:45	06:17	05:04	20:46 (1)	04:28	05:59		20:59 (1)	06:05	07:14	08:21	08:34	09:25
	16:27	17:42	18:48	20:59	22:06	22	21:08 (1)	22:49	17	21:16 (1)	21:16	19:49	18:24	16:11	15:44
20	09:09	08:00	06:42	06:14	05:02	20:46 (1)	04:28	05:01		20:57 (1)	06:08	07:16	08:23	08:37	09:26
	16:29	17:44	18:50	21:01	22:08	22	21:08 (1)	22:50	19	21:16 (1)	21:13	19:46	18:21	16:09	15:44
21	09:07	07:58	06:39	06:12	05:00	20:47 (1)	04:29	05:03		20:57 (1)	06:10	07:18	08:26	08:39	09:26
	16:31	17:46	18:52	21:03	22:10	21	21:08 (1)	22:50	20	21:17 (1)	21:11	19:43	18:18	16:07	15:45
22	09:05	07:55	06:37	06:09	04:58	20:47 (1)	04:29	05:05		20:57 (1)	06:12	07:20	08:28	08:41	09:27
	16:34	17:49	18:55	21:06	22:12	21	21:08 (1)	22:50	21	21:18 (1)	21:08	19:40	18:16	16:06	15:45
23	09:04	07:52	06:34	06:06	04:56	20:47 (1)	04:29	05:07		20:57 (1)	06:14	07:22	08:30	08:43	09:27
	16:36	17:51	18:57	21:08	22:14	20	21:07 (1)	22:50	22	21:19 (1)	21:05	19:37	18:13	16:04	15:46
24	09:02	07:50	06:31	06:03	04:54	20:48 (1)	04:29	05:09		20:56 (1)	06:16	07:25	08:33	08:45	09:28
	16:38	17:54	18:59	21:10	22:16	19	21:07 (1)	22:50	22	21:18 (1)	21:03	19:34	18:10	16:02	15:46
25	09:00	07:47	06:28	06:01	04:52	20:49 (1)	04:30	05:11		20:56 (1)	06:19	07:27	07:35	08:48	09:28
	16:41	17:56	19:01	21:12	22:18	17	21:06 (1)	22:50	23	21:19 (1)	21:00	19:31	17:08	16:01	15:47
26	08:58	07:44	06:25	05:58	04:51	20:50 (1)	04:30	05:13		20:57 (1)	06:21	07:29	07:38	08:50	09:28
	16:43	17:59	19:04	21:15	22:20	16	21:06 (1)	22:50	22	21:19 (1)	20:57	19:28	17:05	15:59	15:48
27	08:56	07:41	06:22	05:55	04:49	20:51 (1)	04:31	05:15		20:57 (1)	06:23	07:31	07:40	08:52	09:28
	16:45	18:01	19:06	21:17	22:22	15	21:06 (1)	22:50	22	21:19 (1)	20:54	19:25	17:03	15:58	15:49
28	08:54	07:39	06:19	05:53	04:47	20:52 (1)	04:31	05:17		20:57 (1)	06:25	07:33	07:42	08:54	09:28
	16:48	18:03	19:08	21:19	22:24	12	21:04 (1)	22:50	22	21:19 (1)	20:51	19:23	17:00	15:56	15:49
29	08:52	07:16	05:50	04:46	04:46	20:53 (1)	04:32	05:19		20:56 (1)	06:28	07:36	07:45	08:56	09:28
	16:50	18:11	19:16	21:22	22:25	10	21:03 (1)	22:49	22	21:18 (1)	20:49	19:20	16:57	15:55	15:51
30	08:50	07:13	05:48	04:44	04:44	20:55 (1)	04:33	05:21		20:57 (1)	06:30	07:38	07:47	08:58	09:28
	16:52	18:13	19:18	21:24	22:27	7	21:02 (1)	22:49	21	21:18 (1)	20:46	19:17	16:55	15:54	15:52
31	08:48	07:11	05:43	04:43	04:43	20:53 (1)	04:33	05:23		20:57 (1)	06:32	07:49	07:49	08:58	09:28
	16:55	18:15	19:20	21:25	22:29	22	21:03 (1)	22:50	21	21:18 (1)	20:43	19:17	16:52	15:53	15:53
Mulige solskinstimer	222	260	365	432	521	546	545	478		386	319	237	200		
Samlet, worst case					425		343	86							
Sol reduktion					0,50		0,50	0,50							
Drifttidsred.					0,80		0,80	0,80							
Vindretn. red.					0,81		0,81	0,81							
Samlet reduktion					0,32		0,32	0,32							
Samlet, reel					138		111	28							

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned Solopgang (tt:mm) Første tidspunkt (tt:mm) med skygge (Skygge fra mølle første gang)
Solnedgang (tt:mm) Minutter med skygge Sidste tidspunkt (tt:mm) med skygge (Skygge fra mølle sidste gang)

Projekt:

Friestad

Udskrevet/Side

18.03.2021 10:20 / 4

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Vindkraft Projektering AS

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Solvind Projekt AS

Beregnet:

18.03.2021 10:19/2.6.1.252

SHADOW - Kalender**Beregning:** 3 x E-48 skyggekast Friestad **Skyggemodtager:** B - B**Forudsætninger for skyggeberegning**

Maksimal afstand for påvirkning

1 500 m

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Minimum solhøjde over horisont med indflydelse

3 °

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec

Dagstep for beregning

1 dage

Driftstid

Tidskridt til beregning

1 minutter

N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	Januar	Februar	Marts	April	Maj	Juni
1	09:28	10:21 (1) 08:46	07:36	07:08	05:45	04:41
	15:54	14 10:35 (1) 16:57	18:06	20:17	21:26	22:31
2	09:28	10:22 (1) 08:44	07:33	07:05	05:43	04:40
	15:56	14 10:36 (1) 17:00	18:08	20:20	21:29	22:32
3	09:27	10:21 (1) 08:42	07:31	07:02	05:40	04:39
	15:57	16 10:37 (1) 17:02	18:10	20:22	21:31	22:34
4	09:27	10:21 (1) 08:39	09:23 (2) 07:28	06:59	05:38	04:38
	15:59	17 10:38 (1) 17:05	3 09:26 (2) 18:13	20:24	21:33	22:35
5	09:26	10:21 (1) 08:37	09:20 (2) 07:25	06:56	05:35	04:37
	16:00	18 10:39 (1) 17:07	11 09:31 (2) 18:15	20:27	21:36	22:37
6	09:25	10:21 (1) 08:35	09:17 (2) 07:22	06:53	05:33	04:35
	16:02	19 10:40 (1) 17:10	15 09:32 (2) 18:18	20:29	21:38	22:38
7	09:25	10:21 (1) 08:33	09:16 (2) 07:19	06:51	05:30	04:34
	16:03	20 10:41 (1) 17:12	18 09:34 (2) 18:20	20:31	21:40	22:39
8	09:24	10:22 (1) 08:30	09:15 (2) 07:17	07:57 (3) 06:48	05:28	04:34
	16:05	20 10:42 (1) 17:15	20 09:35 (2) 18:22	4 08:01 (3) 20:33	21:42	22:41
9	09:23	10:21 (1) 08:28	09:13 (2) 07:14	07:52 (3) 06:45	05:25	04:33
	16:07	21 10:42 (1) 17:17	23 09:36 (2) 18:25	13 08:05 (3) 20:36	21:45	22:42
10	09:22	10:22 (1) 08:26	09:13 (2) 07:11	07:50 (3) 06:42	05:23	04:32
	16:09	21 10:43 (1) 17:20	24 09:37 (2) 18:27	17 08:07 (3) 20:38	21:47	22:43
11	09:21	10:22 (1) 08:23	09:13 (2) 07:08	07:48 (3) 06:39	05:21	04:31
	16:10	22 10:44 (1) 17:22	24 09:37 (2) 18:29	20 08:08 (3) 20:40	21:49	22:44
12	09:20	10:22 (1) 08:21	09:12 (2) 07:05	07:46 (3) 06:36	05:19	04:31
	16:12	22 10:44 (1) 17:24	25 09:37 (2) 18:32	22 08:08 (3) 20:43	21:51	22:45
13	09:19	10:22 (1) 08:18	09:12 (2) 07:02	07:45 (3) 06:34	05:16	04:30
	16:14	22 10:44 (1) 17:27	26 09:38 (2) 18:34	24 08:09 (3) 20:45	21:53	22:46
14	09:17	10:23 (1) 08:16	09:12 (2) 07:00	07:45 (3) 06:31	05:14	04:30
	16:16	22 10:45 (1) 17:29	26 09:38 (2) 18:36	25 08:10 (3) 20:47	21:56	22:47
15	09:16	10:22 (1) 08:13	09:12 (2) 06:57	07:44 (3) 06:28	05:12	04:29
	16:18	23 10:45 (1) 17:32	26 09:38 (2) 18:39	26 08:10 (3) 20:50	21:58	22:47
16	09:15	10:23 (1) 08:11	09:13 (2) 06:54	07:44 (3) 06:25	05:10	04:29
	16:20	23 10:46 (1) 17:34	25 09:38 (2) 18:41	26 08:10 (3) 20:52	22:00	22:48
17	09:13	10:24 (1) 08:08	09:13 (2) 06:51	07:44 (3) 06:23	05:08	04:29
	16:23	23 10:47 (1) 17:37	24 09:37 (2) 18:43	25 08:09 (3) 20:54	22:02	22:49
18	09:12	10:24 (1) 08:05	09:14 (2) 06:48	07:43 (3) 06:20	05:06	04:29
	16:25	23 10:47 (1) 17:39	22 09:36 (2) 18:45	26 08:09 (3) 20:56	22:04	22:49
19	09:10	10:25 (1) 08:03	09:14 (2) 06:45	07:44 (3) 06:17	05:04	04:28
	16:27	22 10:47 (1) 17:42	21 09:35 (2) 18:48	24 08:08 (3) 20:59	22:06	22:50
20	09:09	10:25 (1) 08:00	09:16 (2) 06:42	07:44 (3) 06:14	05:02	04:28
	16:29	22 10:47 (1) 17:44	19 09:35 (2) 18:50	23 08:07 (3) 21:01	22:08	22:50
21	09:07	10:26 (1) 07:58	09:17 (2) 06:39	07:44 (3) 06:12	05:00	04:29
	16:31	21 10:47 (1) 17:46	15 09:32 (2) 18:52	21 08:05 (3) 21:03	22:10	22:50
22	09:05	10:26 (1) 07:55	09:20 (2) 06:37	07:45 (3) 06:09	04:58	04:29
	16:34	21 10:47 (1) 17:49	9 09:29 (2) 18:55	18 08:03 (3) 21:06	22:12	22:50
23	09:04	10:27 (1) 07:52	06:34	07:47 (3) 06:06	04:56	04:29
	16:36	20 10:47 (1) 17:51	14 18:57	08:01 (3) 21:08	22:14	22:50
24	09:02	10:27 (1) 07:50	06:31	07:50 (3) 06:03	04:54	04:29
	16:38	19 10:46 (1) 17:54	18:59	7 07:57 (3) 21:10	22:16	22:51
25	09:00	10:29 (1) 07:47	06:28	06:01	04:52	04:30
	16:41	16 10:45 (1) 17:56	19:01	21:13	22:18	22:50
26	08:58	10:30 (1) 07:44	06:25	05:58	04:51	04:30
	16:43	14 10:44 (1) 17:59	19:04	21:15	22:20	22:50
27	08:56	10:33 (1) 07:42	06:22	05:55	04:49	04:31
	16:45	10 10:43 (1) 18:01	19:06	21:17	22:22	22:50
28	08:54	10:36 (1) 07:39	06:19	05:53	04:47	04:31
	16:48	3 10:39 (1) 18:03	19:08	21:19	22:24	22:50
29	08:52		07:16	05:50	04:46	04:32
	16:50		20:11	21:22	22:26	22:50
30	08:50		07:14	05:48	04:44	04:33
	16:52		20:13	21:24	22:27	22:49
31	08:48		07:11		04:43	
	16:55		20:15		22:29	
Mulige solskinstimer	222	260	365	432	521	546
Samlet, worst case	528	376	335			
Sol reduktion	0,50	0,50	0,50			
Drifttidsred.	0,80	0,80	0,80			
Vindretn. red.	0,78	0,82	0,78			
Samlet reduktion	0,31	0,33	0,31			
Samlet, reel	164	122	104			

