

Project:

**FW Cierpice**

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Main Result****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2****Assumptions for shadow calculations**

Maximum distance for influence

Calculate only when more than 20 % of sun is covered by the blade

Please look in WTG table

Minimum sun height over horizon for influence

3 °

Day step for calculation

1 days

Time step for calculation

1 minutes

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Height Contours: CONTOURLINE\_ONLINEDATA\_0.wj

Obstacles used in calculation

Eye height: 1,5 m

Grid resolution: 10,0 m

**WTGs**

Polish GK 1992/19-ETRS89				WTG type			Shadow data				
East	North	Z	Row	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]
data/Description											
1	369 035	311 963	230,0 EW1	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	117,0	1 716	0,0
2	369 480	312 108	225,8 EW2	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	117,0	1 716	0,0
3	369 947	312 060	216,3 EW3	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	117,0	1 716	0,0
4	370 203	311 996	206,6 EW4	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	117,0	1 716	0,0
5	370 551	311 950	195,7 EW5	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	117,0	1 716	0,0
6	369 512	311 787	217,6 EW6	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	117,0	1 716	0,0
7	370 076	311 668	200,9 EW7	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	117,0	1 716	0,0

**Shadow receptor-Input**

Polish GK 1992/19-ETRS89										Direction mode	
No.	Name	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window		
				[m]	[m]	[m]	[m]	[°]	[°]		
A 01	Cierpice 1	370 173	313 022	200,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"	
B 02	Cierpice 2	370 551	312 969	194,6	1,0	1,0	1,0	0,0	90,0	"Green house mode"	
C 03	Cierpice 3	370 826	312 925	190,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"	
D 04	Gołaczów 1	371 280	311 730	190,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"	
E 05	Konary 1	369 161	311 272	220,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"	
F 06	Konary 2	369 861	311 501	210,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"	

**Calculation Results**

Shadow receptor

		Shadow, worst case			Shadow, expected values	
No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]	
A 01	Cierpice 1	33:56	66	0:41	1:52	
B 02	Cierpice 2	28:53	78	0:37	1:38	
C 03	Cierpice 3	37:32	104	0:33	2:15	
D 04	Gołaczów 1	51:32	115	0:40	7:19	

To be continued on next page...

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**SHADOW - Main Result****Calculation:** ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]	
E 05	Konary 1	34:38	94	0:38	4:56	
F 06	Konary 2	40:51	65	0:56	5:52	

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	EW1	48:47	5:31
2	EW2	36:20	2:14
3	EW3	42:33	3:08
4	EW4	19:30	2:21
5	EW5	54:35	8:06
6	EW6	7:58	0:24
7	EW7	40:35	5:26

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## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2Shadow receptor: A - 01 Cierpice 1

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:54	14:21 (1)	07:29	06:38	06:30	05:28	04:45	04:43	05:17	06:04	06:51	06:42	07:30
2	15:57	40	15:22 (1)	16:43	17:32	19:23	20:11	20:54	21:08	20:38	19:39	18:32	16:29
3	15:58	40	14:21 (2)	07:27	06:36	06:28	05:26	04:44	04:43	05:19	06:06	06:52	06:43
4	15:58	40	15:22 (1)	16:44	17:33	19:25	20:13	20:56	21:08	20:37	19:37	18:30	16:27
5	16:00	40	14:22 (2)	07:26	06:34	06:26	05:24	04:44	04:44	05:20	06:07	06:54	06:45
6	16:01	39	15:23 (1)	16:46	17:35	19:26	20:14	20:57	21:07	20:35	19:35	18:28	16:25
7	16:02	39	14:23 (2)	07:24	06:32	06:24	05:23	04:43	04:45	05:22	06:09	06:55	06:47
8	16:03	39	15:24 (1)	16:48	17:37	19:28	20:16	20:58	21:07	20:33	19:32	18:25	16:23
9	16:04	38	14:23 (2)	07:23	06:30	06:21	05:21	04:42	04:46	05:23	06:10	06:57	06:48
10	16:05	38	15:24 (1)	16:50	17:39	19:29	20:17	20:59	21:07	20:32	19:30	18:23	16:22
11	16:06	38	14:24 (2)	07:21	06:27	06:19	05:19	04:42	04:46	05:25	06:12	06:59	06:50
12	16:07	38	15:25 (1)	16:51	17:40	19:31	20:19	20:59	21:06	20:30	19:28	18:21	16:20
13	16:08	38	14:25 (2)	07:20	06:25	06:17	05:17	04:41	04:47	05:26	06:13	07:00	06:52
14	16:09	38	15:25 (1)	16:53	17:42	19:33	20:21	21:00	21:06	20:28	19:26	18:19	16:19
15	16:10	38	14:26 (2)	07:18	06:23	06:15	05:16	04:41	04:48	05:28	06:15	07:02	06:54
16	16:11	38	15:27 (1)	16:55	17:44	19:34	20:22	21:01	21:05	20:27	19:24	18:17	16:17
17	16:12	38	14:27 (2)	07:16	06:21	06:13	05:14	04:40	04:49	05:29	06:17	07:03	06:55
18	16:13	37	15:27 (1)	16:57	17:45	19:36	20:24	21:02	21:04	20:25	19:21	18:15	16:15
19	16:14	37	14:29 (2)	07:15	06:19	06:11	05:12	04:40	04:50	05:31	06:18	07:05	06:57
20	16:15	37	15:28 (1)	16:58	17:47	19:37	20:25	21:03	21:04	20:23	19:19	18:12	16:14
21	16:16	37	14:30 (2)	07:13	06:17	06:08	05:11	04:40	04:51	05:32	06:20	07:07	06:59
22	16:17	37	15:28 (1)	17:00	17:49	19:39	20:27	21:03	21:03	20:21	19:17	18:10	16:12
23	16:18	37	14:32 (2)	07:11	06:14	06:06	05:09	04:39	04:52	05:34	06:21	07:08	07:00
24	16:19	37	15:28 (1)	17:02	17:50	19:41	20:28	21:04	21:02	20:19	19:15	18:08	16:11
25	16:20	37	14:35 (2)	07:09	06:12	06:04	05:08	04:39	04:53	05:35	06:23	07:10	07:02
26	16:21	37	15:28 (1)	17:04	17:52	19:42	20:30	21:05	21:01	20:18	19:12	18:06	16:09
27	16:22	37	15:10 (1)	07:08	06:10	06:02	05:06	04:39	04:54	05:37	06:24	07:11	07:04
28	16:23	37	15:29 (1)	17:06	17:54	19:44	20:31	21:05	21:01	20:16	19:10	18:04	16:08
29	16:24	37	15:10 (1)	07:06	06:08	06:00	05:05	04:39	04:55	05:38	06:26	07:13	07:05
30	16:25	37	15:30 (1)	17:07	17:55	19:46	20:33	21:06	21:00	20:14	19:08	18:02	16:07
31	16:26	37	15:11 (1)	07:04	06:06	05:58	05:03	04:39	04:56	05:40	06:27	07:15	07:07
32	16:27	37	15:30 (1)	17:09	17:57	19:47	20:34	21:06	20:59	20:12	19:06	18:00	16:05
33	16:28	37	15:11 (1)	07:02	06:03	05:56	05:02	04:39	04:57	05:41	06:29	07:16	07:09
34	16:29	37	15:30 (1)	17:11	17:59	19:49	20:35	21:07	20:58	20:10	19:03	17:58	16:04
35	16:30	37	15:12 (1)	07:00	06:01	05:54	05:01	04:39	04:59	05:43	06:30	07:18	07:10
36	16:31	37	15:30 (1)	17:13	18:00	19:50	20:37	21:07	20:57	20:08	19:01	17:56	16:03
37	16:32	37	15:13 (1)	06:58	05:59	05:52	04:59	04:39	05:00	05:44	06:32	07:20	07:12
38	16:33	37	15:29 (1)	17:14	18:02	19:52	20:38	21:08	20:56	20:06	18:59	17:54	16:02
39	16:34	37	15:14 (1)	06:56	05:57	05:49	04:58	04:39	05:01	05:46	06:33	07:21	07:14
40	16:35	37	15:29 (1)	17:16	18:03	19:54	20:40	21:08	20:54	20:04	18:57	17:52	16:01
41	16:36	37	15:15 (1)	06:54	05:55	05:47	04:57	04:39	05:02	05:47	06:35	07:23	07:15
42	16:37	37	15:28 (1)	17:18	18:05	19:55	20:41	21:08	20:53	20:02	18:54	17:49	15:59
43	16:38	37	15:16 (1)	06:52	05:52	05:45	04:55	04:39	05:04	05:49	06:37	07:25	07:17
44	16:39	37	15:27 (1)	17:20	18:07	19:57	20:42	21:08	20:52	20:00	18:52	17:48	15:58
45	16:40	37	15:19 (1)	06:50	05:50	05:43	04:54	04:39	05:05	05:50	06:38	07:26	07:18
46	16:41	37	15:25 (1)	17:21	18:08	19:58	20:44	21:09	20:51	19:58	18:50	17:46	15:57
47	16:42	37	16:48	05:48	05:41	04:53	04:39	05:06	05:52	06:40	07:28	07:20	14:53 (1)
48	16:43	37	17:23	18:10	20:00	20:45	21:09	20:50	19:56	18:48	17:44	15:56	14:59 (1)
49	16:44	37	16:46	05:46	05:39	04:52	04:40	05:08	05:53	06:41	07:29	07:21	14:51 (1)
50	16:45	37	17:25	18:12	20:02	20:46	21:09	20:48	19:54	18:45	17:42	15:55	14:52 (1)
51	16:46	37	16:44	05:43	05:38	04:51	04:40	05:09	05:55	06:43	07:31	07:23	14:49 (1)
52	16:47	37	17:27	18:13	20:03	20:48	21:09	20:47	19:52	18:43	17:40	15:54	14:50 (1)
53	16:48	37	16:42	05:41	05:36	04:50	04:41	05:10	05:57	06:44	07:33	07:25	14:49 (1)
54	16:49	37	17:28	18:15	20:05	20:49	21:09	20:46	19:50	18:41	17:38	15:54	14:50 (1)
55	16:50	37	16:40	05:39	05:34	04:49	04:41	05:12	05:58	06:46	07:35	07:26	14:49 (1)
56	16:51	37	17:30	18:16	20:06	20:50	21:09	20:44	19:47	18:39	17:36	15:53	14:50 (1)
57	16:52	37	16:37	05:32	04:48	04:42	05:13	06:00	06:47	07:37	07:27	14:49 (1)	14:50 (1)
58	16:53	37	16:37	19:18	20:08	20:51	21:08	20:43	19:45	18:37	17:34	15:52	14:50 (1)
59	16:54	37	16:37	06:35	05:30	04:47	04:42	05:14	06:01	06:49	07:38	07:29	14:14 (2)
60	16:55	37	16:39	19:20	20:10	20:52	21:08	20:41	19:43	18:34	17:32	15:51	14:50 (1)
61	16:56	37	16:39	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)
62	16:57	37	16:40	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:50	14:50 (1)
63	16:58	37	16:40	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)
64	16:59	37	16:40	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:50	14:50 (1)
65	17:00	37	16:40	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)
66	17:01	37	16:40	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:50	14:50 (1)
67	17:02	37	16:40	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)
68	17:03	37	16:40	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:50	14:50 (1)
69	17:04	37	16:40	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)
70	17:05	37	16:40	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:50	14:50 (1)
71	17:06	37	16:40	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)
72	17:07	37	16:40	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:50	14:50 (1)
73	17:08	37	16:40	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)
74	17:09	37	16:40	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:50	14:50 (1)
75	17:10	37	16:40	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)
76	17:11	37	16:40	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:50	14:50 (1)
77	17:12	37	16:40	06:32	05:25	04:46	04:41	05:16	06:03	06:51	07:40	07:31	14:50 (1)</

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## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2Shadow receptor: B - 02 Cierpice 2

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

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177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	07:54	14:10 (3)	07:29	15:30 (2)	06:38	06:30	05:28	04:45	04:43	05:17	06:04	06:51	06:42	07:30		
2	15:57	29	14:59 (6)	16:43	15	15:45 (2)	17:32	19:23	20:11	20:54	21:08	20:38	19:39	18:32	16:29	15:51
3	07:54	14:11 (3)	07:27	15:31 (2)	06:36	06:28	05:26	04:44	04:43	05:19	06:06	06:52	06:43	07:32	16:27	15:50
4	15:58	27	14:59 (6)	16:44	13	15:44 (2)	17:33	19:25	20:13	20:56	21:08	20:37	19:37	18:30	16:27	15:50
5	07:53	14:13 (3)	07:26	15:34 (2)	06:34	06:26	05:24	04:44	04:44	05:20	06:07	06:54	06:45	07:33	16:27	15:50
6	15:59	24	15:00 (6)	16:46	8	15:42 (2)	17:35	19:26	20:14	20:57	21:07	20:35	19:35	18:28	16:25	15:49
7	07:53	14:15 (3)	07:24	15:32	06:32	06:24	05:23	04:43	04:45	05:22	06:09	06:55	06:47	07:34	16:25	15:49
8	15:00	21	15:00 (6)	16:48	17:37	19:28	20:16	20:58	21:07	20:33	19:32	18:25	16:23	15:49	14:39 (6)	14:39 (6)
9	07:53	14:16 (3)	07:23	15:30	06:30	06:21	05:21	04:42	04:46	05:23	06:10	06:57	06:48	07:36	16:23	15:49
10	15:01	16	14:59 (6)	16:50	17:38	19:29	20:17	20:58	21:07	20:32	19:30	18:23	16:22	15:49	14:43	14:43 (6)
11	07:53	14:51 (6)	07:21	15:32	06:27	06:19	05:19	04:42	04:46	05:25	06:12	06:59	06:50	07:37	16:22	15:49
12	16:02	8	14:59 (6)	16:51	17:40	19:31	20:19	20:59	21:06	20:30	19:28	18:21	16:20	15:48	14:44	14:44 (6)
13	07:53	14:52 (6)	07:20	15:33	06:25	06:17	05:17	04:41	04:47	05:26	06:13	07:00	06:52	07:38	16:20	15:48
14	16:04	5	14:57 (6)	16:53	17:42	19:33	20:21	21:00	21:06	20:28	19:26	18:19	16:19	15:48	14:46	14:46 (6)
15	07:52	07:18	15:30	16:15	06:23	06:15	05:16	04:41	04:48	05:28	06:15	07:02	06:54	15:03 (2)	15:03 (2)	15:03 (2)
16	16:05	16:55	17:44	19:34	20:22	21:01	21:05	20:27	19:24	18:17	16:17	15:13 (2)	15:17	14:47 (6)	14:47 (6)	14:47 (6)
17	07:52	07:16	15:31	16:16	06:21	06:13	05:14	04:40	04:49	05:29	06:17	07:03	06:55	15:02 (2)	15:02 (2)	15:02 (2)
18	16:06	16:57	17:45	19:36	20:24	21:02	21:04	20:25	19:21	18:15	16:15	15:15 (2)	15:17	14:47 (6)	14:47 (6)	14:47 (6)
19	07:51	07:15	15:32	16:17	06:19	06:10	05:12	04:40	04:50	05:31	06:18	07:05	06:57	15:00 (2)	15:00 (2)	15:00 (2)
20	16:07	16:58	17:47	19:37	20:25	21:03	21:04	20:23	19:19	18:12	16:14	15:16 (2)	15:17	14:47 (6)	14:47 (6)	14:47 (6)
21	07:51	07:13	15:33	16:18	06:17	06:08	05:11	04:40	04:51	05:32	06:20	07:07	06:59	15:00 (2)	15:00 (2)	15:00 (2)
22	16:09	17:00	17:49	19:39	20:27	21:03	21:03	20:21	19:17	18:10	16:12	15:18 (2)	15:17	14:47 (6)	14:47 (6)	14:47 (6)
23	07:50	07:11	15:34	16:19	06:14	06:06	05:09	04:39	04:52	05:34	06:21	07:08	07:00	15:00 (2)	15:00 (2)	15:00 (2)
24	16:10	17:02	17:50	19:41	20:28	21:04	21:02	20:19	19:15	18:08	16:11	15:19 (2)	15:17	14:47 (6)	14:47 (6)	14:47 (6)
25	07:49	15:29 (2)	07:09	15:35 (2)	06:12	06:04	05:08	04:39	04:53	05:35	06:23	07:10	07:02	15:00 (2)	15:00 (2)	15:00 (2)
26	16:12	6	15:35 (2)	17:04	17:52	19:42	20:30	21:05	21:01	20:18	19:12	18:06	16:09	15:20 (2)	15:20 (2)	15:20 (2)
27	07:49	15:28 (2)	07:07	15:38 (2)	06:10	06:02	05:06	04:39	04:54	05:37	06:24	07:11	07:04	15:00 (2)	15:00 (2)	15:00 (2)
28	16:13	10	15:38 (2)	17:06	17:54	19:44	20:31	21:05	21:01	20:16	19:10	18:04	16:08	15:20 (2)	15:20 (2)	15:20 (2)
29	07:48	15:27 (2)	07:06	15:39 (2)	06:08	06:00	05:05	04:39	04:55	05:38	06:26	07:13	07:05	15:00 (2)	15:00 (2)	15:00 (2)
30	16:15	13	15:40 (2)	17:07	17:55	19:45	20:33	21:06	21:00	20:14	19:08	18:02	16:07	15:20 (2)	15:20 (2)	15:20 (2)
31	07:47	15:26 (2)	07:04	15:41 (2)	06:06	05:58	05:03	04:39	04:56	05:40	06:27	07:15	07:07	15:00 (2)	15:00 (2)	15:00 (2)
32	16:16	15	15:41 (2)	17:09	17:57	19:47	20:34	21:06	20:59	20:12	19:06	18:00	16:05	15:20 (2)	15:20 (2)	15:20 (2)
33	07:46	15:26 (2)	07:02	15:42 (2)	06:03	05:56	05:02	04:38	04:57	05:41	06:29	07:16	07:09	15:00 (2)	15:00 (2)	15:00 (2)
34	16:18	16	15:42 (2)	17:11	17:59	19:49	20:35	21:07	20:58	20:10	19:03	17:58	16:04	15:20 (2)	15:20 (2)	15:20 (2)
35	07:46	15:25 (2)	07:00	15:43 (2)	06:01	05:54	05:01	04:38	04:59	05:43	06:30	07:18	07:10	15:00 (2)	15:00 (2)	15:00 (2)
36	16:19	18	15:43 (2)	17:13	18:00	19:50	20:37	21:07	20:57	20:08	19:01	17:56	16:03	15:20 (2)	15:20 (2)	15:20 (2)
37	07:45	15:25 (2)	06:58	15:44 (2)	05:59	05:52	04:59	04:39	05:00	05:44	06:32	07:20	07:12	15:00 (2)	15:00 (2)	15:00 (2)
38	16:21	19	15:44 (2)	17:14	18:02	19:52	20:38	21:08	20:56	20:06	18:59	17:54	16:02	15:20 (2)	15:20 (2)	15:20 (2)
39	07:44	15:25 (2)	06:56	15:45 (2)	05:57	05:49	04:58	04:39	05:01	05:46	06:33	07:21	07:14	15:00 (2)	15:00 (2)	15:00 (2)
40	16:22	20	15:45 (2)	17:16	18:03	19:54	20:40	21:08	20:54	20:04	18:57	17:51	16:00	15:20 (2)	15:20 (2)	15:20 (2)
41	07:43	15:24 (2)	06:54	15:46 (2)	05:55	05:47	04:57	04:39	05:02	05:47	06:35	07:23	07:15	15:00 (2)	15:00 (2)	15:00 (2)
42	16:24	21	15:45 (2)	17:18	18:05	19:55	20:41	21:08	20:53	20:02	18:54	17:49	15:59	15:20 (2)	15:20 (2)	15:20 (2)
43	07:42	15:24 (2)	06:52	15:47 (2)	05:52	05:45	04:55	04:39	05:04	05:49	06:37	07:25	07:17	15:00 (2)	15:00 (2)	15:00 (2)
44	16:26	22	15:46 (2)	17:20	18:07	19:57	20:42	21:08	20:52	20:00	18:52	17:47	15:58	15:20 (2)	15:20 (2)	15:20 (2)
45	07:41	15:25 (2)	06:50	15:47 (2)	05:50	05:43	04:54	04:39	05:05	05:50	06:38	07:26	07:18	15:00 (2)	15:00 (2)	15:00 (2)
46	16:27	22	15:47 (2)	17:21	18:08	19:58	20:44	21:08	20:51	19:58	18:50	17:46	15:57	15:20 (2)	15:20 (2)	15:20 (2)
47	07:39	15:25 (2)	06:48	15:48 (2)	05:48	05:41	04:53	04:39	05:06	05:52	06:40	07:28	07:20	15:00 (2)	15:00 (2)	15:00 (2)
48	16:29	22	15:47 (2)	17:23	18:10	20:00	20:45	21:09	20:50	19:56	18:48	17:44	15:56	15:20 (2)	15:20 (2)	15:20 (2)
49	07:38	15:25 (2)	06:46	15:49 (2)	05:46	05:39	04:52	04:40	05:07	05:53	06:41	07:29	07:21	15:00 (2)	15:00 (2)	15:00 (2)
50	16:30	22	15:47 (2)	17:25	18:12	20:02	20:46	21:09	20:48	19:54	18:45	17:42	15:55	15:20 (2)	15:20 (2)	15:20 (2)
51	07:37	15:25 (2)	06:44	15:50 (2)	05:43	05:38	04:51	04:40	05:09	05:55	06:43	07:31	07:23	15:00 (2)	15:00 (2)	15:00 (2)
52	16:32	23	15:48 (2)	17:27	18:13	20:03	20:48	21:09	20:47	19:52	18:43	17:40	15:54	15:20 (2)	15:20 (2)	15:20 (2)
53	07:36	15:26 (2)	06:42	15:51 (2)	05:41	05:36	04:50	04:41	05:10	05:57	06:44	07:34	07:24	15:00 (2)	15:00 (2)	15:00 (2)
54	16:34	22	15:48 (2)	17:28	18:15	20:05	20:49	21:09	20:46	19:50	18:41	17:38	15:54	15:20 (2)	15:20 (2)	15:20 (2)
55	07:34	15:26 (2)	06:40	15:52 (2)	05:39	05:34	04:49	04:41	05:12	05:58	06:46	07:36	07:26	15:00 (2)	15:00 (2)	15:00 (2)
56	16:36	21	15:47 (2)	17:30	18:16	20:06	20:50	21:09	20:44	19:47	18:39	17:36	15:53	15:20 (2)	15:20 (2)	15:20 (2)
57	07:33	15:27 (2)	06:40	15:53 (2)	06:37	05:32	04:48	04:42	05:13	06:00	06:47	07:36	07:27	15:00 (2)	15:00 (2)	15:00 (2)
58	16:37	21	15:48 (2)	17:31	19:18	20:08	20:51	21:08	20:43	19:45	18:37	17:34	15:52	15:20 (2)	15:20 (2)	15:20 (2)
59	07:32	15:27 (2)	06:40	15:54 (2)	06:35	05:30	04:47	04:42	05:14	06:01	06:49	07:38	07:29	15:00 (2)	15:00 (2)	15:00 (2)
60	16:39	20	15:47 (2)	17:32	19:20	20:10	20:52	21:08	20:41	19:43	18:34	17:32	15:51	15:20 (2)	15:20 (2)	15:20 (2)
61	07:30	15:29 (2)	06:40	15:55 (2)	06:32	05:28	04:46	04:40	05:16	06:03	06:50	07:39	07:30	15:00 (2)	15:00 (2)	15:00 (2)
62	16:41	18	15:47 (2)	17:33	19:21	20:11	20:53	21:09	20:42	19:44	18:35	17:33	15:52	15:20 (2)	15:20 (2)	15:20 (2)
Potential sun hours	264		280		367	414	480	492	496	450	380	333	271		250	
Total, worst case	481		36										389			827
Sun reduction	0.24		0.31										0.19			0.17
Oper. time red.	0.47		0.47										0.47			0.47
Wind dir. red.	0.61		0.61										0.61			0.61
Total reduction	0.07		0.09										0.06			0.05
Total, real	33		3										22			40

Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 5

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Calculated:

2014-11-11 21:28/2.9.285

## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2Shadow receptor: C - 03 Cierpice 3

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
2,08 3,09 3,64 5,36 7,46 7,03 8,08 7,26 4,75 4,21 1,76 1,39

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
177 155 173 127 144 326 604 321 392 619 710 350 4 098  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:54	14:16 (4)	07:29	15:59 (2)	06:38	06:30	05:28	04:45	04:43	05:17	06:04	06:51
2	07:54	15:15 (3)	07:27	16:12 (2)	07:32	19:23	20:11	20:54	21:08	20:36	19:39	18:32
3	07:53	15:18 (3)	07:26	16:13 (2)	07:33	19:24	20:13	20:56	21:08	20:37	19:37	18:30
4	07:53	15:17 (3)	07:26	16:15 (2)	07:35	19:26	20:14	20:57	21:07	20:35	19:35	18:28
5	07:53	15:18 (3)	07:24	16:15 (2)	07:37	19:28	20:16	20:58	21:07	20:33	19:32	18:25
6	07:53	15:19 (3)	07:23	16:16 (2)	07:38	19:29	20:17	20:58	21:07	20:32	19:30	18:23
7	07:52	15:19 (3)	07:21	16:16 (2)	07:40	19:31	20:19	20:59	21:06	20:30	19:28	18:21
8	07:52	15:20 (3)	07:20	16:17 (2)	07:42	19:33	20:21	21:00	21:06	20:28	19:26	18:19
9	07:52	15:21 (3)	07:19	16:18 (2)	07:44	19:34	20:22	21:01	21:05	20:27	19:24	18:17
10	07:51	15:22 (3)	07:18	16:19 (2)	07:46	19:36	20:24	21:02	21:04	20:25	19:21	18:15
11	07:51	15:23 (3)	07:17	16:20 (2)	07:48	19:37	20:25	21:03	21:04	20:23	19:19	18:12
12	07:50	15:24 (3)	07:16	16:21 (2)	07:50	19:39	20:27	21:03	21:03	20:21	19:17	18:10
13	07:49	15:25 (3)	07:15	16:22 (2)	07:52	19:41	20:29	21:04	21:02	20:19	19:15	18:08
14	07:49	15:26 (3)	07:14	16:23 (2)	07:54	19:42	20:30	21:05	21:01	20:18	19:12	18:06
15	07:48	15:27 (3)	07:13	16:24 (2)	07:56	19:44	20:31	21:05	21:00	20:16	19:10	18:04
16	07:47	15:28 (3)	07:12	16:25 (2)	07:58	19:46	20:33	21:06	21:00	20:14	19:08	18:02
17	07:46	15:29 (3)	07:11	16:26 (2)	08:00	19:48	20:35	21:07	20:58	20:10	19:03	17:58
18	07:46	15:30 (3)	07:10	16:27 (2)	08:02	19:50	20:37	21:07	20:57	20:08	19:01	17:56
19	07:45	15:31 (3)	07:09	16:28 (2)	08:04	19:52	20:39	21:08	20:58	20:10	19:03	17:58
20	07:44	15:32 (3)	07:08	16:29 (2)	08:06	19:54	20:41	21:09	20:59	20:12	19:06	18:00
21	07:43	15:33 (3)	07:07	16:30 (2)	08:08	19:56	20:43	21:11	21:01	20:14	19:09	18:04
22	07:42	15:34 (3)	07:06	16:31 (2)	08:10	19:58	20:45	21:13	21:03	20:16	19:12	18:06
23	07:41	15:35 (3)	07:05	16:32 (2)	08:12	20:00	20:47	21:15	21:05	20:18	19:15	18:09
24	07:39	15:36 (3)	07:04	16:33 (2)	08:14	20:02	20:49	21:17	21:07	20:20	19:17	18:12
25	07:38	15:37 (3)	07:03	16:34 (2)	08:16	20:04	20:51	21:19	21:09	20:22	19:19	18:14
26	07:37	15:38 (3)	07:02	16:35 (2)	08:18	20:06	20:53	21:21	21:11	20:24	19:21	18:16
27	07:36	15:39 (3)	07:01	16:36 (2)	08:20	20:08	20:55	21:23	21:13	20:26	19:23	18:18
28	07:34	15:40 (3)	07:00	16:37 (2)	08:22	20:10	20:57	21:25	21:15	20:28	19:25	18:20
29	07:33	15:41 (3)	06:59	16:38 (2)	08:24	20:12	20:59	21:27	21:17	20:30	19:27	18:22
30	07:32	15:42 (3)	06:58	16:39 (2)	08:26	20:14	21:01	21:29	21:19	20:32	19:29	18:24
31	07:30	15:43 (3)	06:57	16:40 (2)	08:28	20:16	21:03	21:31	21:21	20:34	19:32	18:26
Potential sun hours	264	280	367	414	480	492	496	450	380	333	271	250
Total, worst case	600	207								37	516	892
Sun reduction	0,24	0,31								0,39	0,19	0,17
Oper. time red.	0,47	0,47								0,47	0,47	0,47
Wind dir. red.	0,60	0,62								0,62	0,61	0,60
Total reduction	0,07	0,09								0,11	0,06	0,05
Total, real	41	19								4	29	43