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned	Solopgang (tt:mm)	Første tidspunkt (tt:mm) med skygge	(Skygge fra mølle første gang)
	Solnedgang (tt:mm)	Minutter med skygge	Sidste tidspunkt (tt:mm) med skygge
			(Skygge fra mølle sidste gang)

Projekt:

Friestad

Udskrevet/Side

18.03.2021 10:20 / 5

Brugerlicens:

Vindkraft Projekt AS

Ullandhaugveien 150

NO-4021 Stavanger

+47 88004802

Solvind Projekt AS

Beregnet:

18.03.2021 10:19/2.6.1.252

SHADOW - Kalender

Beregning: 3 x E-48 skyggekast Friestad Skyggemodtager: B - B

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning

1 500 m

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Minimum solhøjde over horisont med indflydelse

3 °

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec

Dagstep for beregning

1 dage

Driftstid

Tidskridt til beregning

1 minutter

N	NNØ	ØNØ	Ø	ØSØ	SSØ	S	SSV	VSV	V	VNV	NNV	I alt
519	114	182	361	1 420	1 052	448	252	330	247	555	1 519	6 999

	Juli	August	September	Oktober	November	December				
1	04:34 22:49	05:26 22:01	06:34 20:40	07:40 19:14	08:25 (3) 08:48 (3)	07:52 16:50	08:43 (2) 09:06 (2)	09:00 15:53	10:04 (1) 22	10:26 (1) 10:05 (1)
2	04:35 22:48	05:28 21:59	06:36 20:37	07:42 19:11	08:26 (3) 08:47 (3)	07:54 16:48	08:43 (2) 09:05 (2)	09:02 15:52	21	10:26 (1) 10:05 (1)
3	04:36 22:47	05:30 21:57	06:39 20:35	07:45 19:08	08:27 (3) 08:45 (3)	07:57 16:45	08:44 (2) 09:05 (2)	09:04 15:51	21	10:26 (1) 10:06 (1)
4	04:37 22:47	05:32 21:54	06:41 20:32	07:47 19:05	08:28 (3) 08:43 (3)	07:59 16:43	08:46 (2) 09:04 (2)	09:05 15:50	20	10:26 (1) 10:06 (1)
5	04:38 22:46	05:34 21:52	06:43 20:29	07:49 19:03	08:32 (3) 08:41 (3)	08:01 16:40	08:47 (2) 09:02 (2)	09:07 15:49	19	10:26 (1) 10:07 (1)
6	04:39 22:45	05:36 21:49	06:45 20:26	07:51 19:00	08:04 16:38	08:04 16:38	08:50 (2) 09:00 (2)	09:09 15:48	19	10:26 (1) 10:08 (1)
7	04:40 22:44	05:39 21:47	06:47 20:23	07:54 18:57	08:06 16:36	08:06 16:36	09:10 15:47	09:10 15:47	18	10:26 (1) 10:09 (1)
8	04:42 22:43	05:41 21:45	06:50 20:20	07:56 18:54	08:09 16:33	08:09 16:33	09:12 15:46	09:12 15:46	17	10:26 (1) 10:10 (1)
9	04:43 22:42	05:43 21:42	06:52 20:17	07:58 18:51	08:11 16:31	08:11 16:31	09:14 15:46	09:14 15:46	15	10:26 (1) 10:11 (1)
10	04:44 22:41	05:45 21:40	06:54 20:15	08:00 18:48	08:13 16:29	08:13 16:29	09:15 15:45	09:15 15:45	15	10:26 (1) 10:12 (1)
11	04:46 22:39	05:47 21:37	06:56 20:12	08:03 18:46	08:16 16:27	08:16 16:27	09:16 15:45	09:16 15:45	14	10:26 (1) 10:13 (1)
12	04:47 22:38	05:50 21:35	06:58 20:09	08:05 18:43	08:18 16:25	08:18 16:25	09:18 15:44	09:18 15:44	13	10:26 (1) 10:13 (1)
13	04:49 22:37	05:52 21:32	07:01 20:06	08:07 18:40	08:21 16:23	08:21 16:23	09:19 15:44	09:19 15:44	12	10:26 (1) 10:15 (1)
14	04:51 22:35	05:54 21:29	07:03 20:03	08:10 18:37	08:23 16:21	08:23 16:21	10:08 (1) 15:44	09:20 15:44	11	10:26 (1) 10:16 (1)
15	04:52 22:34	05:56 21:27	07:05 20:00	08:12 18:35	08:25 16:19	08:25 16:19	10:04 (1) 15:44	09:21 15:44	10	10:26 (1) 10:16 (1)
16	04:54 22:32	05:59 21:24	07:07 19:57	08:14 18:32	08:28 16:17	08:28 16:17	10:03 (1) 15:44	09:22 15:44	9	10:26 (1) 10:17 (1)
17	04:56 22:31	06:01 21:22	07:09 19:54	08:16 18:29	08:30 16:15	08:30 16:15	10:03 (1) 15:44	09:23 15:44	8	10:26 (1) 10:18 (1)
18	04:58 22:29	06:03 21:19	07:12 19:51	08:19 18:26	08:32 16:13	08:32 16:13	10:01 (1) 15:44	09:24 15:44	7	10:26 (1) 10:19 (1)
19	04:59 22:27	06:05 21:16	07:14 19:49	08:39 (3) 08:43 (3)	08:21 18:24	08:34 16:11	10:01 (1) 15:44	09:25 15:44	6	10:26 (1) 10:20 (1)
20	05:01 22:26	06:08 21:14	07:16 19:46	08:34 (3) 08:47 (3)	08:23 18:21	09:50 (2) 10:01 (2)	10:01 (1) 15:44	09:26 15:44	5	10:26 (1) 10:21 (1)
21	05:03 22:24	06:10 21:11	07:18 19:43	08:31 (3) 08:48 (3)	08:26 18:18	09:47 (2) 10:03 (2)	10:01 (1) 15:45	09:26 15:45	5	10:26 (1) 10:22 (1)
22	05:05 22:22	06:12 21:08	07:20 19:40	08:30 (3) 08:50 (3)	08:28 18:16	09:46 (2) 10:05 (2)	10:01 (1) 15:45	09:27 15:45	5	10:26 (1) 10:22 (1)
23	05:07 22:20	06:14 21:05	07:22 19:37	08:29 (3) 08:51 (3)	08:30 18:13	09:44 (2) 10:06 (2)	10:01 (1) 15:46	09:27 15:46	5	10:26 (1) 10:22 (1)
24	05:09 22:18	06:16 21:03	07:25 19:34	08:28 (3) 08:51 (3)	08:33 18:10	09:44 (2) 10:07 (2)	10:01 (1) 15:46	09:28 15:46	6	10:28 (1) 10:22 (1)
25	05:11 22:16	06:19 21:00	07:27 19:31	08:26 (3) 08:51 (3)	07:35 17:08	08:42 (2) 09:07 (2)	10:01 (1) 15:47	09:28 15:47	6	10:28 (1) 10:21 (1)
26	05:13 22:14	06:21 20:57	07:29 19:28	08:25 (3) 08:51 (3)	07:38 17:05	08:42 (2) 09:08 (2)	10:02 (1) 15:48	09:28 15:48	8	10:29 (1) 10:21 (1)
27	05:15 22:12	06:23 20:54	07:31 19:25	08:25 (3) 08:51 (3)	07:40 17:03	08:42 (2) 09:08 (2)	10:02 (1) 15:49	09:28 15:49	9	10:30 (1) 10:22 (1)
28	05:17 22:10	06:25 20:52	07:34 19:23	08:25 (3) 08:51 (3)	07:42 17:00	08:42 (2) 09:07 (2)	10:03 (1) 15:49	09:29 15:49	9	10:31 (1) 10:22 (1)
29	05:19 22:08	06:28 20:49	07:36 19:20	08:25 (3) 08:50 (3)	07:45 16:57	08:42 (2) 09:08 (2)	10:03 (1) 15:51	09:29 15:51	10	10:32 (1) 10:22 (1)
30	05:21 22:06	06:30 20:46	07:38 19:17	08:25 (3) 08:49 (3)	07:47 16:55	08:41 (2) 09:07 (2)	10:03 (1) 15:52	09:28 15:52	12	10:34 (1) 10:21 (1)
31	05:23 22:03	06:32 20:43		07:50 16:52	08:42 (2) 09:07 (2)		09:28 15:53	10:21 (1) 15:53	13	10:34 (1)
Mulige solskinstimer	545	478	386	319	237		200			
Samlet, worst case			251	356	436		370			
Sol reduktion			0,50	0,50	0,50		0,00			
Drifttidsred.			0,80	0,80	0,80		0,80			
Vindretn. red.			0,78	0,81	0,79		0,78			
Samlet reduktion			0,31	0,32	0,31		0,00			
Samlet, reel			78	115	137		0			

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned	Solopgang (tt:mm)	Solnedgang (tt:mm)	Minutter med skygge	Første tidspunkt (tt:mm) med skygge	Sidste tidspunkt (tt:mm) med skygge	(Skygge fra mølle første gang)	(Skygge fra mølle sidste gang)
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Projekt:
Friestad

Udskrevet/Side
18.03.2021 10:20 / 6

Brugerlicens:
Vindkraft Projektering AS
Ullandhaugveien 150
NO-4021 Stavanger
+47 88004802
Solvind Projekt AS
Beregnet:
18.03.2021 10:19/2.6.1.252

SHADOW - Kalender

Beregning: 3 x E-48 skyggekast Friestad Skyggemodtager: C - C

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning 1 500 m
Minimum solhøjde over horisont med indflydelse 3 °
Dagstep for beregning 1 dage
Tidskridt til beregning 1 minutter

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid
N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNW I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	Januar	Februar	Marts	April	Maj	Juni	Juli	August	September	Oktober	November	December
1	09:28 15:54	08:46 16:57	07:36 18:06	07:08 20:17	05:45 21:26	04:41 22:30	04:34 22:48	05:26 22:01	06:34 20:40	07:40 19:14	07:52 16:50	09:00 15:53
2	09:28 15:56	08:44 17:00	07:33 18:08	07:05 20:20	05:43 21:29	04:40 22:32	04:35 22:48	05:28 21:59	06:36 20:37	07:42 19:11	07:54 16:48	09:02 15:52
3	09:27 15:57	08:42 17:02	07:30 18:10	07:02 20:22	05:40 21:31	04:39 22:34	04:36 22:47	05:30 21:56	06:39 20:35	07:45 19:08	07:57 16:45	09:04 15:51
4	09:27 15:59	08:39 17:05	07:28 18:13	06:59 20:24	05:38 21:33	04:38 22:35	04:37 22:46	05:32 21:54	06:41 20:32	07:47 19:05	07:59 16:43	09:05 15:50
5	09:26 16:00	08:37 17:07	07:25 18:15	06:56 20:27	05:35 21:35	04:37 22:36	04:38 22:46	05:34 21:52	06:43 20:29	07:49 19:02	08:01 16:40	09:07 15:49
6	09:25 16:02	08:35 17:10	07:22 18:18	06:53 20:29	05:33 21:38	04:35 22:38	04:39 22:45	05:36 21:49	06:45 20:26	07:51 19:00	08:04 16:38	09:09 15:48
7	09:25 16:03	08:33 17:12	07:19 18:20	06:51 20:31	05:30 21:40	04:34 22:39	04:40 22:44	05:39 21:47	06:47 20:23	07:54 18:57	08:06 16:36	09:10 15:47
8	09:24 16:05	08:30 17:15	07:16 18:22	06:48 20:33	05:28 21:42	04:34 22:40	04:42 22:43	05:41 21:44	06:50 20:20	07:56 18:54	08:09 16:33	09:12 15:46
9	09:23 16:07	08:28 17:17	07:14 18:25	06:45 20:36	05:25 21:45	04:33 22:42	04:43 22:42	05:43 21:42	06:52 20:17	07:58 18:51	08:11 16:31	09:13 15:46
10	09:22 16:09	08:25 17:19	07:11 18:27	06:42 20:38	05:23 21:47	04:32 22:43	04:44 22:40	05:45 21:40	06:54 20:15	08:00 18:48	08:13 16:29	09:15 15:45
11	09:21 16:10	08:23 17:22	07:08 18:29	06:39 20:40	05:21 21:49	04:31 22:44	04:46 22:39	05:47 21:37	06:56 20:12	08:03 18:46	08:16 16:27	09:16 15:45
12	09:20 16:12	08:21 17:24	07:05 18:32	06:36 20:43	05:19 21:51	04:31 22:45	04:47 22:38	05:50 21:34	06:58 20:09	08:05 18:43	08:18 16:25	09:18 15:44
13	09:19 16:14	08:18 17:27	07:02 18:34	06:34 20:45	05:16 21:53	04:30 22:46	04:49 22:37	05:52 21:32	07:01 20:06	08:07 18:40	08:20 16:23	09:19 15:44
14	09:17 16:16	08:16 17:29	06:59 18:36	06:31 20:47	05:14 21:56	04:30 22:46	04:51 22:35	05:54 21:29	07:03 20:03	08:09 18:37	08:23 16:21	09:20 15:44
15	09:16 16:18	08:13 17:32	06:57 18:39	06:28 20:49	05:12 21:58	04:29 22:47	04:52 22:34	05:56 21:27	07:05 20:00	08:12 18:34	08:25 16:19	09:21 15:44
16	09:15 16:20	08:11 17:34	06:54 18:41	06:25 20:52	05:10 22:00	04:29 22:48	04:54 22:32	05:59 21:24	07:07 19:57	08:14 18:32	08:27 16:17	09:22 15:44
17	09:13 16:23	08:08 17:37	06:51 18:43	06:22 20:54	05:08 22:02	04:29 22:48	04:56 22:31	06:01 21:21	07:09 19:54	08:16 18:29	08:30 16:15	09:23 15:44
18	09:12 16:25	08:05 17:39	06:48 18:45	06:20 20:56	05:06 22:04	04:29 22:49	04:58 22:29	06:03 21:19	07:11 19:51	08:19 18:26	08:32 16:13	09:24 15:44
19	09:10 16:27	08:03 17:42	06:45 18:48	06:17 20:59	05:04 22:06	04:28 22:49	04:59 22:27	06:05 21:16	07:14 19:49	08:21 18:24	08:34 16:11	09:25 15:44
20	09:09 16:29	08:00 17:44	06:42 18:50	06:14 21:01	05:02 22:08	04:28 22:50	05:01 22:25	06:08 21:13	07:16 19:46	08:23 18:21	08:37 16:09	09:26 15:44
21	09:07 16:31	07:58 17:46	06:39 18:52	06:12 21:03	05:00 22:10	04:29 22:50	05:03 22:24	06:10 21:11	07:18 19:43	08:26 18:18	08:39 16:07	09:26 15:45
22	09:05 16:34	07:55 17:49	06:37 18:55	06:09 21:06	04:58 22:12	04:29 22:50	05:05 22:22	06:12 21:08	07:20 19:40	08:28 18:16	08:41 16:06	09:27 15:45
23	09:04 16:36	07:52 17:51	06:34 18:57	06:06 21:08	04:56 22:14	04:29 22:50	05:07 22:20	06:14 21:05	07:22 19:37	08:30 18:13	08:43 16:04	09:27 15:46
24	09:02 16:38	07:50 17:54	06:31 18:59	06:03 21:10	04:54 22:16	04:29 22:50	05:09 22:18	06:16 21:03	07:25 19:34	08:33 18:10	08:45 16:02	09:28 15:46
25	09:00 16:41	07:47 17:56	06:28 19:01	06:01 21:12	04:52 22:18	04:30 22:50	05:11 22:16	06:19 21:00	07:27 19:31	07:35 17:08	08:48 16:01	09:28 15:47
26	08:58 16:43	07:44 17:59	06:25 19:04	05:58 21:15	04:51 22:20	04:30 22:50	05:13 22:14	06:21 20:57	07:29 19:28	07:38 17:05	08:50 15:59	09:28 15:48
27	08:56 16:45	07:41 18:01	06:22 19:06	05:55 21:17	04:49 22:22	04:31 22:50	05:15 22:12	06:23 20:54	07:31 19:25	07:40 17:03	08:52 15:58	09:28 15:49
28	08:54 16:48	07:39 18:03	06:19 19:08	05:53 21:19	04:47 22:24	04:31 22:50	05:17 22:10	06:25 20:51	07:33 19:23	07:42 17:00	08:54 15:56	09:28 15:50
29	08:52 16:50	07:36 18:11	06:16 19:11	05:50 21:22	04:46 22:25	04:32 22:49	05:19 22:08	06:28 20:49	07:36 19:20	07:45 16:57	08:56 15:55	09:28 15:51
30	08:50 16:52	07:33 18:13	06:13 19:13	05:48 21:24	04:44 22:27	04:33 22:49	05:21 22:05	06:30 20:46	07:38 19:17	07:47 16:55	08:58 15:54	09:28 15:52
31	08:48 16:55	07:28 18:15	06:11 19:15	05:43 21:24	04:43 22:29	04:33 22:50	05:23 22:03	06:32 20:43	07:49 16:52	07:58 15:52	09:28 15:53	
Mulige solskinstitimer	222	260	365	432	521	546	545	478	386	319	237	200
Samlet, worst case												
Sol reduktion												
Drifttidsred.												
Vindretn. red.												
Samlet reduktion												
Samlet, reel												

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned Solopgang (tt:mm) Første tidspunkt (tt:mm) med skygge (Skygge fra mølle første gang)
Solnedgang (tt:mm) Minutter med skygge Sidste tidspunkt (tt:mm) med skygge (Skygge fra mølle sidste gang)

Projekt:

Friestad

Udskrevet/Side

18.03.2021 10:20 / 7

Brugerlicens:

Vindkraft Projekt AS

Ullandhaugveien 150

NO-4021 Stavanger

+47 88004802

Solvind Projekt AS

Beregnet:

18.03.2021 10:19/2.6.1.252

SHADOW - Kalender

Beregning: 3 x E-48 skyggekast Friestad Skyggemodtager: D - D

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning

1 500 m

Minimum solhøjde over horisont med indflydelse

3 °

Dagstep for beregning

1 dage

Tidsskridt til beregning

1 minutter

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid

N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	Januar	Februar	Marts	April	Maj	Juni	Juli	August	September	Oktober	November	December
1	09:28	08:46	07:36	07:08	05:45	04:41	04:34	05:26	06:34	07:40	07:52	09:00
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	16:55	18:15	19:20	21:24	22:27	22:49	22:03	20:43	19:17	16:52	15:53	15:53
Mulige solskinstimer	222	260	365	432	521	546	545	478	386	319	237	200
Samlet, worst case												
Sol reduktion												
Drifttidsred.												
Vindretn. red.												
Samlet reduktion												
Samlet, reel												

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned	Solopgang (tt:mm)	Første tidspunkt (tt:mm) med skygge	(Skygge fra mølle første gang)
	Solnedgang (tt:mm)	Minutter med skygge	Sidste tidspunkt (tt:mm) med skygge
			(Skygge fra mølle sidste gang)

Projekt:

Friestad

Udskrevet/Side

18.03.2021 10:20 / 8

Brugerlicens:

Vindkraft Projekt AS

Ullandhaugveien 150

NO-4021 Stavanger

+47 88004802

Solvind Projekt AS

Beregnet:

18.03.2021 10:19/2.6.1.252

SHADOW - Kalender

Beregning: 3 x E-48 skyggekast Friestad Skyggemodtager: E - E

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning 1 500 m
 Minimum solhøjde over horisont med indflydelse 3 °
 Dagstep for beregning 1 dage
 Tidsskridt til beregning 1 minutter

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid

N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
 519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

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

Projekt:
Friestad

Udskrevet/Side
18.03.2021 10:20 / 9

Brugerlicens:
Vindkraft Projekt AS
Ullandhaugveien 150
NO-4021 Stavanger
+47 88004802
Solvind Projekt AS
Beregnet:
18.03.2021 10:19/2.6.1.252

SHADOW - Kalender

Beregning: 3 x E-48 skyggekast Friestad Skyggemodtager: F - F

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning 1 500 m
Minimum solhøjde over horisont med indflydelse 3 °
Dagstep for beregning 1 dage
Tidskridt til beregning 1 minutter