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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Calculated:

2014-11-11 21:28/2.9.285

## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2Shadow receptor: D - 04 Gołaczów 1

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

January			February			March			April			May			June		
1	07:54	15:57	07:29	16:43	06:38	07:29	16:43	06:38	06:30	18:21 (7)	05:28	18:55 (5)	04:45				
2	07:54	15:58	07:27	16:44	06:36	07:27	16:44	06:36	19:23	18:32 (7)	20:11	19:31 (5)	20:54				
3	07:53	15:59	07:26	16:46	06:34	07:26	16:46	06:34	06:28		05:26	18:54 (5)	04:44				
4	07:53	16:00	07:24	16:48	06:32	07:24	16:48	06:32	19:24		20:13	19:31 (5)	20:55				
5	07:53	16:01	07:23	16:50	06:30	07:23	16:50	06:30	06:26		05:24	18:53 (5)	04:44				
6	07:53	16:02	07:21	16:51	06:27	07:21	16:51	06:27	19:26		20:14	19:31 (5)	20:56				
7	07:52	16:04	07:20	16:53	06:25	07:20	16:53	06:25	06:24		05:23	18:52 (5)	04:43				
8	07:52	16:05	07:18	16:55	06:23	07:18	16:55	06:23	19:28		20:16	19:31 (5)	20:57				
9	07:52	16:06	07:16	16:57	06:21	07:16	16:57	06:21	06:21		05:21	18:53 (5)	04:42				
10	07:51	16:07	07:14	16:58	06:19	07:14	16:58	06:19	19:29		20:17	19:32 (5)	20:58				
11	07:51	16:09	07:13	17:00	06:17	07:13	17:00	06:17	06:19		05:19	18:52 (5)	04:42				
12	07:50	16:10	07:11	17:02	06:14	07:11	17:02	06:14	19:31		20:19	19:32 (5)	20:59				
13	07:49	16:12	07:09	17:04	06:12	07:09	17:04	06:12	06:17		05:17	18:53 (5)	04:41				
14	07:49	16:13	07:07	17:06	06:10	07:07	17:06	06:10	19:33		20:20	19:32 (5)	21:00				
15	07:48	16:15	07:06	17:07	06:08	07:06	17:07	06:08	06:15		05:16	18:52 (5)	04:41				
16	07:47	16:16	07:04	17:09	06:06	07:04	17:09	06:06	19:34		20:22	19:32 (5)	21:01				
17	07:46	16:18	07:02	17:11	06:03	07:02	17:11	06:03	06:13		05:14	18:52 (5)	04:40				
18	07:45	16:19	07:00	17:13	06:01	07:00	17:13	06:01	19:36		20:24	19:31 (5)	21:02				
19	07:45	16:21	06:58	17:14	05:59	06:58	17:14	05:59	06:10		05:12	18:53 (5)	04:40				
20	07:44	16:22	06:56	17:16	05:57	06:56	17:16	05:57	19:37		20:25	19:31 (5)	21:03				
21	07:43	16:24	06:54	17:18	05:55	06:54	17:18	05:55	06:06		05:09	18:53 (5)	04:39				
22	07:42	16:26	06:52	17:20	05:53	06:52	17:20	05:53	19:41		20:28	19:31 (5)	21:04				
23	07:40	16:27	06:50	17:22	05:51	06:50	17:22	05:51	06:04		05:08	18:54 (5)	04:39				
24	07:39	16:29	06:48	17:24	05:49	06:48	17:24	05:49	19:42		20:30	19:31 (5)	21:05				
25	07:38	16:30	06:46	17:26	05:47	06:46	17:26	05:47	06:02		05:06	18:54 (5)	04:39				
26	07:37	16:32	06:44	17:28	05:45	06:44	17:28	05:45	19:44		20:31	19:30 (5)	21:05				
27	07:36	16:34	06:42	17:30	05:43	06:42	17:30	05:43	06:00		05:05	18:54 (5)	04:39				
28	07:34	16:36	06:40	17:32	05:41	06:40	17:32	05:41	19:45		20:32	19:29 (5)	21:06				
29	07:33	16:37	06:38	17:34	05:39	06:38	17:34	05:39	05:58	19:07 (4)	05:03	18:55 (5)	04:39				
30	07:32	16:39	06:36	17:36	05:37	06:36	17:36	05:37	19:47	12	19:19 (3)	19:29 (5)	21:06				
31	07:30	16:41	06:34	17:38	05:35	06:34	17:38	05:35	05:56	19:04 (4)	05:02	18:55 (5)	04:39				
Potential sun hours	264		280		367		414		19:49	17	19:21 (3)	20:35	33	19:28 (5)	21:07		
Total, worst case					275		406		05:54	21	19:02 (4)	05:01	18:56 (5)	04:38			
Sun reduction					0,31		0,39		17:27 (7)	21	19:23 (3)	20:37	32	19:28 (5)	21:07		
Oper. time red.					0,47		0,47		17:35 (7)	21	19:23 (3)	20:37	32	19:28 (5)	21:07		
Wind dir. red.					0,66		0,68		17:24 (7)	22	19:01 (4)	04:59	18:57 (5)	04:39			
Total reduction					0,09		0,12		17:37 (7)	22	19:23 (3)	20:38	30	19:27 (5)	21:07		
Total, real					26		50		17:22 (7)	24	19:00 (4)	04:58	18:58 (5)	04:39			
									17:39 (7)	24	19:24 (3)	20:40	29	19:27 (5)	21:08		
									17:20 (7)	25	18:59 (4)	04:57	19:00 (5)	04:39			
									17:41 (7)	25	19:24 (3)	20:41	26	19:26 (5)	21:08		
									17:19 (7)	26	18:58 (4)	04:55	19:00 (5)	04:39			
									17:40 (7)	26	19:24 (3)	20:42	24	19:24 (5)	21:08		
									17:18 (7)	27	18:57 (4)	04:54	19:01 (5)	04:39			
									17:41 (7)	27	19:24 (3)	20:44	22	19:23 (5)	21:08		
									17:17 (7)	27	18:57 (4)	04:53	19:02 (5)	04:39			
									17:41 (7)	27	19:24 (5)	20:45	20	19:22 (5)	21:08		
									17:17 (7)	30	18:56 (4)	04:52	19:04 (5)	04:40			
									17:41 (7)	30	19:26 (5)	20:46	17	19:21 (5)	21:09		
									17:16 (7)	31	18:57 (4)	04:51	19:06 (5)	04:40			
									17:40 (7)	31	19:28 (5)	20:47	13	19:19 (5)	21:09		
									17:16 (7)		18:57 (4)	04:50		19:09 (5)	04:41		
									17:40 (7)	32	19:29 (5)	20:49	9	19:18 (5)	21:09		
									17:17 (7)		18:57 (4)	04:49			04:41		
									17:39 (7)	32	19:29 (5)	20:50			21:08		
									18:18 (7)		18:56 (5)	04:48			04:42		
									19:18 (7)	34	19:30 (5)	20:51			21:08		
									18:18 (7)		18:55 (5)	04:47			04:42		
									18:36 (7)	35	19:30 (5)	20:52			21:08		
									18:19 (7)			04:46					
									18:35 (7)			20:53					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 7

Licensed user:

ProSilence Krzysztof Kreciproch

Ul. Spychalskiego 13/207

PL-45 716 Opole

+48 77 550 11 43

Krzysztof Kręciproch / prosilence@prosilence.pl

Calculated:

2014-11-11 21:28/2.9.285

## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2Shadow receptor: D - 04 Gołaczów 1

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:43	05:17	19:03 (5) 06:04	06:51	06:42	07:30
	21:08	20:38	38 19:41 (5) 19:39	18:32	16:29	15:51
2	04:43	05:19	19:03 (5) 06:06	06:52	06:43	07:32
	21:08	20:37	38 19:41 (5) 19:37	18:30	16:27	15:50
3	04:44	05:20	19:03 (5) 06:07	06:54	06:45	07:33
	21:07	20:35	39 19:42 (5) 19:35	18:28	16:25	15:49
4	04:45	05:22	19:02 (5) 06:09	06:55	06:47	07:34
	21:07	20:33	39 19:41 (5) 19:32	18:25	16:23	15:49
5	04:46	05:23	19:03 (5) 06:10	06:57	06:48	07:35
	21:06	20:32	39 19:42 (5) 19:30	18:23	16:22	15:49
6	04:46	05:25	19:02 (5) 06:12	06:58	06:50	07:37
	21:06	20:30	40 19:42 (5) 19:28	18:21	16:20	15:48
7	04:47	05:26	19:02 (5) 06:13	07:00	06:52	07:38
	21:05	20:28	39 19:41 (5) 19:26	18:19	16:19	15:48
8	04:48	05:28	19:02 (5) 06:15	07:02	06:54	07:39
	21:05	20:27	39 19:41 (5) 19:24	18:17	16:17	15:47
9	04:49	05:29	19:02 (5) 06:16	07:03	06:55	07:40
	21:04	20:25	39 19:41 (5) 19:21	18:14	16:15	15:47
10	04:50	05:31	19:03 (5) 06:18	07:05	06:57	07:41
	21:04	20:23	38 19:41 (5) 19:19	18:12	16:14	15:47
11	04:51	05:32	19:02 (5) 06:20	18:14 (7)	07:06	06:59
	21:03	20:21	38 19:40 (5) 19:17	18:24 (7)	18:10	16:12
12	04:52	05:34	19:02 (5) 06:21	18:11 (7)	07:08	07:00
	21:02	20:19	37 19:39 (5) 19:15	18:27 (7)	18:08	16:11
13	04:53	05:35	19:03 (5) 06:23	18:09 (7)	07:10	07:02
	21:01	20:17	36 19:39 (5) 19:12	18:27 (7)	18:06	16:09
14	04:54	05:37	19:03 (5) 06:24	18:08 (7)	07:11	07:04
	21:00	20:16	34 19:37 (5) 19:10	18:28 (7)	18:04	16:08
15	04:55	05:38	19:05 (4) 06:26	18:06 (7)	07:13	07:05
	21:00	20:14	32 19:37 (5) 19:08	18:28 (7)	18:02	16:07
16	04:56	19:20 (5) 05:40	19:04 (4) 06:27	18:06 (7)	07:15	07:07
	20:59	4 19:24 (5) 20:12	31 19:35 (5) 19:06	18:29 (7)	18:00	16:05
17	04:57	19:16 (5) 05:41	19:04 (4) 06:29	18:05 (7)	07:16	07:09
	20:58	11 19:27 (5) 20:10	30 19:34 (5) 19:03	18:28 (7)	17:58	16:04
18	04:59	19:14 (5) 05:43	19:03 (4) 06:30	18:05 (7)	07:18	07:10
	20:57	15 19:29 (5) 20:08	29 19:32 (5) 19:01	18:29 (7)	17:56	16:03
19	05:00	19:14 (5) 05:44	19:03 (4) 06:32	18:04 (7)	07:20	07:12
	20:55	18 19:32 (5) 20:06	28 19:31 (5) 18:59	18:28 (7)	17:53	16:02
20	05:01	19:12 (5) 05:46	19:03 (4) 06:33	18:04 (7)	07:21	07:14
	20:54	21 19:33 (5) 20:04	26 19:29 (3) 18:57	18:27 (7)	17:51	16:00
21	05:02	19:11 (5) 05:47	19:03 (4) 06:35	18:04 (7)	07:23	07:15
	20:53	23 19:34 (5) 20:02	26 19:29 (3) 18:54	18:26 (7)	17:49	15:59
22	05:04	19:10 (5) 05:49	19:04 (4) 06:36	18:05 (7)	07:25	07:17
	20:52	25 19:35 (5) 20:00	25 19:29 (3) 18:52	18:25 (7)	17:47	15:58
23	05:05	19:09 (5) 05:50	19:04 (4) 06:38	18:05 (7)	07:26	07:18
	20:51	27 19:36 (5) 19:58	23 19:27 (3) 18:50	18:23 (7)	17:45	15:57
24	05:06	19:08 (5) 05:52	19:05 (4) 06:40	18:07 (7)	07:28	07:20
	20:50	29 19:37 (5) 19:56	22 19:27 (3) 18:48	18:21 (7)	17:44	15:56
25	05:07	19:07 (5) 05:53	19:05 (4) 06:41	18:09 (7)	07:30	07:21
	20:48	31 19:38 (5) 19:54	20 19:25 (3) 18:45	18:19 (7)	16:42	15:55
26	05:09	19:06 (5) 05:55	19:07 (4) 06:43		06:31	07:23
	20:47	32 19:38 (5) 19:52	17 19:24 (3) 18:43		16:40	15:54
27	05:10	19:05 (5) 05:57	19:09 (4) 06:44		06:33	07:24
	20:45	34 19:39 (5) 19:50	12 19:21 (3) 18:41		16:38	15:54
28	05:12	19:06 (5) 05:58			06:35	07:26
	20:44	34 19:40 (5) 19:47			16:36	15:53
29	05:13	19:05 (5) 06:00			06:36	07:27
	20:43	35 19:40 (5) 19:45			16:34	15:52
30	05:14	19:04 (5) 06:01			06:38	07:29
	20:41	36 19:40 (5) 19:43			16:32	15:51
31	05:16	19:04 (5) 06:03			06:40	07:54
	20:40	37 19:41 (5) 19:41			16:30	15:56
Potential sun hours	496	450	380	333	271	250
Total, worst case	412	854	287			
Sun reduction	0,51	0,50	0,37			
Oper. time red.	0,47	0,47	0,47			
Wind dir. red.	0,67	0,68	0,66			
Total reduction	0,16	0,16	0,12			
Total, real	66	135	33			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 8

Licensed user:

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PL-45 716 Opole

+48 77 550 11 43

Krzysztof Kręciproch / prosilence@prosilence.pl

Calculated:

2014-11-11 21:28/2.9.285

## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2Shadow receptor: E - 05 Konary 1

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	07:54 15:57	07:29 16:43	06:38 17:32	06:30 19:23	05:28 20:11	04:45 20:54	05:29 (5) 05:56 (7)	04:43 21:08	05:43 (7) 05:56 (7)	05:17 20:38	05:45 (7) 06:06 (7)	06:04 19:39	06:51 18:32	06:42 16:29	07:30 15:51
2	07:54 15:58	07:27 16:44	06:36 17:33	06:28 19:25	05:26 20:13	04:45 20:56	05:32 (7) 05:55 (7)	04:44 21:08	05:43 (7) 05:57 (7)	05:19 20:37	05:47 (7) 06:06 (7)	06:06 19:37	06:52 18:30	06:43 16:27	07:32 15:50
3	07:53 15:59	07:26 16:46	06:34 17:35	06:26 19:26	05:25 20:14	04:44 20:57	05:32 (7) 05:55 (7)	04:44 21:07	05:42 (7) 05:58 (7)	05:20 20:35	05:48 (7) 06:05 (7)	06:07 19:35	06:54 18:28	06:45 16:25	07:33 15:50
4	07:53 16:00	07:24 16:48	06:32 17:37	06:24 19:28	05:23 20:16	04:43 20:58	05:33 (7) 05:55 (7)	04:45 21:07	05:41 (7) 05:58 (7)	05:22 20:33	05:51 (7) 06:03 (7)	06:09 19:32	06:55 18:26	06:47 16:24	07:34 15:49
5	07:53 16:01	07:23 16:50	06:30 17:39	06:21 19:29	05:21 20:17	04:43 20:58	05:33 (7) 05:54 (7)	04:46 21:07	05:41 (7) 05:59 (7)	05:23 20:32	05:51 (7) 06:02 (7)	06:10 19:30	06:57 18:23	06:48 16:22	07:36 15:49
6	07:53 16:02	07:21 16:51	06:28 17:40	06:19 19:31	05:19 20:19	04:42 20:59	05:35 (7) 05:54 (7)	04:47 21:06	05:41 (7) 06:00 (7)	05:25 20:30	05:52 (7) 06:00 (7)	06:12 19:28	06:59 18:21	06:50 16:20	07:37 15:48
7	07:53 16:04	07:20 16:53	06:25 17:42	06:17 19:33	05:18 20:21	04:41 21:00	05:35 (7) 05:51 (7)	04:47 21:01	05:41 (7) 06:01 (7)	05:26 20:28	05:53 (7) 05:57 (7)	06:14 19:26	07:00 18:19	06:52 16:19	07:38 15:48
8	07:52 16:05	07:18 16:55	06:23 17:44	06:15 19:34	05:16 20:22	04:41 21:01	05:36 (7) 05:52 (7)	04:48 21:01	05:40 (7) 05:53 (7)	05:28 21:05	05:47 (7) 06:01 (7)	06:15 19:24	07:02 18:17	06:54 16:17	07:39 15:48
9	07:52 16:06	07:16 16:57	06:21 17:45	06:13 19:36	05:14 20:24	04:40 21:02	05:39 (7) 05:54 (7)	04:49 21:02	05:40 (7) 05:53 (7)	05:29 21:04	05:49 (7) 06:02 (7)	06:17 19:21	07:03 18:15	06:55 16:15	07:40 15:47
10	07:51 16:08	07:15 16:59	06:19 17:47	06:11 19:37	05:13 20:25	04:40 21:03	05:37 (7) 05:54 (7)	04:50 21:03	05:39 (7) 05:52 (7)	05:31 21:04	05:47 (7) 06:02 (7)	06:18 19:19	07:05 18:12	06:57 16:14	07:41 15:47
11	07:51 16:09	07:13 17:00	06:17 17:49	06:08 19:39	05:11 20:27	04:40 21:03	05:38 (7) 05:56 (7)	04:51 21:03	05:39 (7) 05:52 (7)	05:32 21:03	05:47 (7) 06:03 (7)	06:20 19:17	07:07 18:10	06:59 16:12	07:42 15:47
12	07:50 16:10	07:11 17:02	06:15 17:50	06:06 19:41	05:09 20:28	04:39 21:04	05:39 (5) 05:56 (7)	04:52 21:04	05:34 (5) 05:52 (7)	05:34 21:02	05:34 (5) 06:04 (7)	07:00 19:15	07:08 18:08	07:00 16:11	07:43 15:47
13	07:49 16:12	07:09 17:04	06:12 17:52	06:04 19:42	05:08 20:30	04:39 21:05	05:33 (5) 05:51 (7)	04:53 21:01	05:33 (5) 06:04 (7)	05:35 20:18	05:35 (5) 06:04 (7)	06:23 19:13	07:10 18:06	07:02 16:10	07:44 15:47
14	07:49 16:13	07:08 17:06	06:10 17:54	06:02 19:44	05:06 20:31	04:39 21:05	05:31 (5) 05:56 (7)	04:54 21:05	05:32 (5) 06:05 (7)	05:37 20:16	05:37 (5) 06:05 (7)	06:24 19:10	07:11 18:04	07:04 16:08	07:45 15:47
15	07:48 16:15	07:06 17:07	06:08 17:55	06:00 19:46	05:05 20:33	04:39 21:06	05:30 (5) 05:57 (7)	04:55 21:06	05:31 (5) 06:05 (7)	05:38 20:14	05:38 (5) 06:05 (7)	06:26 19:08	07:13 18:02	07:05 16:07	07:46 15:47
16	07:47 16:16	07:04 17:09	06:06 17:57	05:58 19:47	05:03 20:34	04:39 21:06	05:29 (5) 05:58 (7)	04:56 21:06	05:30 (5) 06:06 (7)	05:40 20:12	05:40 (5) 06:06 (7)	06:27 19:06	07:15 18:00	07:07 16:06	07:47 15:47
17	07:46 16:18	07:02 17:11	06:04 17:59	05:56 19:49	05:02 20:35	04:39 21:07	05:27 (5) 05:57 (7)	04:59 21:07	05:30 (5) 06:06 (7)	05:41 20:10	05:41 (5) 06:06 (7)	06:29 19:04	07:16 17:58	07:09 16:04	07:48 15:47
18	07:46 16:19	07:00 17:13	06:01 18:00	05:54 19:50	05:01 20:37	04:39 21:07	05:26 (5) 05:57 (7)	04:59 21:07	05:30 (5) 06:07 (7)	05:43 20:08	05:43 (5) 06:07 (7)	06:30 19:01	07:18 17:56	07:10 16:03	07:49 15:48
19	07:45 16:21	06:58 17:14	05:59 18:02	05:52 19:52	04:59 20:38	04:39 21:08	05:25 (5) 05:58 (7)	04:59 21:08	05:08 (4) 05:49 (7)	05:00 20:56	05:44 20:06	06:32 18:59	07:20 17:54	07:12 16:02	07:49 15:48
20	07:44 16:22	06:56 17:16	05:57 18:03	05:50 19:54	04:58 20:40	04:39 21:08	05:24 (5) 05:58 (7)	04:59 21:08	05:08 (4) 05:49 (7)	05:01 20:54	05:46 20:04	06:34 18:57	07:21 17:52	07:14 16:01	07:50 15:48
21	07:43 16:24	06:54 17:18	05:55 18:05	05:48 19:55	04:57 20:41	04:39 21:08	05:23 (5) 05:58 (7)	04:59 21:08	05:08 (4) 05:49 (7)	05:02 20:53	05:47 20:02	06:35 18:55	07:23 17:50	07:15 16:00	07:51 15:49
22	07:42 16:26	06:52 17:20	05:52 18:07	05:46 19:57	04:55 20:42	04:39 21:08	05:22 (5) 05:58 (7)	04:59 21:08	05:08 (4) 05:49 (7)	05:04 20:52	05:49 20:00	06:37 18:52	07:25 17:48	07:17 15:58	07:51 15:49
23	07:41 16:27	06:50 17:21	05:50 18:08	05:44 19:58	04:54 20:44	04:39 21:08	05:21 (5) 05:58 (7)	04:59 21:08	05:09 (4) 05:50 (7)	05:05 20:51	05:51 19:58	06:38 18:50	07:26 17:46	07:18 15:57	07:52 15:50
24	07:39 16:29	06:48 17:23	05:48 18:10	05:42 20:00	04:53 20:45	04:40 21:09	05:19 (5) 05:57 (7)	04:40 21:09	05:09 (4) 05:50 (7)	05:06 20:50	05:52 19:56	06:40 18:48	07:28 17:44	07:20 15:56	07:52 15:50
25	07:38 16:31	06:46 17:25	05:46 18:12	05:40 20:02	04:52 20:46	04:39 21:09	05:20 (5) 05:58 (7)	04:40 21:09	05:09 (4) 05:51 (7)	05:08 20:48	05:54 19:54	06:41 18:46	07:30 16:42	07:21 15:55	07:52 15:51
26	07:37 16:32	06:44 17:27	05:44 18:13	05:38 20:03	04:51 20:48	04:39 21:09	05:21 (5) 05:58 (7)	04:40 21:09	05:10 (4) 05:52 (7)	05:09 20:47	05:55 19:52	06:43 18:43	07:31 16:40	07:23 15:55	07:53 15:52
27	07:36 16:34	06:42 17:28	05:41 18:15	05:36 20:05	04:50 20:49	04:41 21:09	05:10 (4) 05:57 (7)	05:10 21:09	05:38 (5) 05:53 (7)	05:57 19:50	05:57 (5) 06:07 (7)	06:44 18:41	07:33 16:38	07:24 15:54	07:53 15:52
28	07:34 16:36	06:40 17:30	05:39 18:16	05:34 20:06	04:49 20:50	04:41 21:09	05:11 (4) 05:57 (7)	05:12 21:09	05:40 (5) 05:54 (7)	05:58 19:48	05:58 (5) 06:08 (7)	06:46 18:39	07:35 16:36	07:26 15:53	07:53 15:53
29	07:33 16:37	06:37 17:31	05:32 18:18	05:32 20:08	04:48 20:51	04:42 21:08	05:23 (5) 05:57 (7)	04:42 21:08	05:11 (4) 05:54 (7)	05:13 20:43	06:00 19:45	06:48 18:37	07:37 16:34	07:27 15:52	07:53 15:54
30	07:32 16:39	06:35 17:33	05:30 19:20	05:30 20:10	04:47 20:52	04:42 21:08	05:24 (5) 05:56 (7)	04:42 21:08	05:44 (7) 05:56 (7)	05:15 20:41	06:01 19:43	06:49 18:34	07:38 16:32	07:29 15:51	07:54 15:55
31	07:30 16:41	06:32 17:35	06:32 19:21	06:32 20:53	04:46 20:53	04:46 21:09	05:25 (5) 05:56 (7)	06:03 21:09	05:44 (5) 06:07 (7)	06:03 19:41	06:03 19:41	06:40 16:31	07:39 15:50	07:54 15:56	
Potential sun hours	264	280	367	413	480	492	496	450	380	333	271	250			
Total, worst case					723	406	855			94					
Sun reduction					0,48	0,43	0,51			0,50					
Oper. time red.					0,47	0,47	0,47			0,47					
Wind dir. red.					0,63	0,63	0,63			0,63					
Total reduction					0,14	0,13	0,15			0,15					
Total, real					103	51	128			14					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker
--------------	------------------	-----------------	----------------------



Project:

FW Cierpice

**Description:**

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 9

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Calculated:

2014-11-11 21:28/2.9.285

## SHADOW - Calendar

**Calculation:** ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2 **Shadow receptor:** F - 06 Konary 2

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [ ]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.08	3.09	3.64	5.36	7.46	7.03	8.08	7.26	4.75	4.21	1.76	1.39

### Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
177 155 173 127 144 326 604 321 392 619 710 350 4 098