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid
N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	Januar	Februar	Marts	April	Maj	Juni	Juli	August	September	Oktober	November	December
1	09:28	08:46	07:36	07:08	05:45	04:41	20:36 (1) 04:34	05:26	20:38 (1) 06:34	07:40	07:52	09:00
	15:54	16:57	18:06	20:17	21:26	22:31	13 20:49 (1) 22:48	22:01	26 21:04 (1) 20:40	19:14	16:50	15:53
2	09:28	08:44	07:33	07:05	05:43	04:40	20:36 (1) 04:35	05:28	20:38 (1) 06:36	07:42	07:54	09:02
	15:56	17:00	18:08	20:20	21:29	22:32	11 20:47 (1) 22:48	21:59	25 21:03 (1) 20:37	19:11	16:48	15:52
3	09:27	08:42	07:30	07:02	05:40	04:39	20:39 (1) 04:36	05:30	20:39 (1) 06:39	07:45	07:57	09:04
	15:57	17:02	18:10	20:22	21:31	22:34	8 20:47 (1) 22:47	21:56	23 21:02 (1) 20:35	19:08	16:45	15:51
4	09:27	08:39	07:28	06:59	05:38	04:38	20:41 (1) 04:37	05:32	20:40 (1) 06:41	07:47	07:59	09:05
	15:59	17:05	18:13	20:24	21:33	22:35	4 20:45 (1) 22:46	21:54	22 21:02 (1) 20:32	19:05	16:43	15:50
5	09:26	08:37	07:25	06:56	05:35	20:35 (1) 04:37	04:38	05:34	20:41 (1) 06:43	07:49	08:01	09:07
	16:00	17:07	18:15	20:27	21:35	11 20:46 (1) 22:37	22:46	21:52	19 21:00 (1) 20:29	19:02	16:40	15:49
6	09:25	08:35	07:22	06:53	05:33	20:33 (1) 04:35	04:39	05:36	20:42 (1) 06:45	07:51	08:04	09:09
	16:02	17:10	18:18	20:29	21:38	15 20:48 (1) 22:38	22:45	21:49	17 20:59 (1) 20:26	19:00	16:38	15:48
7	09:25	08:33	07:19	06:51	05:30	20:31 (1) 04:34	04:40	05:39	20:43 (1) 06:47	07:54	08:06	09:10
	16:03	17:12	18:20	20:31	21:40	18 20:49 (1) 22:39	22:44	21:47	14 20:57 (1) 20:23	18:57	16:36	15:47
8	09:24	08:30	07:16	06:48	05:28	20:30 (1) 04:34	04:42	05:41	20:46 (1) 06:50	07:56	08:09	09:12
	16:05	17:15	18:22	20:33	21:42	21 20:51 (1) 22:40	22:43	21:44	9 20:55 (1) 20:20	18:54	16:33	15:46
9	09:23	08:28	07:14	06:45	05:25	20:29 (1) 04:33	04:43	20:46 (1) 05:43	06:52	07:58	08:11	09:13
	16:07	17:17	18:25	20:36	21:45	23 20:52 (1) 22:42	22:42	7 20:53 (1) 21:42	20:17	18:51	16:31	15:46
10	09:22	08:25	07:11	06:42	05:23	20:29 (1) 04:32	04:44	20:44 (1) 05:45	06:54	08:00	08:13	09:15
	16:09	17:19	18:27	20:38	21:47	23 20:52 (1) 22:43	22:40	10 20:54 (1) 21:40	20:15	18:48	16:29	15:45
11	09:21	08:23	07:08	06:39	05:21	20:28 (1) 04:31	04:46	20:44 (1) 05:47	06:56	08:03	08:16	09:16
	16:10	17:22	18:29	20:40	21:49	25 20:53 (1) 22:44	22:39	12 20:56 (1) 21:37	20:12	18:46	16:27	15:45
12	09:20	08:21	07:05	06:36	05:19	20:28 (1) 04:31	04:47	20:43 (1) 05:50	06:58	08:05	08:18	09:18
	16:12	17:24	18:32	20:43	21:51	25 20:53 (1) 22:45	22:38	14 20:57 (1) 21:34	20:09	18:43	16:25	15:44
13	09:19	08:18	07:02	06:34	05:16	20:27 (1) 04:30	04:49	20:42 (1) 05:52	07:01	08:07	08:20	09:19
	16:14	17:27	18:34	20:45	21:53	27 20:54 (1) 22:46	22:37	17 20:59 (1) 21:32	20:06	18:40	16:23	15:44
14	09:17	08:16	06:59	06:31	05:14	20:27 (1) 04:30	04:51	20:41 (1) 05:54	07:03	08:10	08:23	09:20
	16:16	17:29	18:36	20:47	21:56	27 20:54 (1) 22:46	22:35	18 20:59 (1) 21:29	20:03	18:37	16:21	15:44
15	09:16	08:13	06:57	06:28	05:12	20:27 (1) 04:29	04:52	20:40 (1) 05:56	07:05	08:12	08:25	09:21
	16:18	17:32	18:39	20:49	21:58	27 20:54 (1) 22:47	22:34	19 20:59 (1) 21:27	20:00	18:34	16:19	15:44
16	09:15	08:11	06:54	06:25	05:10	20:26 (1) 04:29	04:54	20:40 (1) 05:59	07:07	08:14	08:27	09:22
	16:20	17:34	18:41	20:52	22:00	28 20:54 (1) 22:48	22:32	21 21:01 (1) 21:24	19:57	18:32	16:17	15:44
17	09:13	08:08	06:51	06:22	05:08	20:26 (1) 04:29	04:56	20:40 (1) 06:01	07:09	08:16	08:30	09:23
	16:23	17:37	18:43	20:54	22:02	28 20:54 (1) 22:48	22:31	22 21:02 (1) 21:21	19:54	18:29	16:15	15:44
18	09:12	08:05	06:48	06:20	05:06	20:27 (1) 04:29	04:58	20:39 (1) 06:03	07:11	08:19	08:32	09:24
	16:25	17:39	18:45	20:56	22:04	28 20:55 (1) 22:49	22:29	23 21:02 (1) 21:19	19:51	18:26	16:13	15:44
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	16:27	17:42	18:48	20:59	22:06	27 20:54 (1) 22:49	22:27	24 21:03 (1) 21:16	19:49	18:24	16:11	15:44
20	09:09	08:00	06:42	06:14	05:02	20:27 (1) 04:28	05:01	20:38 (1) 06:08	07:16	08:23	08:37	09:26
	16:29	17:44	18:50	21:01	22:08	27 20:54 (1) 22:50	22:25	25 21:03 (1) 21:13	19:46	18:21	16:09	15:44
21	09:07	07:58	06:39	06:12	05:00	20:28 (1) 04:29	05:03	20:38 (1) 06:10	07:18	08:26	08:39	09:26
	16:31	17:46	18:52	21:03	22:10	26 20:54 (1) 22:50	22:24	25 21:03 (1) 21:11	19:43	18:18	16:07	15:45
22	09:05	07:55	06:37	06:09	04:58	20:28 (1) 04:29	05:05	20:38 (1) 06:12	07:20	08:28	08:41	09:27
	16:34	17:49	18:55	21:06	22:12	26 20:54 (1) 22:50	22:22	26 21:04 (1) 21:08	19:40	18:16	16:06	15:45
23	09:04	07:52	06:34	06:06	04:56	20:28 (1) 04:29	05:07	20:38 (1) 06:14	07:22	08:30	08:43	09:27
	16:36	17:51	18:57	21:08	22:14	25 20:53 (1) 22:50	22:20	27 21:05 (1) 21:05	19:37	18:13	16:04	15:46
24	09:02	07:50	06:31	06:03	04:54	20:29 (1) 04:29	05:09	20:37 (1) 06:16	07:25	08:33	08:45	09:28
	16:38	17:54	18:59	21:10	22:16	24 20:53 (1) 22:50	22:18	27 21:04 (1) 21:03	19:34	18:10	16:02	15:46
25	09:00	07:47	06:28	06:01	04:52	20:29 (1) 04:30	05:11	20:37 (1) 06:19	07:27	08:35	08:48	09:28
	16:41	17:56	19:01	21:12	22:18	23 20:52 (1) 22:50	22:16	28 21:05 (1) 21:00	19:31	17:08	16:01	15:47
26	08:58	07:44	06:25	05:58	04:51	20:30 (1) 04:30	05:13	20:37 (1) 06:21	07:29	08:38	08:50	09:28
	16:43	17:59	19:04	21:15	22:20	22 20:52 (1) 22:50	22:14	28 21:05 (1) 20:57	19:28	17:05	15:59	15:48
27	08:56	07:41	06:22	05:55	04:49	20:31 (1) 04:31	05:15	20:37 (1) 06:23	07:31	08:40	08:52	09:28
	16:45	18:01	19:06	21:17	22:22	21 20:52 (1) 22:50	22:12	28 21:05 (1) 20:54	19:25	17:03	15:58	15:49
28	08:54	07:39	06:19	05:53	04:47	20:31 (1) 04:31	05:17	20:38 (1) 06:25	07:33	08:42	08:54	09:28
	16:48	18:03	19:08	21:19	22:24	20 20:51 (1) 22:50	22:10	27 21:05 (1) 20:52	19:23	17:00	15:56	15:49
29	08:52	07:16	05:50	04:46	04:46	20:32 (1) 04:32	05:19	20:37 (1) 06:28	07:36	08:45	08:56	09:28
	16:50	20:11	21:22	22:25	19 20:51 (1) 22:49	22:08	27 21:04 (1) 20:49	20:30	19:20	16:57	15:55	15:51
30	08:50	07:13	05:48	04:44	04:44	20:33 (1) 04:33	05:21	20:37 (1) 06:30	07:38	08:47	08:58	09:28
	16:52	20:13	21:24	22:27	17 20:50 (1) 22:49	22:05	27 21:04 (1) 20:46	20:32	19:17	16:55	15:54	15:52
31	08:48	07:11	04:43	04:43	04:43	20:35 (1) 04:35	05:23	20:37 (1) 06:32	07:49	08:58	09:09	09:28
	16:55	20:15	21:26	22:29	15 20:50 (1) 22:49	22:03	27 21:04 (1) 20:43	20:34	16:52	15:53	15:53	15:53
Mulige solskinstimer	222	260	365	432	521	546	545	478	386	319	237	200
Samlet, worst case					618		509	155				
Sol reduktion					0,50		0,50	0,50				
Drifttidsred.					0,80		0,80	0,80				
Vindretn. red.					0,81		0,81	0,81				
Samlet reduktion					0,32		0,32	0,32				
Samlet, reel					199		164	50				

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned Solopgang (tt:mm) Første tidspunkt (tt:mm) med skygge (Skygge fra mølle første gang)
Solnedgang (tt:mm) Minutter med skygge Sidste tidspunkt (tt:mm) med skygge (Skygge fra mølle sidste gang)

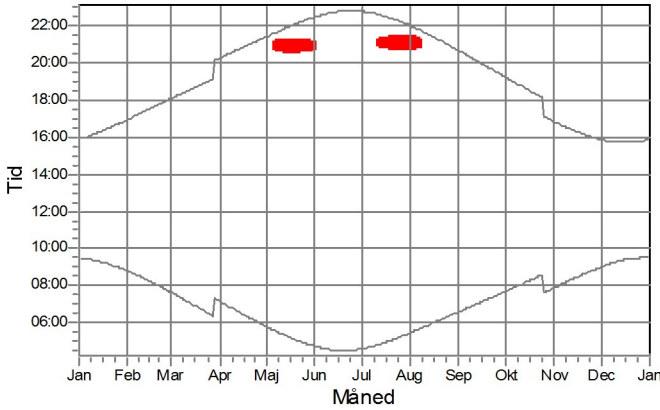
Projekt:
Friestad

Udskrevet/Side
18.03.2021 10:20 / 10
Brugerlicens:
Vindkraft Projektering AS
Ullandhaugveien 150
NO-4021 Stavanger
+47 88004802
Solvind Projekt AS
Beregnet:
18.03.2021 10:19/2.6.1.252

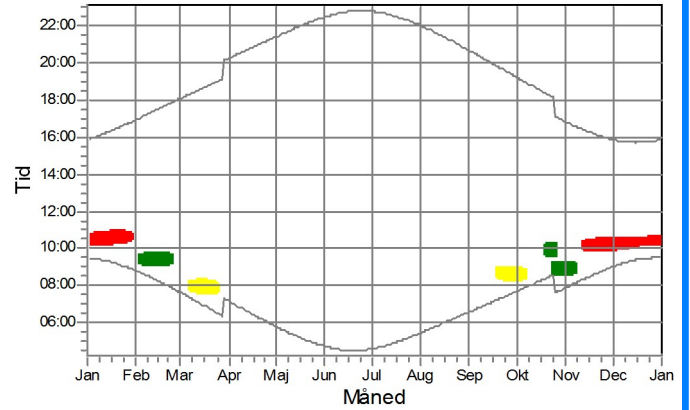
SHADOW - Kalender, grafisk

Beregning: 3 x E-48 skyggekast Friestad

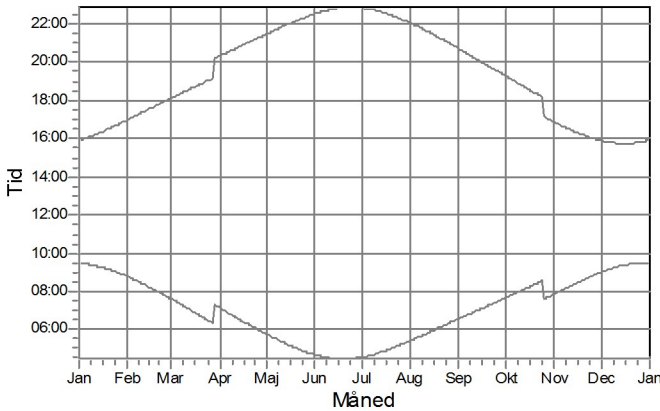
A: A



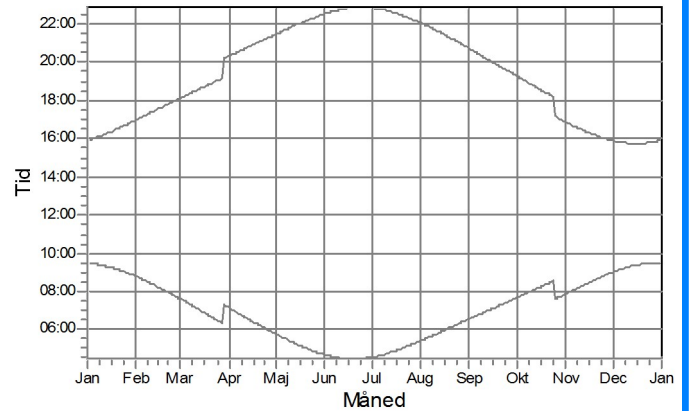
B: B



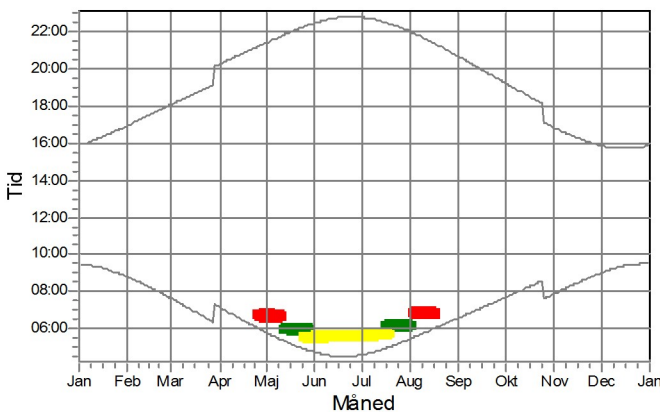
C: C



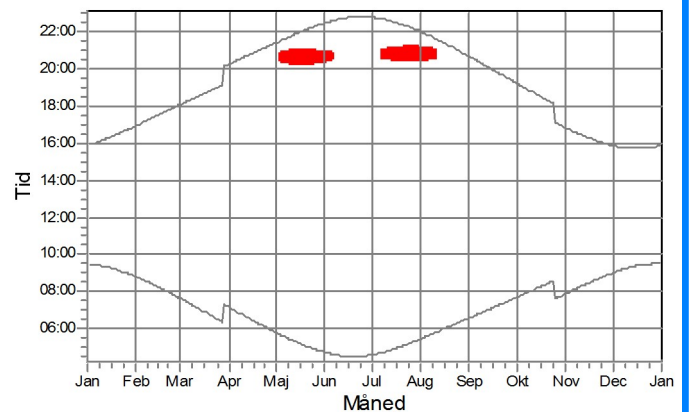
D: D



E: E



F: F



Møller

- 1: ENERCON E-48 800 48.0 !O! nav: 75,6 m (30.1)
- 2: ENERCON E-48 800 48.0 !O! nav: 64,6 m (30.2)
- 3: ENERCON E-48 800 48.0 !O! nav: 64,6 m (30.3)

Projekt:

Friestad

Udskrevet/Side

18.03.2021 10:20 / 11

Brugerlicens:

Vindkraft Projektering AS

Ullandhaugveien 150

NO-4021 Stavanger

+47 88004802

Solvind Projekt AS

Beregnet:

18.03.2021 10:19/2.6.1.252

SHADOW - Kalender pr. mølle**Beregning:** 3 x E-48 skyggekast Friestad **Mølle:** 1 - ENERCON E-48 800 48.0 !O! nav: 75,6 m (30.1)**Forudsætninger for skyggeberegning**

Maksimal afstand for påvirkning

1 500 m

Minimum solhøjde over horisont med indflydelse

3 °

Dagstep for beregning

1 dage

Tidsskridt til beregning

1 minutter

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid

N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	Januar	Februar	Marts	April	Maj	Juni
1	09:28 10:21-10:35/14 15:54	08:46 16:57	07:36 18:06	07:08 20:17	05:45 06:31-06:51/20 21:26	04:41 20:36-20:49/13 22:31
2	09:28 10:22-10:36/14 15:56	08:44 17:00	07:33 18:08	07:05 20:20	05:43 06:31-06:51/20 21:29	04:40 20:36-20:47/11 22:32
3	09:27 10:21-10:37/16 15:57	08:42 17:02	07:30 18:10	07:02 20:22	05:40 06:30-06:51/21 21:31	04:39 20:39-20:47/8 22:34
4	09:27 10:21-10:38/17 15:59	08:39 17:05	07:28 18:13	06:59 20:24	05:38 06:31-06:51/20 21:33	04:38 20:41-20:45/4 22:35
5	09:26 10:21-10:39/18 16:00	08:37 17:07	07:25 18:15	06:56 20:27	05:35 06:31-06:50/19 21:35	04:37 22:37
6	09:25 10:21-10:40/19 16:02	08:35 17:10	07:22 18:18	06:53 20:29	05:33 06:32-06:50/18 21:38	04:35 22:38
7	09:25 10:21-10:41/20 16:03	08:33 17:12	07:19 18:20	06:51 20:31	05:30 06:32-06:50/18 20:53-21:01/8 21:40	04:34 22:39
8	09:24 10:22-10:42/20 16:05	08:30 17:15	07:17 18:22	06:48 20:33	05:28 06:32-06:48/16 21:42	04:34 22:40
9	09:23 10:21-10:42/21 16:07	08:28 17:17	07:14 18:25	06:45 20:36	05:25 06:33-06:47/14 21:45	04:33 22:42
10	09:22 10:22-10:43/21 16:09	08:25 17:20	07:11 18:27	06:42 20:38	05:23 06:35-06:45/10 21:47	04:32 22:43
11	09:21 10:22-10:44/22 16:10	08:23 17:22	07:08 18:29	06:39 20:40	05:21 06:37-06:43/6 21:49	04:31 22:44
12	09:20 10:22-10:44/22 16:12	08:21 17:24	07:05 18:32	06:36 20:43	05:19 20:28-21:07/39 21:51	04:31 22:45
13	09:19 10:22-10:44/22 16:14	08:18 17:27	07:02 18:34	06:34 20:45	05:16 20:27-21:08/41 21:53	04:30 22:46
14	09:17 10:23-10:45/22 16:16	08:16 17:29	06:59 18:36	06:31 20:47	05:14 20:27-21:08/41 21:56	04:30 22:46
15	09:16 10:22-10:45/23 16:18	08:13 17:32	06:57 18:39	06:28 20:49	05:12 20:27-21:08/41 21:58	04:29 22:47
16	09:15 10:23-10:46/23 16:20	08:11 17:34	06:54 18:41	06:25 20:52	05:10 20:26-21:08/42 22:00	04:29 22:48
17	09:13 10:24-10:47/23 16:23	08:08 17:37	06:51 18:43	06:23 20:54	05:08 20:26-21:08/42 22:02	04:29 22:49
18	09:12 10:24-10:47/23 16:25	08:05 17:39	06:48 18:45	06:20 20:56	05:06 20:27-21:09/42 22:04	04:29 22:49
19	09:10 10:25-10:47/22 16:27	08:03 17:42	06:45 18:48	06:17 20:59	05:04 20:27-21:08/41 22:06	04:28 22:49
20	09:09 10:25-10:47/22 16:29	08:00 17:44	06:42 18:50	06:14 21:01	05:02 20:27-21:08/41 22:08	04:28 22:50
21	09:07 10:26-10:47/21 16:31	07:58 17:46	06:39 18:52	06:12 21:03	05:00 20:28-21:08/40 22:10	04:29 22:50
22	09:05 10:26-10:47/21 16:34	07:55 17:49	06:37 18:55	06:09 21:06	04:58 20:28-21:08/40 22:12	04:29 22:50
23	09:04 10:27-10:47/20 16:36	07:52 17:51	06:34 18:57	06:06 21:08	04:56 20:28-21:07/39 22:14	04:29 22:50
24	09:02 10:27-10:46/19 16:38	07:50 17:54	06:31 18:59	06:03 21:10	04:54 20:29-21:07/38 22:16	04:29 22:50
25	09:00 10:29-10:45/16 16:41	07:47 17:56	06:28 19:01	06:01 06:40-06:45/5 21:13	04:52 20:29-21:06/37 22:18	04:30 22:50
26	08:58 10:30-10:44/14 16:43	07:44 17:59	06:25 19:04	05:58 06:36-06:47/11 21:15	04:51 20:30-21:06/36 22:20	04:30 22:50
27	08:56 10:33-10:43/10 16:45	07:41 18:01	06:22 19:06	05:55 06:35-06:49/14 21:17	04:49 20:31-21:06/35 22:22	04:31 22:50
28	08:54 10:36-10:39/3 16:48	07:39 18:03	06:19 19:08	05:53 06:33-06:50/17 21:19	04:47 20:31-20:51/20 22:24	04:31 22:50
29	08:52 16:50		07:16 20:11	05:50 06:32-06:51/19 21:22	04:46 20:32-20:51/19 22:26	04:32 22:49
30	08:50 16:53		07:14 20:13	05:48 06:32-06:51/19 21:24	04:44 20:33-20:50/17 22:27	04:33 22:49
31	08:48 16:55		07:11 20:15		04:43 20:35-20:50/15 22:29	
Mulige solskinstimer	222	260	365	432	521	546
Antal minutter med skyggekast	528	0	0	85	1114	36