Idle start wind speed: Cut in wind speed from power curve

Idle start wind speed: Cut in wind speed from power curve

		January	February	March	April	May		June		July		August	September	October	November	December	
	1	07:54 15:57	07:29 16:43	06:38 17:32	06:30 19:23	05:28 20:11		04:45 20:54		19:42 (1) 20:11 (1)	04:43 21:08	05:12 (5) 20:18 (1)	05:17 20:38	06:04 19:39	06:51 18:32	06:42 16:29	07:30 15:51
	2	07:54 15:58	07:27 16:44	06:36 17:33	06:28 19:25	05:26 20:13		04:45 20:56	29	19:41 (1) 20:11 (1)	04:43 21:08	05:13 (5) 20:19 (1)	05:19 20:37	06:06 19:37	06:52 18:30	06:43 16:27	07:32 15:50
	3	07:53 15:59	07:26 16:46	06:34 17:35	06:26 19:26	05:24 20:14		04:44 20:57	30	19:41 (1) 20:11 (1)	04:44 21:07	05:14 (5) 20:19 (1)	05:20 20:35	06:07 19:35	06:54 18:28	06:45 16:25	07:33 15:50
	4	07:53 16:00	07:24 16:48	06:32 17:37	06:24 19:28	05:23 20:16		04:43 20:58		05:13 (5) 20:12 (1)	04:45 21:07	05:14 (5) 20:19 (1)	05:22 20:33	06:09 19:32	06:55 18:25	06:47 16:24	07:34 15:49
	5	07:53 16:01	07:23 16:50	06:30 17:39	06:21 19:29	05:21 20:17		04:42 20:58	34	05:10 (5) 20:12 (1)	04:46 21:07	05:15 (5) 20:19 (1)	05:23 20:32	06:10 19:30	06:57 18:23	06:48 16:22	07:36 15:49
	6	07:53 16:02	07:21 16:51	06:27 17:40	06:19 19:31	05:19 20:19		04:42 20:59	40	05:10 (5) 20:13 (1)	04:46 21:06	05:16 (5) 20:19 (1)	05:25 20:30	06:12 19:28	06:59 18:21	06:50 16:20	07:37 15:48
	7	07:52 16:04	07:20 16:53	06:25 17:42	06:17 19:33	05:18 20:21		04:41 21:00	43	05:09 (5) 20:13 (1)	04:47 21:06	05:17 (5) 20:20 (1)	05:26 20:28	06:14 19:26	07:00 18:19	06:52 16:19	07:38 15:48
	8	07:52 16:05	07:18 16:55	06:23 17:44	06:15 19:34	05:16 20:22		04:41 21:01	45	05:09 (5) 20:14 (1)	04:48 21:05	05:17 (5) 20:19 (1)	05:28 20:27	06:15 19:24	07:02 18:17	06:54 16:17	07:39 15:48
	9	07:52 16:06	07:16 16:57	06:21 17:45	06:13 19:36	05:14 20:24		04:40 21:02	47	05:09 (5) 20:14 (1)	04:49 21:04	05:18 (1) 20:19 (1)	05:29 20:25	06:17 19:21	07:03 18:15	06:55 16:15	07:40 15:47
	10	07:51 16:08	07:15 16:59	06:19 17:47	06:11 19:37	05:13 20:25		04:40 21:03	48	05:08 (5) 20:14 (1)	04:50 21:04	05:18 (1) 20:19 (1)	05:31 20:23	06:18 19:19	07:05 18:12	06:57 16:14	07:41 15:47
	11	07:51 16:09	07:13 17:00	06:17 17:49	06:08 19:39	05:11 20:27		04:40 21:03	50	05:08 (5) 20:14 (1)	04:51 21:03	05:19 (1) 20:19 (1)	05:32 20:21	06:20 19:17	07:07 18:10	06:59 16:12	07:42 15:47
	12	07:50 16:10	07:11 17:02	06:15 17:50	06:06 19:41	05:09 20:28		04:39 21:04	52	05:08 (5) 20:15 (1)	04:52 21:02	05:19 (1) 20:19 (1)	05:34 20:19	06:21 19:15	07:08 18:08	07:00 16:11	07:43 15:47
	13	07:49 16:12	07:09 17:04	06:12 17:52	06:04 19:42	05:08 20:30		04:39 21:05	52	05:08 (5) 20:15 (1)	04:53 21:01	05:20 (1) 20:19 (1)	05:35 20:18	06:23 19:12	07:10 18:06	07:02 16:10	07:44 15:47
	14	07:49 16:13	07:07 17:06	06:10 17:54	06:02 19:44	05:06 20:31		04:39 21:05	52	05:08 (5) 20:15 (1)	04:54 21:00	05:21 (1) 20:18 (1)	05:37 20:16	06:24 19:10	07:11 18:04	07:04 16:08	07:45 15:47
	15	07:48 16:15	07:06 17:07	06:08 17:55	06:00 19:46	05:05 20:33		04:39 21:06	54	05:08 (5) 20:16 (1)	04:55 21:00	05:22 (1) 20:18 (1)	05:38 20:14	06:26 19:08	07:13 18:02	07:05 16:07	07:46 15:47
	16	07:47 16:16	07:04 17:09	06:06 17:57	05:58 19:47	05:03 20:34		04:39 21:06	54	05:08 (5) 20:16 (1)	04:56 20:59	05:23 (1) 20:17 (1)	05:40 20:12	06:27 19:06	07:15 18:00	07:07 16:05	07:47 15:47
	17	07:46 16:18	07:02 17:11	06:04 17:59	05:56 19:49	05:02 20:35		04:39 21:07	54	05:08 (5) 20:16 (1)	04:58 20:58	05:24 (1) 20:17 (1)	05:41 20:10	06:29 19:04	07:16 17:58	07:09 16:04	07:48 15:47
	18	07:46 16:19	07:00 17:13	06:01 18:00	05:54 19:50	05:01 20:37		04:39 21:07	55	05:08 (5) 20:16 (1)	04:59 20:57	05:25 (1) 20:16 (1)	05:43 20:08	06:30 19:01	07:18 17:56	07:10 16:03	07:49 15:48
	19	07:45 16:21	06:58 17:14	05:59 18:02	05:52 19:52	04:59 20:38		04:39 21:08	56	05:08 (5) 20:17 (1)	05:00 20:56	05:26 (1) 20:16 (1)	05:44 20:06	06:32 18:59	07:20 17:54	07:12 16:02	07:49 15:48
	20	07:44 16:22	06:56 17:16	05:57 18:03	05:50 19:54	04:58 20:40	6	19:52 (1) 19:58 (1)	04:39 21:08	05:08 (5) 20:17 (1)	05:01 20:54	05:27 (1) 20:15 (1)	05:46 20:04	06:33 18:57	07:21 17:52	07:14 16:01	07:50 15:48
	21	07:43 16:24	06:54 17:18	05:55 18:05	05:47 19:55	04:57 20:41	12	19:49 (1) 20:01 (1)	04:39 21:08	05:08 (5) 20:17 (1)	05:02 20:53	05:28 (1) 20:14 (1)	05:47 20:02	06:35 18:55	07:23 17:50	07:15 15:59	07:50 15:49
	22	07:42 16:26	06:52 17:20	05:52 18:07	05:45 19:57	04:55 20:42	15	19:48 (1) 20:03 (1)	04:39 21:08	05:08 (5) 20:17 (1)	05:04 20:52	05:29 (1) 20:12 (1)	05:49 20:00	06:37 18:52	07:25 17:48	07:17 15:58	07:51 15:49
	23	07:41 16:27	06:50 17:21	05:50 18:08	05:43 19:58	04:54 20:44	18	19:46 (1) 20:04 (1)	04:39 21:08	05:09 (5) 20:18 (1)	05:05 20:51	05:30 (1) 20:10 (1)	05:50 19:58	06:38 18:50	07:26 17:46	07:18 15:57	07:52 15:50
	24	07:39 16:29	06:48 17:23	05:48 18:10	05:41 20:00	04:53 20:45	20	19:45 (1) 20:05 (1)	04:39 21:09	05:09 (5) 20:18 (1)	05:06 20:50	05:31 (1) 20:10 (1)	05:54 19:56	06:40 18:48	07:28 17:44	07:20 15:56	07:52 15:50
	25	07:38 16:31	06:46 17:25	05:46 18:12	05:40 20:02	04:52 20:46	22	19:44 (1) 20:06 (1)	04:40 21:09	05:09 (5) 20:17 (1)	05:08 20:48	05:32 (1) 20:10 (1)	05:54 19:54	06:41 18:46	07:29 16:42	07:21 15:55	07:52 15:51
	26	07:37 16:32	06:44 17:27	05:44 18:13	05:38 20:03	04:51 20:47	24	19:44 (1) 20:08 (1)	04:40 21:09	05:10 (5) 20:18 (1)	05:09 20:47	05:33 (1) 20:10 (1)	05:55 19:52	06:43 18:43	07:31 16:40	07:23 15:55	07:53 15:52
	27	07:36 16:34	06:42 17:28	05:41 18:15	05:36 20:05	04:50 20:49	26	19:43 (1) 20:09 (1)	04:41 21:09	05:10 (5) 20:18 (1)	05:10 20:46	05:34 (1) 20:11 (1)	05:57 19:50	06:44 18:41	07:32 16:38	07:24 15:54	07:53 15:52
	28	07:34 16:36	06:40 17:30	05:39 18:16	05:34 20:06	04:49 20:50	26	19:43 (1) 20:09 (1)	04:41 21:09	05:11 (5) 20:19 (1)	05:12 20:44	05:35 (1) 20:12 (1)	05:58 19:47	06:46 18:39	07:35 16:36	07:26 15:53	07:53 15:53
	29	07:33 16:37		06:37 19:18	05:32 20:08	04:48 20:51	28	19:42 (1) 20:10 (1)	04:42 21:08	05:11 (5) 20:18 (1)	05:13 20:43	05:36 (1) 20:13 (1)	06:00 19:45	06:47 18:37	07:36 16:34	07:27 15:52	07:53 15:54
	30	07:32 16:39		06:35 19:20	05:30 20:10	04:47 20:52	28	19:42 (1) 20:10 (1)	04:42 21:08	05:12 (5) 20:19 (1)	05:14 20:41	05:37 (1) 20:14 (1)	06:01 19:43	06:49 18:34	07:38 16:32	07:29 15:51	07:54 15:55
	31	07:30 16:41		06:32 19:21		04:46 20:53	29	19:41 (1) 20:10 (1)			05:16 20:40	05:38 (1) 19:41	06:03		06:40 16:31		07:54 15:56
Potential sun hours		264	280	367	414	480		492		496		450	380	333	271	250	
Total, worst case						254		1472				725					
Sun reduction						0.48		0.43				0.51					
Oper. time red.						0.47		0.47				0.47					
Wind dir. red.						0.69		0.67				0.68					
Total reduction						0.16		0.13				0.16					
Total, real						39		197				116					

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

Project:

**FW Cierpice**

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 10

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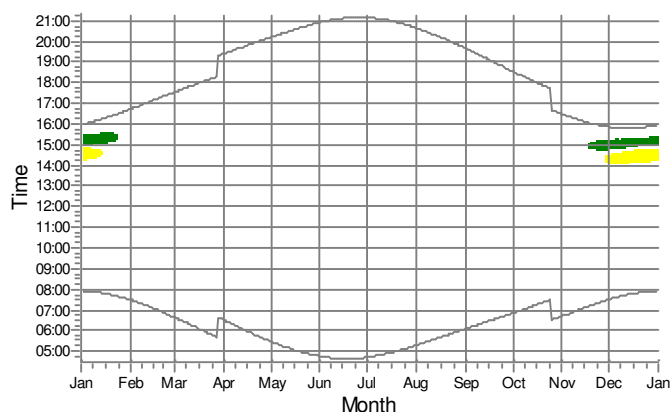
Krzysztof Kręciproch / prosilence@prosilence.pl

Calculated:

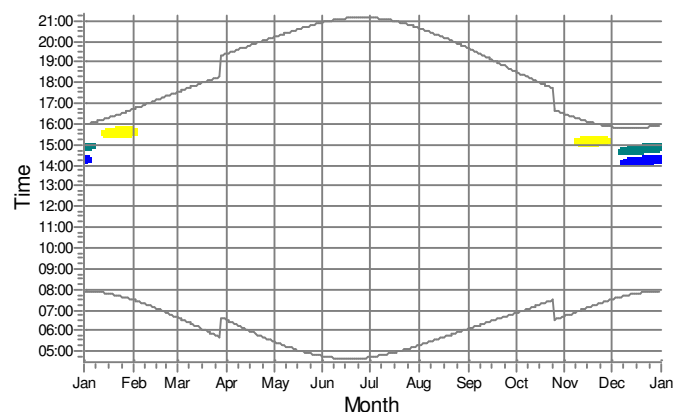
2014-11-11 21:28/2.9.285

**SHADOW - Calendar, graphical****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2**

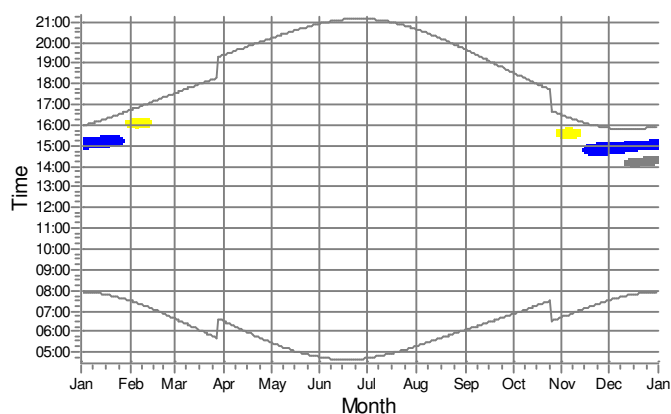
A: 01 Cierpice 1



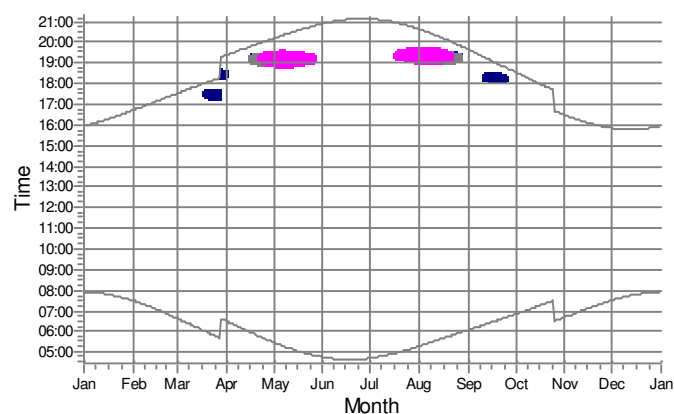
B: 02 Cierpice 2



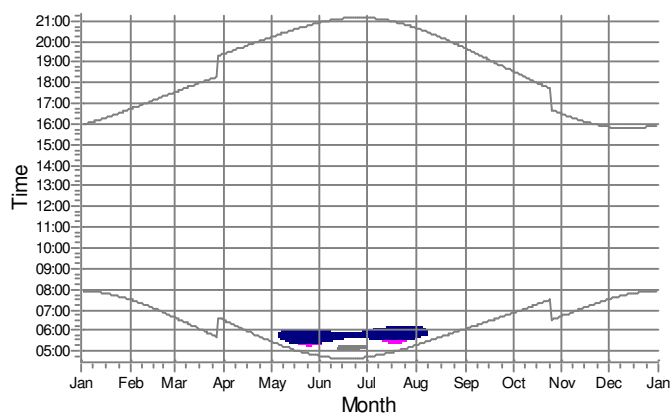
C: 03 Cierpice 3



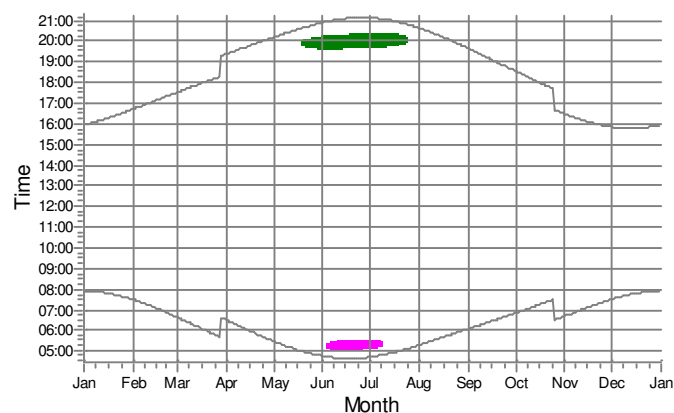
D: 04 Gołaczów 1



E: 05 Konary 1



F: 06 Konary 2



WTGs



1: EW1

2: EW2



3: EW3

4: EW4



5: EW5

6: EW6



7: EW7

Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 11

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 1 - EW1****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	
1	07:54	15:06-15:22/16	07:29	06:38	06:30	05:28		04:45	19:42-20:11/29
	15:57		16:43	17:32	19:23	20:11		20:55	
2	07:54	15:05-15:22/17	07:27	06:36	06:28	05:26		04:45	19:41-20:11/30
	15:58		16:44	17:33	19:25	20:13		20:56	
3	07:54	15:06-15:23/17	07:26	06:34	06:26	05:25		04:44	19:41-20:11/30
	15:59		16:46	17:35	19:26	20:14		20:57	
4	07:53	15:06-15:24/18	07:24	06:32	06:24	05:23		04:43	19:41-20:12/31
	16:00		16:48	17:37	19:28	20:16		20:58	
5	07:53	15:06-15:24/18	07:23	06:30	06:21	05:21		04:43	19:41-20:12/31
	16:01		16:50	17:39	19:29	20:17		20:59	
6	07:53	15:07-15:25/18	07:21	06:28	06:19	05:19		04:42	19:41-20:13/32
	16:02		16:51	17:40	19:31	20:19		20:59	
7	07:53	15:06-15:25/19	07:20	06:25	06:17	05:18		04:41	19:41-20:13/32
	16:04		16:53	17:42	19:33	20:21		21:00	
8	07:52	15:07-15:27/20	07:18	06:23	06:15	05:16		04:41	19:41-20:14/33
	16:05		16:55	17:44	19:34	20:22		21:01	
9	07:52	15:07-15:27/20	07:16	06:21	06:13	05:14		04:40	19:42-20:14/32
	16:06		16:57	17:45	19:36	20:24		21:02	
10	07:51	15:08-15:28/20	07:15	06:19	06:11	05:13		04:40	19:41-20:14/33
	16:08		16:59	17:47	19:38	20:25		21:03	
11	07:51	15:08-15:28/20	07:13	06:17	06:08	05:11		04:40	19:42-20:14/32
	16:09		17:00	17:49	19:39	20:27		21:03	
12	07:50	15:08-15:28/20	07:11	06:15	06:06	05:09		04:39	19:42-20:15/33
	16:10		17:02	17:50	19:41	20:28		21:04	
13	07:50	15:08-15:28/20	07:09	06:12	06:04	05:08		04:39	19:42-20:15/33
	16:12		17:04	17:52	19:42	20:30		21:05	
14	07:49	15:10-15:29/19	07:08	06:10	06:02	05:06		04:39	19:43-20:15/32
	16:13		17:06	17:54	19:44	20:31		21:05	
15	07:48	15:10-15:30/20	07:06	06:08	06:00	05:05		04:39	19:43-20:16/33
	16:15		17:07	17:55	19:46	20:33		21:06	
16	07:47	15:11-15:30/19	07:04	06:06	05:58	05:03		04:39	19:43-20:16/33
	16:16		17:09	17:57	19:47	20:34		21:06	
17	07:46	15:11-15:30/19	07:02	06:04	05:56	05:02		04:39	19:43-20:16/33
	16:18		17:11	17:59	19:49	20:35		21:07	
18	07:46	15:12-15:30/18	07:00	06:01	05:54	05:01		04:39	19:43-20:16/33
	16:19		17:13	18:00	19:50	20:37		21:07	
19	07:45	15:13-15:29/16	06:58	05:59	05:52	04:59		04:39	19:43-20:17/34
	16:21		17:14	18:02	19:52	20:38		21:08	
20	07:44	15:14-15:29/15	06:56	05:57	05:50	04:58	19:52-19:58/6	04:39	19:44-20:17/33
	16:22		17:16	18:04	19:54	20:40		21:08	
21	07:43	15:15-15:28/13	06:54	05:55	05:48	04:57	19:49-20:01/12	04:39	19:44-20:17/33
	16:24		17:18	18:05	19:55	20:41		21:08	
22	07:42	15:16-15:27/11	06:52	05:52	05:46	04:55	19:48-20:03/15	04:39	19:44-20:17/33
	16:26		17:20	18:07	19:57	20:42		21:08	
23	07:41	15:19-15:25/6	06:50	05:50	05:44	04:54	19:46-20:04/18	04:39	19:45-20:18/33
	16:27		17:21	18:08	19:58	20:44		21:09	
24	07:39		06:48	05:48	05:42	04:53	19:45-20:05/20	04:40	19:44-20:18/34
	16:29		17:23	18:10	20:00	20:45		21:09	
25	07:38		06:46	05:46	05:40	04:52	19:44-20:06/22	04:40	19:44-20:17/33
	16:31		17:25	18:12	20:02	20:46		21:09	
26	07:37		06:44	05:44	05:38	04:51	19:44-20:08/24	04:40	19:45-20:18/33
	16:32		17:27	18:13	20:03	20:48		21:09	
27	07:36		06:42	05:41	05:36	04:50	19:43-20:09/26	04:41	19:45-20:18/33
	16:34		17:28	18:15	20:05	20:49		21:09	
28	07:34		06:40	05:39	05:34	04:49	19:43-20:09/26	04:41	19:46-20:19/33
	16:36		17:30	18:17	20:06	20:50		21:09	
29	07:33			06:37	05:32	04:48	19:42-20:10/28	04:42	19:45-20:18/33
	16:37			19:18	20:08	20:51		21:08	
30	07:32			06:35	05:30	04:47	19:42-20:10/28	04:42	19:46-20:19/33
	16:39			19:20	20:10	20:52		21:08	
31	07:30			06:32		04:46	19:41-20:10/29		
	16:41			19:21		20:53			
Potential sun hours	264		280		367	414	480	492	
Sum of minutes with flicker	399		0		0	0	254	973	

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 12

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 1 - EW1****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:43 19:46-20:18/32 21:08	05:17 20:38	06:04 19:39	06:51 18:32	06:42 16:29	07:30 14:50-15:10/20 15:51
2	04:44 19:46-20:19/33 21:08	05:19 20:37	06:06 19:37	06:52 18:30	06:43 16:27	07:32 14:50-15:10/20 15:50
3	04:44 19:47-20:19/32 21:07	05:20 20:35	06:07 19:35	06:54 18:28	06:45 16:25	07:33 14:51-15:11/20 15:50
4	04:45 19:46-20:19/33 21:07	05:22 20:33	06:09 19:32	06:55 18:26	06:47 16:24	07:34 14:51-15:11/20 15:49
5	04:46 19:47-20:19/32 21:07	05:23 20:32	06:10 19:30	06:57 18:23	06:49 16:22	07:36 14:52-15:12/20 15:49
6	04:46 19:48-20:19/31 21:06	05:25 20:30	06:12 19:28	06:59 18:21	06:50 16:20	07:37 14:53-15:11/18 15:48
7	04:47 19:48-20:20/32 21:06	05:26 20:28	06:14 19:26	07:00 18:19	06:52 16:19	07:38 14:53-15:11/18 15:48
8	04:48 19:48-20:19/31 21:05	05:28 20:27	06:15 19:24	07:02 18:17	06:54 16:17	07:39 14:53-15:11/18 15:48
9	04:49 19:48-20:19/31 21:04	05:29 20:25	06:17 19:21	07:03 18:15	06:55 16:15	07:40 14:55-15:12/17 15:47
10	04:50 19:48-20:19/31 21:04	05:31 20:23	06:18 19:19	07:05 18:12	06:57 16:14	07:41 14:55-15:12/17 15:47
11	04:51 19:49-20:19/30 21:03	05:32 20:21	06:20 19:17	07:07 18:10	06:59 16:12	07:42 14:56-15:13/17 15:47
12	04:52 19:49-20:19/30 21:02	05:34 20:19	06:21 19:15	07:08 18:08	07:00 16:11	07:43 14:57-15:13/16 15:47
13	04:53 19:50-20:19/29 21:01	05:35 20:18	06:23 19:13	07:10 18:06	07:02 16:10	07:44 14:57-15:13/16 15:47
14	04:54 19:50-20:18/28 21:01	05:37 20:16	06:24 19:10	07:12 18:04	07:04 16:08	07:45 14:58-15:13/15 15:47
15	04:55 19:51-20:18/27 21:00	05:38 20:14	06:26 19:08	07:13 18:02	07:05 16:07	07:46 14:59-15:14/15 15:47
16	04:56 19:52-20:17/25 20:59	05:40 20:12	06:27 19:06	07:15 18:00	07:07 16:06	07:47 14:59-15:13/14 15:47
17	04:58 19:52-20:17/25 20:58	05:41 20:10	06:29 19:04	07:16 17:58	07:09 16:04	07:48 15:00-15:14/14 15:47
18	04:59 19:53-20:16/23 20:57	05:43 20:08	06:30 19:01	07:18 17:56	07:10 16:03	07:49 15:01-15:14/13 15:48
19	05:00 19:55-20:16/21 20:56	05:44 20:06	06:32 18:59	07:20 17:54	07:12 16:02	07:49 15:01-15:14/13 15:48
20	05:01 19:55-20:15/20 20:54	05:46 20:04	06:34 18:57	07:21 17:52	07:14 16:01	07:50 15:01-15:15/14 15:48
21	05:02 19:57-20:14/17 20:53	05:47 20:02	06:35 18:55	07:23 17:50	07:15 15:59	07:51 15:02-15:15/13 15:49
22	05:04 19:58-20:12/14 20:52	05:49 20:00	06:37 18:52	07:25 17:48	07:17 15:58	07:51 15:02-15:15/13 15:49
23	05:05 20:00-20:10/10 20:51	05:50 19:58	06:38 18:50	07:26 17:46	07:18 15:57	07:52 15:02-15:16/14 15:50
24	05:06 20:50 20:48	05:52 19:56	06:40 18:48	07:28 17:44	07:20 15:56	07:52 15:04-15:17/13 15:50
25	05:08 20:48 20:47	05:54 19:54	06:41 18:46	06:30 16:42	07:22 15:55	07:52 15:04-15:17/13 15:51
26	05:09 20:47 20:46	05:55 19:52	06:43 18:43	06:31 16:40	07:23 15:55	07:53 15:04-15:17/13 15:52
27	05:10 20:46 20:45	05:57 19:50	06:44 18:41	06:33 16:38	07:25 15:54	07:53 15:05-15:19/14 15:52
28	05:12 20:44 20:43	05:58 19:48	06:46 18:39	06:35 16:36	07:26 15:53	07:53 15:05-15:19/14 15:53
29	05:13 20:43 20:42	06:00 19:45	06:48 18:37	06:37 16:34	07:27 15:52	07:53 15:05-15:20/15 15:54
30	05:15 20:41 20:40	06:01 19:43	06:49 18:34	06:38 16:32	07:29 15:51	07:54 15:05-15:21/16 15:55
31	05:16 20:40 20:39	06:03 19:41	06:40 18:31	06:40 16:31	07:40 15:56	07:54 15:06-15:21/15 15:56
Potential sun hours	496	450	380	333	271	250
Sum of minutes with flicker	617	0	0	0	196	488

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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Calculated:

2014-11-11 21:28/2.9.285

## SHADOW - Calendar per WTG

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 2 - EW2

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April		May		June		July		August		September		October		November		December	
1	07:54	14:21-14:45/24	07:29	15:30-15:45/15	06:38	06:30	05:28	04:45	04:43	05:17	06:04	06:51	06:42	15:27-15:44/17	07:30	14:12-14:25/13								
	15:57		16:43	15:59-16:12/13	17:32	19:23	20:11	20:54	21:08	20:38	19:39	18:32	16:29		15:51									
2	07:54	14:21-14:44/23	07:27	15:31-15:44/13	06:36	06:28	05:26	04:45	04:43	05:19	06:06	06:52	06:43	15:27-15:45/18	07:32	14:11-14:26/15								
	15:58		16:44	15:58-16:13/15	17:33	19:25	20:13	20:56	21:08	20:37	19:37	18:30	16:27		15:50									
3	07:54	14:22-14:44/22	07:26	15:34-15:42/8	06:34	06:26	05:24	04:44	04:44	05:20	06:07	06:54	06:45	15:26-15:45/19	07:33	14:11-14:28/17								
	15:59		16:46	15:58-16:15/17	17:35	19:26	20:14	20:57	21:07	20:35	19:35	18:28	16:25		15:50									
4	07:53	14:23-14:45/22	07:24	15:37-16:15/18	06:32	06:24	05:23	04:43	04:45	05:22	06:09	06:55	06:47	15:26-15:46/20	07:34	14:10-14:28/18								
	16:00		16:48		17:37	19:28	20:16	20:58	21:07	20:33	19:32	18:26	16:24		15:49									
5	07:53	14:23-14:44/21	07:23	15:56-16:15/19	06:30	06:21	05:21	04:42	04:46	05:23	06:10	06:57	06:48	15:27-15:46/19	07:36	14:11-14:30/19								
	16:01		16:50		17:39	19:29	20:17	20:59	21:07	20:32	19:30	18:23	16:22		15:49									
6	07:53	14:24-14:45/21	07:21	15:57-16:16/19	06:28	06:19	05:19	04:42	04:46	05:25	06:12	06:59	06:50	15:27-15:46/19	07:37	14:10-14:31/21								
	16:02		16:51		17:40	19:31	20:19	20:59	21:06	20:30	19:28	18:21	16:20		15:48									
7	07:53	14:25-14:44/19	07:20	15:57-16:16/19	06:25	06:17	05:18	04:41	04:47	05:26	06:14	07:00	06:52	15:28-15:46/18	07:38	14:10-14:31/21								
	16:04		16:53		17:42	19:33	20:21	21:00	21:06	20:28	19:26	18:19	16:19		15:48									
8	07:52	14:26-14:44/18	07:18	15:57-16:15/18	06:23	06:15	05:16	04:41	04:48	05:28	06:15	07:02	06:54	15:03-15:13/10	07:39	14:10-14:32/22								
	16:05		16:55		17:44	19:34	20:22	21:01	21:05	20:27	19:24	18:17	16:17	15:27-15:44/17	15:48									
9	07:52	14:27-14:44/17	07:16	15:58-16:16/18	06:21	06:13	05:14	04:40	04:49	05:29	06:17	07:03	06:55	15:02-15:15/13	07:40	14:11-14:33/22								
	16:06		16:57		17:45	19:36	20:24	21:02	21:04	20:25	19:21	18:15	16:15	15:28-15:44/16	15:47									
10	07:51	14:29-14:44/15	07:15	15:59-16:15/16	06:19	06:11	05:13	04:40	04:50	05:31	06:18	07:05	06:57	15:00-15:16/16	07:41	14:11-14:34/23								
	16:08		16:59		17:47	19:37	20:25	21:03	21:04	20:23	19:19	18:12	16:14	15:30-15:43/13	15:47									
11	07:51	14:30-14:43/13	07:13	15:59-16:14/15	06:17	06:08	05:11	04:40	04:51	05:32	06:20	07:07	06:59	15:00-15:18/18	07:42	14:11-14:35/24								
	16:09		17:00		17:49	19:39	20:27	21:03	21:03	20:21	19:17	18:10	16:12	15:32-15:42/10	15:47									
12	07:50	14:32-14:41/9	07:11	16:01-16:13/12	06:15	06:06	05:09	04:39	04:52	05:34	06:21	07:08	07:00	14:59-15:19/20	07:43	14:11-14:35/24								
	16:10		17:02		17:50	19:41	20:28	21:04	21:02	20:19	19:15	18:08	16:11	15:34-15:39/5	15:47									
13	07:49	14:35-14:38/3	07:09	16:03-16:11/8	06:12	06:04	05:08	04:39	04:53	05:35	06:23	07:10	07:02	14:59-15:20/21	07:44	14:11-14:36/25								
	16:12		17:04		17:52	19:42	20:30	21:05	21:01	20:18	19:13	18:06	16:10		15:47									
14	07:49	15:28-15:38/10	07:08		06:10	06:02	05:06	04:39	04:54	05:37	06:24	07:11	07:04	14:58-15:19/21	07:45	14:12-14:37/25								
	16:13		17:06		17:54	19:44	20:31	21:05	21:01	20:16	19:10	18:04	16:08		15:47									
15	07:48	15:27-15:40/13	07:06		06:08	06:00	05:05	04:39	04:55	05:38	06:26	07:13	07:05	14:58-15:20/22	07:46	14:12-14:37/25								
	16:15		17:07		17:55	19:46	20:33	21:06	21:00	20:14	19:08	18:02	16:07		15:47									
16	07:47	15:26-15:41/15	07:04		06:06	05:58	05:03	04:39	04:56	05:40	06:27	07:15	07:07	14:58-15:20/22	07:47	14:12-14:37/25								
	16:16		17:09		17:57	19:47	20:34	21:06	20:59	20:12	19:06	18:00	16:05		15:47									
17	07:46	15:26-15:42/16	07:02		06:04	05:56	05:02	04:39	04:58	05:41	06:29	07:16	07:09	14:59-15:21/22	07:48	14:12-14:38/26								
	16:18		17:11		17:59	19:49	20:35	21:07	20:58	20:10	19:04	17:58	16:04		15:47									
18	07:46	15:25-15:43/18	07:00		06:01	05:54	05:01	04:39	04:59	05:43	06:30	07:18	07:10	14:59-15:21/22	07:49	14:13-14:39/26								
	16:19		17:13		18:00	19:50	20:37	21:07	20:57	20:08	19:01	17:56	16:03		15:48									
19	07:45	15:25-15:44/19	06:58		05:59	05:52	04:59	04:39	05:00	05:44	06:32	07:20	07:12	14:59-15:21/22	07:49	14:13-14:38/25								
	16:21		17:14		18:02	19:52	20:38	21:08	20:56	20:06	18:59	17:54	16:02		15:48									
20	07:44	15:25-15:45/20	06:56		05:57	05:50	04:58	04:39	05:01	05:46	06:33	07:21	07:14	14:59-15:21/22	07:50	14:14-14:39/25								
	16:22		17:16		18:03	19:54	20:40	21:08	20:54	20:04	18:57	17:52	16:01		15:48									
21	07:43	15:24-15:45/21	06:54		05:55	05:48	04:57	04:39	05:02	05:47	06:35	07:23	07:15	15:00-15:21/21	07:51	14:15-14:40/25								
	16:24		17:18		18:05	19:55	20:41	21:08	20:53	20:02	18:55	17:50	15:59		15:49									
22	07:42	15:24-15:46/22	06:52		05:52	05:45	04:55	04:39	05:04	05:49	06:37	07:25	07:17	15:01-15:21/20	07:51	14:15-14:40/25								
	16:26		17:20		18:07	19:57	20:42	21:08	20:52	20:00	18:52	17:48	15:58		15:49									
23	07:41	15:25-15:47/22	06:50		05:50	05:43	04:54	04:39	05:05	05:50	06:38	07:26	07:18	15:01-15:20/19	07:52	14:15-14:40/25								
	16:27		17:21		18:08	19:58	20:44	21:08	20:51	19:58	18:50	17:46	15:57		15:50									
24	07:39	15:25-15:47/22	06:48		05:48	05:41	04:53	04:40	05:06	05:52	06:40	07:28	07:20	15:02-15:20/18	07:52	14:16-14:41/25								
	16:29		17:23		18:10	20:00	20:45	21:09	20:50	19:56	18:48	17:44	15:56		15:50									
25	07:38	15:25-15:47/22	06:46		05:46	05:40	04:52	04:40	05:08	05:54	06:41	06:30	07:21	15:04-15:20/16	07:52	14:16-14:41/25								
	16:31		17:25		18:12	20:02	20:46	21:09	20:48	19:54	18:46	16:42	15:55		15:51									
26	07:37	15:25-15:48/23	06:44		05:44	05:38	04:51	04:40	05:09	05:55	06:43	06:31	07:23	15:04-15:19/15	07:53	14:16-14:42/26								
	16:32		17:27		18:13	20:03	20:48	21:09	20:47	19:52	18:43	16:40	15:55		15:52									
27	07:36	15:26-15:48/22	06:42		05:41	05:36	04:50	04:41	05:10	05:57	06:44	06:33	07:25	15:06-15:19/13	07:53	14:18-14:43/25								
	16:34		17:28		18:15	20:05	20:49	21:09	20:46	19:50	18:41	16:38	15:54		15:52									
28	07:34	15:26-15:47/21	06:40		05:39	05:34	04:49	04:41	05:12	05:58	06:46	06:35	07:26	15:07-15:17/10	07:53	14:18-14:43/25								
	16:36		17:30		18:16	20:06	20:50	21:09	20:44	19:48	18:39	16:36	15:53		15:53									
29	07:33	15:27-15:48/21			06:37	05:32	04:48	04:42	05:13	06:00	06:47	06:37	07:27	14:17-14:19/2	07:53	14:19-14:43/24								
	16:37				19:18	20:08	20:51	21:08	20:43	19:45	18:37	16:34	15:52	15:10-15:16/6	15:54									
30	07:32	15:27-15:47/20			06:35	05:30	04:47	04:42	05:14	06:01	06:49	06:38	07:29	14:14-14:23/9	07:54	14:19-14:44/25								
	16:39		16:02-16:08/6		19:20	20:10	20:52	21:08	20:41	19:43	18:34	16:32	15:51		15:55									
31	07:30	15:29-15:47/18			06:32		04:46		05:16	06:03				15:29-15:44/15	07:54	14:20-14:44/24								
	16:41	16:01-16:11/10			19:21		20:53		20:40	19:41					15:56									
Potential sun hours	264		280		367	414	480	492	496	450	380	333	271		250									
Sum of minutes with flicker	594		243		0	0	0	0	0	0	0	0	591		715									

Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 3 - EW3****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May		June	
1	07:54	14:10-14:25/15	07:29	06:38	06:30		05:28	19:10-19:14/4	04:45	
	15:57	14:54-15:15/21	16:43	17:32	19:23		20:11		20:54	
2	07:54	14:11-14:25/14	07:27	06:36	06:28		05:26		04:45	
	15:58	14:55-15:16/21	16:44	17:33	19:25		20:13		20:56	
3	07:53	14:13-14:24/11	07:26	06:34	06:26		05:24		04:44	
	15:59	14:55-15:17/22	16:46	17:35	19:26		20:14		20:57	
4	07:53	14:15-14:24/9	07:24	06:32	06:24		05:23		04:43	
	16:00	14:56-15:18/22	16:48	17:37	19:28		20:16		20:58	
5	07:53	14:16-14:22/6	07:23	06:30	06:21		05:21		04:42	
	16:01	14:55-15:18/23	16:50	17:39	19:29		20:17		20:58	
6	07:53	14:56-15:19/23	07:21	06:27	06:19		05:19		04:42	
	16:02		16:51	17:40	19:31		20:19		20:59	
7	07:53	14:56-15:19/23	07:20	06:25	06:17		05:17		04:41	
	16:04		16:53	17:42	19:33		20:21		21:00	
8	07:52	14:56-15:20/24	07:18	06:23	06:15		05:16		04:41	
	16:05		16:55	17:44	19:34		20:22		21:01	
9	07:52	14:56-15:21/25	07:16	06:21	06:13		05:14		04:40	
	16:06		16:57	17:45	19:36		20:24		21:02	
10	07:51	14:57-15:22/25	07:15	06:19	06:11		05:13		04:40	
	16:08		16:59	17:47	19:37		20:25		21:03	
11	07:51	14:57-15:22/25	07:13	06:17	06:08		05:11		04:40	
	16:09		17:00	17:49	19:39		20:27		21:03	
12	07:50	14:57-15:22/25	07:11	06:15	06:06		05:09		04:39	
	16:10		17:02	17:50	19:41		20:28		21:04	
13	07:49	14:57-15:22/25	07:09	06:12	06:04		05:08		04:39	
	16:12		17:04	17:52	19:42		20:30		21:05	
14	07:49	14:58-15:24/26	07:07	06:10	06:02		05:06		04:39	
	16:13		17:06	17:54	19:44		20:31		21:05	
15	07:48	14:59-15:24/25	07:06	06:08	06:00		05:05		04:39	
	16:15		17:07	17:55	19:46		20:33		21:06	
16	07:47	14:59-15:24/25	07:04	06:06	05:58	19:10-19:19/9	05:03		04:39	
	16:16		17:09	17:57	19:47		20:34		21:06	
17	07:46	15:00-15:24/24	07:02	06:04	05:56	19:07-19:21/14	05:02		04:39	
	16:18		17:11	17:59	19:49		20:35		21:07	
18	07:46	15:00-15:24/24	07:00	06:01	05:54	19:06-19:23/17	05:01		04:39	
	16:19		17:13	18:00	19:50		20:37		21:07	
19	07:45	15:01-15:24/23	06:58	05:59	05:52	19:05-19:23/18	04:59		04:39	
	16:21		17:14	18:02	19:52		20:38		21:08	
20	07:44	15:02-15:24/22	06:56	05:57	05:50	19:04-19:24/20	04:58		04:39	
	16:22		17:16	18:03	19:54		20:40		21:08	
21	07:43	15:02-15:23/21	06:54	05:55	05:47	19:03-19:24/21	04:57		04:39	
	16:24		17:18	18:05	19:55		20:41		21:08	
22	07:42	15:03-15:23/20	06:52	05:52	05:45	19:02-19:24/22	04:55		04:39	
	16:26		17:20	18:07	19:57		20:42		21:08	
23	07:41	15:04-15:23/19	06:50	05:50	05:43	19:02-19:24/22	04:54		04:39	
	16:27		17:21	18:08	19:58		20:44		21:08	
24	07:39	15:06-15:23/17	06:48	05:48	05:41	19:02-19:23/21	04:53		04:40	
	16:29		17:23	18:10	20:00		20:45		21:09	
25	07:38	15:07-15:21/14	06:46	05:46	05:40	19:02-19:23/21	04:52		04:40	
	16:31		17:25	18:12	20:02		20:46		21:09	
26	07:37	15:09-15:20/11	06:44	05:44	05:38	19:03-19:23/20	04:51		04:40	
	16:32		17:27	18:13	20:03		20:48		21:09	
27	07:36	15:14-15:17/3	06:42	05:41	05:36	19:03-19:22/19	04:50		04:41	
	16:34		17:28	18:15	20:05		20:49		21:09	
28	07:34		06:40	05:39	05:34	19:04-19:21/17	04:49		04:41	
	16:36		17:30	18:16	20:06		20:50		21:09	
29	07:33			06:37	05:32	19:05-19:19/14	04:48		04:42	
	16:37			19:18	20:08		20:51		21:08	
30	07:32			06:35	05:30	19:06-19:17/11	04:47		04:42	
	16:39			19:20	20:10		20:52		21:08	
31	07:30			06:32			04:46			
	16:41			19:21			20:53			
Potential sun hours	264		280	367	414		480		492	0
Sum of minutes with flicker	633		0	0	266		4		0	