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned	Solopgang (tt:mm)	Første tidspunkt (tt:mm) med skygge	Sidste tidspunkt (tt:mm) med skygge	Minutter med skygge
	Solnedgang (tt:mm)	Første tidspunkt (tt:mm) med skygge	Sidste tidspunkt (tt:mm) med skygge	Minutter med skygge

Projekt:
Friestad

Udskrevet/Side
18.03.2021 10:20 / 12
Brugerlicens:
Vindkraft Prosjektering AS
Ullandhaugveien 150
NO-4021 Stavanger
+47 88004802
Solvind Prosjekt AS
Beregnet:
18.03.2021 10:19/2.6.1.252

SHADOW - Kalender pr. mølle

Beregning: 3 x E-48 skyggekast Friestad **Mølle:** 1 - ENERCON E-48 800 48.0 !O! nav: 75,6 m (30.1)

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning 1 500 m
Minimum solhøjde over horisont med indflydelse 3 °
Dagstep for beregning 1 dage
Tidskridt til beregning 1 minutter

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid

N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	July	August	September	Oktober	November	December		
1	04:34 22:49	05:26 20:38-21:17/39 22:01	06:34 20:40	07:40 19:14	07:52 16:50	09:00 10:04-10:26/22 15:53		
2	04:35 22:48	05:28 06:46-06:54/8 21:59 20:38-21:17/39	06:36 20:37	07:42 19:11	07:54 16:48	09:02 10:05-10:26/21 15:52		
3	04:36 22:47	05:30 06:44-06:56/12 21:57 20:39-21:16/37	06:39 20:35	07:45 19:08	07:57 16:45	09:04 10:05-10:26/21 15:51		
4	04:37 22:47	05:32 06:43-06:57/14 21:54 20:40-21:14/34	06:41 20:32	07:47 19:05	07:59 16:43	09:05 10:06-10:26/20 15:50		
5	04:38 22:46	05:34 06:42-06:58/16 21:02-21:13/11 21:52 20:41-21:00/19	06:43 20:29	07:49 19:03	08:01 16:40	09:07 10:07-10:26/19 15:49		
6	04:39 22:45	05:36 06:41-06:59/18 21:04-21:10/6 21:49 20:42-20:59/17	06:45 20:26	07:51 19:00	08:04 16:38	09:09 10:07-10:26/19 15:48		
7	04:40 22:44	05:39 06:41-07:00/19 21:47 20:43-20:57/14	06:47 20:23	07:54 18:57	08:06 16:36	09:10 10:08-10:26/18 15:47		
8	04:42 22:43	05:41 06:40-07:00/20 21:45 20:46-20:55/9	06:50 20:20	07:56 18:54	08:09 16:33	09:12 10:09-10:26/17 15:46		
9	04:43 20:46-20:53/7 22:42	05:43 06:40-07:00/20 21:42	06:52 20:17	07:58 18:51	08:11 16:31	09:14 10:10-10:25/15 15:46		
10	04:44 20:44-20:54/10 22:41	05:45 06:40-07:00/20 21:40	06:54 20:15	08:00 18:48	08:13 16:29	09:15 10:11-10:26/15 15:45		
11	04:46 20:44-20:56/12 22:39	05:47 06:39-07:00/21 21:37	06:56 20:12	08:03 18:46	08:16 16:27	09:16 10:12-10:26/14 15:45		
12	04:47 20:43-20:57/14 22:38	05:50 06:39-06:59/20 21:35	06:58 20:09	08:05 18:43	08:18 16:25	09:18 10:13-10:26/13 15:44		
13	04:49 20:42-20:59/17 22:37 21:05-21:10/5	05:52 06:40-06:59/19 21:32	07:01 20:06	08:07 18:40	08:21 16:23	09:19 10:13-10:25/12 15:44		
14	04:51 20:41-20:59/18 22:35 21:03-21:11/8	05:54 06:40-06:58/18 21:29	07:03 20:03	08:10 18:37	08:23 10:08-10:12/4 16:21	09:20 10:15-10:26/11 15:44		
15	04:52 20:40-20:59/19 22:34 21:01-21:12/11	05:56 06:41-06:57/16 21:27	07:05 20:00	08:12 18:35	08:25 10:04-10:15/11 16:19	09:21 10:16-10:26/10 15:44		
16	04:54 20:40-21:14/34 22:32	05:59 06:42-06:55/13 21:24	07:07 19:57	08:14 18:32	08:28 10:03-10:17/14 16:17	09:22 10:16-10:25/9 15:44		
17	04:56 20:40-21:15/35 22:31	06:01 06:43-06:54/11 21:22	07:09 19:54	08:16 18:29	08:30 10:03-10:19/16 16:15	09:23 10:17-10:25/8 15:44		
18	04:58 20:39-21:15/36 22:29	06:03 06:47-06:51/4 21:19	07:11 19:51	08:19 18:26	08:32 10:01-10:20/19 16:13	09:24 10:19-10:26/7 15:44		
19	04:59 20:39-21:16/37 22:27	06:05 21:16	07:14 19:49	08:21 18:24	08:34 10:01-10:21/20 16:11	09:25 10:20-10:26/6 15:44		
20	05:01 20:38-21:16/38 22:26	06:08 21:13	07:16 19:46	08:23 18:21	08:37 10:01-10:22/21 16:09	09:26 10:21-10:26/5 15:44		
21	05:03 20:38-21:17/39 22:24	06:10 21:11	07:18 19:43	08:26 18:18	08:39 10:01-10:22/21 16:07	09:26 10:21-10:26/5 15:45		
22	05:05 20:38-21:18/40 22:22	06:12 21:08	07:20 19:40	08:28 18:16	08:41 10:01-10:23/22 16:06	09:27 10:22-10:27/5 15:45		
23	05:07 20:38-21:19/41 22:20	06:14 21:05	07:22 19:37	08:30 18:13	08:43 10:01-10:23/22 16:04	09:27 10:22-10:27/5 15:46		
24	05:09 20:37-21:18/41 22:18	06:16 21:03	07:25 19:34	08:33 18:10	08:46 10:01-10:24/23 16:02	09:28 10:22-10:28/6 15:46		
25	05:11 20:37-21:19/42 22:16	06:19 21:00	07:27 19:31	08:35 17:08	08:48 10:01-10:24/23 16:01	09:28 10:22-10:28/6 15:47		
26	05:13 20:37-21:19/42 22:14	06:21 20:57	07:29 19:28	08:38 17:05	08:50 10:02-10:25/23 15:59	09:28 10:21-10:29/8 15:48		
27	05:15 20:37-21:19/42 22:12	06:23 20:54	07:31 19:25	08:40 17:03	08:52 10:02-10:24/22 15:58	09:28 10:21-10:30/9 15:49		
28	05:17 20:38-21:19/41 22:10	06:25 20:52	07:34 19:23	08:42 17:00	08:54 10:03-10:25/22 15:56	09:29 10:22-10:31/9 15:50		
29	05:19 20:37-21:18/41 22:08	06:28 20:49	07:36 19:20	08:45 16:57	08:56 10:03-10:25/22 15:55	09:28 10:22-10:32/10 15:51		
30	05:21 20:37-21:18/41 22:06	06:30 20:46	07:38 19:17	08:47 16:55	08:58 10:03-10:25/22 15:54	09:28 10:22-10:34/12 15:52		
31	05:23 20:37-21:18/41 22:03	06:32 20:43	 	08:49 16:52	 	09:28 10:21-10:34/13 15:53		
	Mulige solskinstimer	545	478	386	319	237	327	370
	Antal minutter med skyggekast	752	494	0	0	327		370

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned Solopgang (tt:mm) Første tidspunkt (tt:mm) med skygge-Sidste tidspunkt (tt:mm) med skygge/Minutter med skygge
Solnedgang (tt:mm) Første tidspunkt (tt:mm) med skygge-Sidste tidspunkt (tt:mm) med skygge/Minutter med skygge

Projekt:

Friestad

Udskrevet/Side

18.03.2021 10:20 / 13

Brugerlicens:

Vindkraft Prosjektering AS

Ullandhaugveien 150

NO-4021 Stavanger

+47 88004802

Solvind Prosjekt AS

Beregnet:

18.03.2021 10:19/2.6.1.252

SHADOW - Kalender pr. mølle**Beregning:** 3 x E-48 skyggekast Friestad **Mølle:** 2 - ENERCON E-48 800 48.0 !O! nav: 64,6 m (30.2)**Forudsætninger for skyggeberegning**

Maksimal afstand for påvirkning

1 500 m

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Minimum solhøjde over horisont med indflydelse

3 °

Dagstep for beregning

1 dage

Tidsskridt til beregning

1 minutter

Driftstid

N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	Januar	Februar	Marts	April	Maj	Juni
1	09:28 15:54	08:46 16:57	07:36 18:06	07:08 20:17	05:45 21:26	04:41 22:31
2	09:28 15:56	08:44 17:00	07:33 18:08	07:05 20:20	05:43 21:29	04:40 22:32
3	09:27 15:57	08:42 17:02	07:30 18:10	07:02 20:22	05:40 21:31	04:39 22:34
4	09:27 15:59	08:39 17:05	07:28 18:13	07:28 20:24	06:59 21:33	05:38 22:35
5	09:26 16:00	08:37 17:07	07:25 18:15	07:25 20:27	06:56 21:35	05:35 22:37
6	09:25 16:02	08:35 17:10	07:22 18:18	07:22 20:29	06:53 21:38	05:33 22:38
7	09:25 16:03	08:33 17:12	07:19 18:20	07:19 20:31	06:51 21:40	05:30 22:39
8	09:24 16:05	08:30 17:15	07:17 18:22	07:17 20:33	06:48 21:42	05:28 22:40
9	09:23 16:07	08:28 17:17	07:14 18:25	07:14 20:36	06:45 21:45	05:25 22:42
10	09:22 16:09	08:25 17:19	07:11 18:27	07:11 20:38	06:42 21:47	05:23 22:43
11	09:21 16:10	08:23 17:22	07:08 18:29	07:08 20:40	06:39 21:49	05:21 22:44
12	09:20 16:12	08:21 17:24	07:05 18:32	07:05 20:43	06:36 21:51	05:19 22:45
13	09:19 16:14	08:18 17:27	07:02 18:34	07:02 20:45	06:34 21:53	05:16 22:46
14	09:17 16:16	08:16 17:29	06:59 18:36	06:59 20:47	06:31 21:56	05:14 22:46
15	09:16 16:18	08:13 17:32	06:57 18:39	06:57 20:49	06:28 21:58	05:12 22:47
16	09:15 16:20	08:11 17:34	06:54 18:41	06:54 20:52	06:25 22:00	05:10 22:48
17	09:13 16:23	08:08 17:37	06:51 18:43	06:51 20:54	06:22 22:02	05:08 22:49
18	09:12 16:25	08:05 17:39	06:48 18:45	06:48 20:56	06:20 22:04	05:06 22:49
19	09:10 16:27	08:03 17:42	06:45 18:48	06:45 20:59	06:17 22:06	05:04 22:49
20	09:09 16:29	08:00 17:44	06:42 18:50	06:42 21:01	06:14 22:08	05:02 22:50
21	09:07 16:31	07:58 17:46	06:39 18:52	06:39 21:03	06:12 22:10	05:00 22:50
22	09:05 16:34	07:55 17:49	06:37 18:55	06:37 21:06	06:09 22:12	05:51 22:50
23	09:04 16:36	07:52 17:51	06:34 18:57	06:34 21:08	06:06 22:14	05:51 22:50
24	09:02 16:38	07:50 17:54	06:31 18:59	06:31 21:10	06:03 22:16	05:52 22:50
25	09:00 16:41	07:47 17:56	06:28 19:01	06:28 21:13	06:01 22:18	05:52 22:50
26	08:58 16:43	07:44 17:59	06:25 19:04	06:25 21:15	05:58 22:20	05:54 22:50
27	08:56 16:45	07:41 18:01	06:22 19:06	06:22 21:17	05:55 22:22	05:55 22:50
28	08:54 16:48	07:39 18:03	06:19 19:08	06:19 21:19	05:53 22:24	05:56 22:50
29	08:52 16:50		07:16 20:11	07:16 21:22	05:50 22:26	05:58 22:49
30	08:50 16:52		07:13 20:13	07:13 21:24	05:48 22:27	05:58 22:49
31	08:48 16:55		07:11 20:15	07:11 21:26	05:46 22:29	05:58 22:49
Mulige solskinstimer	222	260	365	432	521	546
Antal minutter med skyggekast	0	376	0	0	249	0

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned Solopgang (tt:mm) Første tidspunkt (tt:mm) med skygge-Sidste tidspunkt (tt:mm) med skygge/Minutter med skygge
Solnedgang (tt:mm) Første tidspunkt (tt:mm) med skygge-Sidste tidspunkt (tt:mm) med skygge/Minutter med skygge

Projekt:

Friestad

Udskrevet/Side

18.03.2021 10:20 / 14

Brugerlicens:

Vindkraft Projektering AS

Ullandhaugveien 150

NO-4021 Stavanger

+47 88004802

Solvind Projekt AS

Beregnet:

18.03.2021 10:19/2.6.1.252

SHADOW - Kalender pr. mølle**Beregning:** 3 x E-48 skyggekast Friestad **Mølle:** 2 - ENERCON E-48 800 48.0 !O! nav: 64,6 m (30.2)**Forudsætninger for skyggeberegning**

Maksimal afstand for påvirkning

1 500 m

Minimum solhøjde over horisont med indflydelse

3 °

Dagstep for beregning

1 dage

Tidskridt til beregning

1 minutter

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid

N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	July	August	September	Oktober	November	December
1	04:34 22:49	05:26 22:01	06:04-06:14/10	06:34 20:40	07:40 19:14	07:52 16:50
2	04:35 22:48	05:28 21:59	06:07-06:12/5	06:36 20:37	07:42 19:11	07:54 16:48
3	04:36 22:47	05:30 21:57		06:39 20:35	07:45 19:08	07:57 16:45
4	04:37 22:47	05:32 21:54		06:41 20:32	07:47 19:05	07:59 16:43
5	04:38 22:46	05:34 21:52		06:43 20:29	07:49 19:03	08:01 16:40
6	04:39 22:45	05:36 21:49		06:45 20:26	07:51 19:00	08:04 16:38
7	04:40 22:44	05:39 21:47		06:47 20:23	07:54 18:57	08:06 16:36
8	04:42 22:43	05:41 21:45		06:50 20:20	07:56 18:54	08:09 16:33
9	04:43 22:42	05:43 21:42		06:52 20:17	07:58 18:51	08:11 16:31
10	04:44 22:41	05:45 21:40		06:54 20:15	08:00 18:48	08:13 16:29
11	04:46 22:39	05:47 21:37		06:56 20:12	08:03 18:46	08:16 16:27
12	04:47 22:38	05:50 21:35		06:58 20:09	08:05 18:43	08:18 16:25
13	04:49 22:37	05:52 21:32		07:01 20:06	08:07 18:40	08:21 16:23
14	04:51 22:35	05:54 21:29		07:03 20:03	08:10 18:37	08:23 16:21
15	04:52 22:34	06:06-06:12/6	05:56 21:27	07:05 20:00	08:12 18:34	08:25 16:19
16	04:54 22:32	06:04-06:13/9	05:59 21:24	07:07 19:57	08:14 18:32	08:28 16:17
17	04:56 22:31	06:04-06:14/10	06:01 21:22	07:09 19:54	08:16 18:29	08:30 16:15
18	04:58 22:29	06:03-06:15/12	06:03 21:19	07:11 19:51	08:19 18:26	08:32 16:13
19	04:59 22:27	06:02-06:16/14	06:05 21:16	07:14 19:49	08:21 18:24	08:34 16:11
20	05:01 22:26	06:01-06:16/15	06:08 21:13	07:16 19:46	08:23 18:21	08:37 16:09
21	05:03 22:24	06:01-06:17/16	06:10 21:11	07:18 19:43	08:26 18:18	08:39 16:07
22	05:05 22:22	06:01-06:17/16	06:12 21:08	07:20 19:40	08:28 18:16	08:41 16:06
23	05:07 22:20	06:01-06:18/17	06:14 21:05	07:22 19:37	08:30 18:13	08:43 16:04
24	05:09 22:18	06:01-06:17/16	06:16 21:03	07:25 19:34	08:33 18:10	08:46 16:02
25	05:11 22:16	06:01-06:18/17	06:19 21:00	07:27 19:31	08:35 17:08	08:48 16:01
26	05:13 22:14	06:01-06:18/17	06:21 20:57	07:29 19:28	08:38 17:05	08:50 15:59
27	05:15 22:12	06:01-06:18/17	06:23 20:54	07:31 19:25	08:40 17:03	08:52 15:58
28	05:17 22:10	06:02-06:18/16	06:25 20:52	07:33 19:23	08:42 17:00	08:54 15:56
29	05:19 22:08	06:02-06:17/15	06:28 20:49	07:36 19:20	08:45 16:57	08:56 15:55
30	05:21 22:06	06:02-06:16/14	06:30 20:46	07:38 19:17	08:47 16:55	08:58 15:54
31	05:23 22:03	06:03-06:15/12	06:32 20:43	 	07:49 16:52	08:42-09:07/25
	Mulige solskinstimer	545	478	386	319	237
	Antal minutter med skyggekast	239	15	0	270	109

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned	Solopgang (tt:mm)	Første tidspunkt (tt:mm) med skygge	Sidste tidspunkt (tt:mm) med skygge	Minutter med skygge
	Solnedgang (tt:mm)	Første tidspunkt (tt:mm) med skygge	Sidste tidspunkt (tt:mm) med skygge	Minutter med skygge

Projekt:
Friestad

Udskrevet/Side
18.03.2021 10:20 / 16
Brugerlicens:
Vindkraft Projektering AS
Ullandhaugveien 150
NO-4021 Stavanger
+47 88004802
Solvind Projekt AS
Beregnet:
18.03.2021 10:19/2.6.1.252

SHADOW - Kalender pr. mølle

Beregning: 3 x E-48 skyggekast Friestad **Mølle:** 3 - ENERCON E-48 800 48.0 !O! nav: 64,6 m (30.3)

Forudsætninger for skyggeberegning

Maksimal afstand for påvirkning 1 500 m
Minimum solhøjde over horisont med indflydelse 3 °
Dagstep for beregning 1 dage
Tidsskridt til beregning 1 minutter

Solskinssandsynlighed (andel af tid fra solopgang til solnedgang hvor solen skinner)

Jan Feb Mar Apr Maj Jun Jul Aug Sep Okt Nov Dec
0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50 0,00

Driftstid
N NNØ ØNØ Ø ØSØ SSØ S SSV VSV V VNV NNV I alt
519 114 182 361 1 420 1 052 448 252 330 247 555 1 519 6 999

	July	August	September	Oktober	November	December
1	04:34 05:32-05:44/12 22:49	05:26 22:01	06:34 20:40	07:40 08:25-08:48/23 19:14	07:52 16:50	09:00 15:53
2	04:35 05:32-05:45/13 22:48	05:28 21:59	06:36 20:37	07:42 08:26-08:47/21 19:11	07:54 16:48	09:02 15:52
3	04:36 05:32-05:45/13 22:47	05:30 21:57	06:39 20:35	07:45 08:27-08:45/18 19:08	07:57 16:45	09:04 15:51
4	04:37 05:32-05:45/13 22:47	05:32 21:54	06:41 20:32	07:47 08:28-08:43/15 19:05	07:59 16:43	09:05 15:50
5	04:38 05:32-05:46/14 22:46	05:34 21:52	06:43 20:29	07:49 08:32-08:41/9 19:03	08:01 16:40	09:07 15:49
6	04:39 05:32-05:46/14 22:45	05:36 21:49	06:45 20:26	07:51 19:00	08:04 16:38	09:09 15:48
7	04:40 05:32-05:46/14 22:44	05:39 21:47	06:47 20:23	07:54 18:57	08:06 16:36	09:10 15:47
8	04:42 05:32-05:46/14 22:43	05:41 21:45	06:50 20:20	07:56 18:54	08:09 16:33	09:12 15:46
9	04:43 05:32-05:46/14 22:42	05:43 21:42	06:52 20:17	07:58 18:51	08:11 16:31	09:14 15:46
10	04:44 05:33-05:47/14 22:41	05:45 21:40	06:54 20:15	08:00 18:48	08:13 16:29	09:15 15:45
11	04:46 05:33-05:47/14 22:39	05:47 21:37	06:56 20:12	08:03 18:46	08:16 16:27	09:16 15:45
12	04:47 05:33-05:46/13 22:38	05:50 21:35	06:58 20:09	08:05 18:43	08:18 16:25	09:18 15:44
13	04:49 05:33-05:47/14 22:37	05:52 21:32	07:01 20:06	08:07 18:40	08:21 16:23	09:19 15:44
14	04:51 05:33-05:46/13 22:35	05:54 21:29	07:03 20:03	08:10 18:37	08:23 16:21	09:20 15:44
15	04:52 05:34-05:47/13 22:34	05:56 21:27	07:05 20:00	08:12 18:34	08:25 16:19	09:21 15:44
16	04:54 05:34-05:46/12 22:32	05:59 21:24	07:07 19:57	08:14 18:32	08:28 16:17	09:22 15:44
17	04:56 05:36-05:46/10 22:31	06:01 21:22	07:09 19:54	08:16 18:29	08:30 16:15	09:23 15:44
18	04:58 05:37-05:45/8 22:29	06:03 21:19	07:11 19:51	08:19 18:26	08:32 16:13	09:24 15:44
19	04:59 05:39-05:44/5 22:27	06:05 21:16	07:14 08:39-08:43/4 19:49	08:21 18:24	08:34 16:11	09:25 15:44
20	05:01 22:26	06:08 21:13	07:16 08:34-08:47/13 19:46	08:23 18:21	08:37 16:09	09:26 15:44
21	05:03 22:24	06:10 21:11	07:18 08:31-08:48/17 19:43	08:26 18:18	08:39 16:07	09:26 15:45
22	05:05 22:22	06:12 21:08	07:20 08:30-08:50/20 19:40	08:28 18:16	08:41 16:06	09:27 15:45
23	05:07 22:20	06:14 21:05	07:22 08:29-08:51/22 19:37	08:30 18:13	08:43 16:04	09:27 15:46
24	05:09 22:18	06:16 21:03	07:25 08:28-08:51/23 19:34	08:33 18:10	08:46 16:02	09:28 15:46
25	05:11 22:16	06:19 21:00	07:27 08:26-08:51/25 19:31	08:35 17:08	08:48 16:01	09:28 15:47
26	05:13 22:14	06:21 20:57	07:29 08:25-08:51/26 19:28	08:38 17:05	08:50 15:59	09:28 15:48
27	05:15 22:12	06:23 20:54	07:31 08:25-08:51/26 19:25	08:40 17:03	08:52 15:58	09:28 15:49
28	05:17 22:10	06:25 20:52	07:33 08:25-08:51/26 19:23	08:42 17:00	08:54 15:56	09:29 15:49
29	05:19 22:08	06:28 20:49	07:36 08:25-08:50/25 19:20	08:45 16:57	08:56 15:55	09:29 15:50
30	05:21 22:06	06:30 20:46	07:38 08:25-08:49/24 19:17	08:47 16:55	08:58 15:54	09:28 15:52
31	05:23 22:03	06:32 20:43	 	08:49 16:52	 	09:28 15:53
Mulige solskinstimer	545	478	386	319	237	200
Antal minutter med skyggekast	237	0	251	86	0	0

Tabellayout: For hver dag i hver måned udskrives følgende data:

Dage i måned Solopgang (tt:mm) Første tidspunkt (tt:mm) med skygge-Sidste tidspunkt (tt:mm) med skygge/Minutter med skygge
Solnedgang (tt:mm) Første tidspunkt (tt:mm) med skygge-Sidste tidspunkt (tt:mm) med skygge/Minutter med skygge

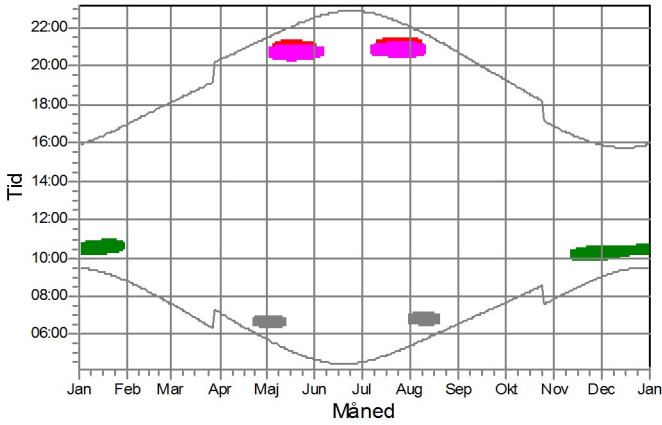
Projekt:
Friestad

Udskrevet/Side
 18.03.2021 10:20 / 17
 Brugerlicens:
Vindkraft Projektering AS
 Ullandhaugveien 150
 NO-4021 Stavanger
 +47 88004802
 Solvind Projekt AS
 Beregnet:
 18.03.2021 10:19/2.6.1.252

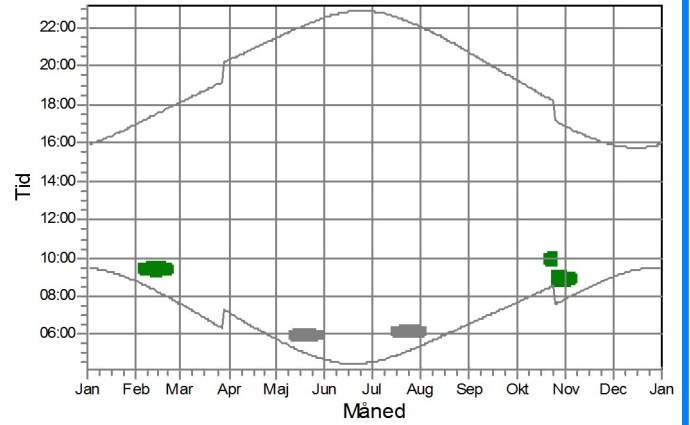
SHADOW - Kalender pr. mølle, grafisk

Beregning: 3 x E-48 skyggekast Friestad

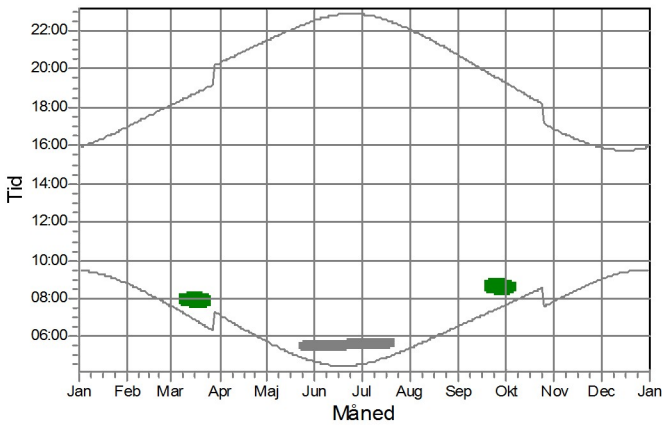
1: ENERCON E-48 800 48.0 IO! nav: 75,6 m (30.1)



2: ENERCON E-48 800 48.0 IO! nav: 64,6 m (30.2)



3: ENERCON E-48 800 48.0 IO! nav: 64,6 m (30.3)



Skyggemodtager



A: A



B: B



E: E



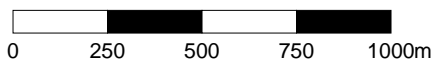
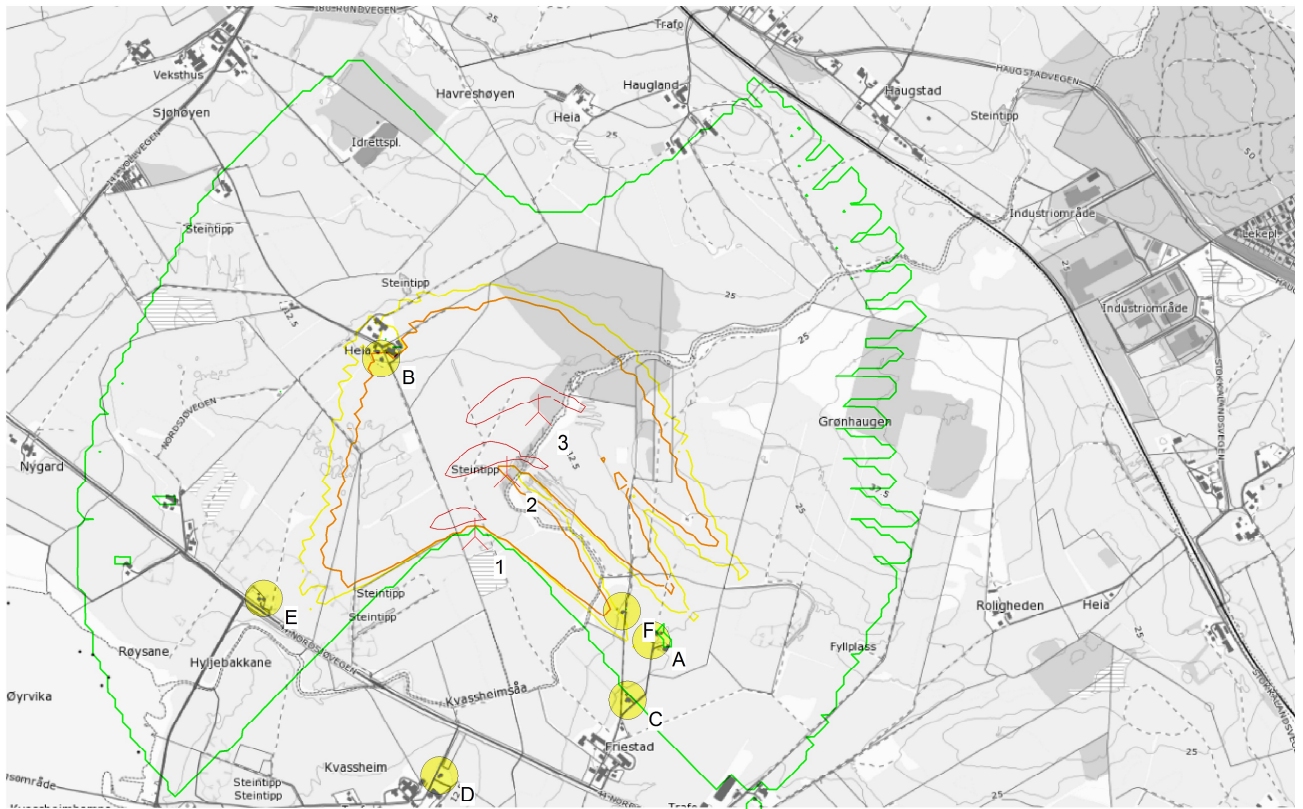
F: F

Projekt:
Friestad

Udskrevet/Side
18.03.2021 10:20 / 18
Brugerlicens:
Vindkraft Prosjektering AS
Ullandhaugveien 150
NO-4021 Stavanger
+47 88004802
Solvind Prosjekt AS
Beregnet:
18.03.2021 10:19/2.6.1.252

SHADOW - Bitmap kort: Export.png

Beregning: 3 x E-48 skyggekast Friestad Fil: Export.png



Kort: , Udskriftsmålestok 1:20 000, Kortcentrum UTM WGS 84 Zone: 32 Øst: 307 895 Nord: 6 494 882

Ny mølle

Skyggemodtager

Isolinier viser skygge i Skyggetimer pr. år. Beregning af reel værdi.

0 8 10 50