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker



Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 3 - EW3****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:43 21:08	05:17 20:38	06:04 19:39	06:51 18:32	06:42 16:29	07:30 15:51
2	04:43 21:08	05:19 20:37	06:06 19:37	06:52 18:30	06:43 16:27	07:32 15:50
3	04:44 21:07	05:20 20:35	06:07 19:35	06:54 18:28	06:45 16:25	07:33 15:50
4	04:45 21:07	05:22 20:33	06:09 19:32	06:55 18:25	06:47 16:24	07:34 15:49
5	04:46 21:07	05:23 20:32	06:10 19:30	06:57 18:23	06:48 16:22	07:36 15:49
6	04:46 21:06	05:25 20:30	06:12 19:28	06:59 18:21	06:50 16:20	07:37 15:48
7	04:47 21:06	05:26 20:28	06:14 19:26	07:00 18:19	06:52 16:19	07:38 15:48
8	04:48 21:05	05:28 20:27	06:15 19:24	07:02 18:17	06:54 16:17	07:39 15:48
9	04:49 21:04	05:29 20:25	06:17 19:21	07:03 18:15	06:55 16:15	07:40 15:47
10	04:50 21:04	05:31 20:23	06:18 19:19	07:05 18:12	06:57 16:14	07:41 15:47
11	04:51 21:03	05:32 20:21	06:20 19:17	07:07 18:10	06:59 16:12	07:42 15:47
12	04:52 21:02	05:34 20:19	06:21 19:15	07:08 18:08	07:00 16:11	07:43 15:47
13	04:53 21:01	05:35 20:18	06:23 19:12	07:10 18:06	07:02 16:10	07:44 15:47
14	04:54 21:01	05:37 20:16	06:24 19:10	07:11 18:04	07:04 16:08	07:45 15:47
15	04:55 21:00	05:38 20:14	06:26 19:08	07:13 18:02	07:05 16:07	07:46 15:47
16	04:56 20:59	05:40 20:12	06:27 19:06	07:15 18:00	07:07 16:05	07:47 15:47
17	04:57 20:58	05:41 20:10	06:29 19:03	07:16 17:58	07:09 16:04	07:48 15:47
18	04:59 20:57	05:43 20:08	06:30 19:01	07:18 17:56	07:10 16:03	07:49 15:48
19	05:00 20:56	05:44 20:06	06:32 18:59	07:20 17:54	07:12 16:02	07:49 15:48
20	05:01 20:54	05:46 20:04	06:33 18:57	07:21 17:52	07:14 16:01	07:50 15:48
21	05:02 20:53	05:47 20:02	06:35 18:54	07:23 17:50	07:15 15:59	07:51 15:49
22	05:04 20:52	05:49 20:00	06:37 18:52	07:25 17:48	07:17 15:58	07:51 15:49
23	05:05 20:51	05:50 19:58	06:38 18:50	07:26 17:46	07:18 15:57	07:52 15:50
24	05:06 20:50	05:52 19:56	06:40 18:48	07:28 17:44	07:20 15:56	07:52 15:50
25	05:08 20:48	05:54 19:54	06:41 18:46	07:29 17:42	07:21 15:55	07:52 15:51
26	05:09 20:47	05:55 19:52	06:43 18:43	07:31 17:40	07:23 15:54	07:53 15:51
27	05:10 20:46	05:57 19:50	06:44 18:41	07:32 17:38	07:24 15:54	07:53 15:52
28	05:12 20:44	05:58 19:47	06:46 18:39	07:34 17:36	07:26 15:53	07:53 15:53
29	05:13 20:43	06:00 19:45	06:47 18:37	07:35 17:34	07:27 15:52	07:53 15:54
30	05:14 20:41	06:01 19:43	06:49 18:34	07:36 17:32	07:29 15:51	07:54 15:55
31	05:16 20:40	06:03 19:41	06:50 18:30	07:37 17:26	07:30 15:50	07:54 15:56
Potential sun hours	496	450	380	333	271	250
Sum of minutes with flicker	0	274	0	0	325	1051

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

**FW Cierpice**

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 4 - EW4****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

January		February		March	April	May		June	
1	07:54 14:16-14:22/6	07:29	06:38	06:30		05:28	18:59-19:21/22	04:45	
	15:57	16:43	17:32	19:23		20:11		20:54	
2	07:54	07:27	06:36	06:28		05:26	19:00-19:19/19	04:45	
	15:58	16:44	17:33	19:25		20:13		20:56	
3	07:53	07:26	06:34	06:26		05:24	19:01-19:17/16	04:44	
	15:59	16:46	17:35	19:26		20:14		20:57	
4	07:53	07:24	06:32	06:24		05:23	19:02-19:15/13	04:43	
	16:00	16:48	17:37	19:28		20:16		20:58	
5	07:53	07:23	06:30	06:21		05:21	19:05-19:13/8	04:42	
	16:01	16:50	17:39	19:29		20:17		20:58	
6	07:53	07:21	06:27	06:19		05:19		04:42	
	16:02	16:51	17:40	19:31		20:19		20:59	
7	07:52	07:20	06:25	06:17		05:17		04:41	
	16:04	16:53	17:42	19:33		20:21		21:00	
8	07:52	07:18	06:23	06:15		05:16		04:41	
	16:05	16:55	17:44	19:34		20:22		21:01	
9	07:52	07:16	06:21	06:13		05:14		04:40	
	16:06	16:57	17:45	19:36		20:24		21:02	
10	07:51	07:15	06:19	06:11		05:13		04:40	
	16:07	16:58	17:47	19:37		20:25		21:03	
11	07:51	07:13	06:17	06:08		05:11		04:40	
	16:09	17:00	17:49	19:39		20:27		21:03	
12	07:50	07:11	06:14	06:06		05:09		04:39	
	16:10	17:02	17:50	19:41		20:28		21:04	
13	07:49	07:09	06:12	06:04		05:08		04:39	05:08-05:09/1
	16:12	17:04	17:52	19:42		20:30		21:05	
14	07:49	07:07	06:10	06:02		05:06		04:39	05:08-05:10/2
	16:13	17:06	17:54	19:44		20:31		21:05	
15	07:48	07:06	06:08	06:00		05:05		04:39	05:08-05:11/3
	16:15	17:07	17:55	19:46		20:33		21:06	
16	07:47	07:04	06:06	05:58	19:07-19:17/10	05:03		04:39	05:08-05:11/3
	16:16	17:09	17:57	19:47		20:34		21:06	
17	07:46	07:02	06:03	05:56	19:04-19:19/15	05:02		04:39	05:08-05:12/4
	16:18	17:11	17:59	19:49		20:35		21:07	
18	07:46	07:00	06:01	05:54	19:02-19:21/19	05:01		04:39	05:08-05:12/4
	16:19	17:13	18:00	19:50		20:37		21:07	
19	07:45	06:58	05:59	05:52	19:01-19:22/21	04:59		04:39	05:08-05:12/4
	16:21	17:14	18:02	19:52		20:38		21:08	
20	07:44	06:56	05:57	05:49	19:00-19:23/23	04:58		04:39	05:08-05:12/4
	16:22	17:16	18:03	19:54		20:40		21:08	
21	07:43	06:54	05:55	05:47	18:59-19:23/24	04:57		04:39	05:08-05:12/4
	16:24	17:18	18:05	19:55		20:41		21:08	
22	07:42	06:52	05:52	05:45	18:58-19:23/25	04:55		04:39	05:08-05:12/4
	16:26	17:20	18:07	19:57		20:42		21:08	
23	07:41	06:50	05:50	05:43	18:57-19:24/27	04:54		04:39	05:09-05:13/4
	16:27	17:21	18:08	19:58		20:44		21:08	
24	07:39	06:48	05:48	05:41	18:57-19:23/26	04:53		04:40	05:09-05:13/4
	16:29	17:23	18:10	20:00		20:45		21:09	
25	07:38	06:46	05:46	05:39	18:56-19:23/27	04:52		04:40	05:09-05:13/4
	16:31	17:25	18:12	20:02		20:46		21:09	
26	07:37	06:44	05:43	05:38	18:57-19:24/27	04:51		04:40	05:10-05:13/3
	16:32	17:27	18:13	20:03		20:47		21:09	
27	07:36	06:42	05:41	05:36	18:57-19:23/26	04:50		04:41	05:10-05:13/3
	16:34	17:28	18:15	20:05		20:49		21:09	
28	07:34	06:40	05:39	05:34	18:57-19:23/26	04:49		04:41	05:11-05:13/2
	16:36	17:30	18:16	20:06		20:50		21:09	
29	07:33		06:37	05:32	18:57-19:22/25	04:48		04:42	05:11-05:12/1
	16:37		19:18	20:08		20:51		21:08	
30	07:32		06:35	05:30	18:58-19:21/23	04:47		04:42	
	16:39		19:20	20:10		20:52		21:08	
31	07:30		06:32			04:46			
	16:41		19:21			20:53			
Potential sun hours	264	280	367	414		480		492	
Sum of minutes with flicker	6	0	0	344		78		54	

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

**FW Cierpice**

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 17

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**ProSilence Krzysztof Kreciproch**

Ul. Spychalskiego 13/207

PL-45 716 Opole

+48 77 550 11 43

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 4 - EW4****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:43 21:08	05:17 20:38	06:04 19:39	06:51 18:32	06:42 16:29	07:30 15:51
2	04:43 21:08	05:19 20:37	06:06 19:37	06:52 18:30	06:43 16:27	07:32 15:50
3	04:44 21:07	05:20 20:35	06:07 19:35	06:54 18:28	06:45 16:25	07:33 15:50
4	04:45 21:07	05:22 20:33	06:09 19:32	06:55 18:25	06:47 16:24	07:34 15:49
5	04:46 21:07	05:23 20:32	06:10 19:30	06:57 18:23	06:48 16:22	07:36 15:49
6	04:46 21:06	05:25 20:30	06:12 19:28	06:59 18:21	06:50 16:20	07:37 15:48
7	04:47 21:06	05:26 20:28	06:13 19:26	07:00 18:19	06:52 16:19	07:38 15:48
8	04:48 21:05	05:28 20:27	06:15 19:24	07:02 18:17	06:54 16:17	07:39 15:48
9	04:49 21:04	05:29 20:25	06:17 19:21	07:03 18:15	06:55 16:15	07:40 15:47
10	04:50 21:04	05:31 20:23	06:18 19:19	07:05 18:12	06:57 16:14	07:41 15:47
11	04:51 21:03	05:32 20:21	06:20 19:17	07:07 18:10	06:59 16:12	07:42 14:07-14:13/6
12	04:52 21:02	05:34 20:19	06:21 19:15	07:08 18:08	07:00 16:11	07:43 14:06-14:15/9
13	04:53 21:01	05:35 20:18	06:23 19:12	07:10 18:06	07:02 16:10	07:44 14:06-14:16/10
14	04:54 21:00	05:37 20:16	06:24 19:10	07:11 18:04	07:04 16:08	07:45 14:06-14:17/11
15	04:55 21:00	05:38 20:14	06:26 19:08	07:13 18:02	07:05 16:07	07:46 14:05-14:17/12
16	04:56 20:59	05:40 20:12	06:27 19:06	07:15 18:00	07:07 16:05	07:47 14:05-14:18/13
17	04:57 20:58	05:41 20:10	06:29 19:03	07:16 17:58	07:09 16:04	07:48 14:05-14:19/14
18	04:59 20:57	05:43 20:08	06:30 19:01	07:18 17:56	07:10 16:03	07:49 14:06-14:20/14
19	05:00 20:56	05:44 20:06	06:32 18:59	07:20 17:54	07:12 16:02	07:49 14:05-14:20/15
20	05:01 20:54	05:46 20:04	06:33 18:57	07:21 17:52	07:14 16:01	07:50 14:06-14:21/15
21	05:02 20:53	05:47 20:02	06:35 18:54	07:23 17:50	07:15 15:59	07:50 14:07-14:22/15
22	05:04 20:52	05:49 20:00	06:37 18:52	07:25 17:48	07:17 15:58	07:51 14:07-14:22/15
23	05:05 20:51	05:50 19:58	06:38 18:50	07:26 17:46	07:18 15:57	07:52 14:07-14:22/15
24	05:06 20:50	05:52 19:56	06:40 18:48	07:28 17:44	07:20 15:56	07:52 14:08-14:23/15
25	05:08 20:48	05:54 19:54	06:41 18:45	07:30 17:42	07:21 15:55	07:52 14:09-14:23/14
26	05:09 20:47	05:55 19:52	06:43 18:43	07:31 17:40	07:23 15:54	07:53 14:09-14:23/14
27	05:10 20:46	05:57 19:50	06:44 18:41	07:33 17:38	07:24 15:54	07:53 14:11-14:24/13
28	05:12 20:44	05:58 19:47	06:46 18:39	07:35 17:36	07:26 15:53	07:53 14:11-14:24/13
29	05:13 20:43	06:00 19:45	06:47 18:37	07:36 17:34	07:27 15:52	07:53 14:12-14:24/12
30	05:14 20:41	06:01 19:43	06:49 18:34	07:38 17:32	07:29 15:51	07:54 14:13-14:24/11
31	05:16 20:40	06:03 19:41		06:40 16:30		07:54 14:15-14:24/9
Potential sun hours	496	450	380	333	271	250
Sum of minutes with flicker	0	423	0	0	0	265

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 18

Licensed user:

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PL-45 716 Opole

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Calculated:

2014-11-11 21:28/2.9.285

## SHADOW - Calendar per WTG

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 5 - EW5

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

2,08 3,09 3,64 5,36 7,46 7,03 8,08 7,26 4,75 4,21 1,76 1,39

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

177 155 173 127 144 326 604 321 392 619 710 350 4 098

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	07:54 15:57	07:29 16:43	06:38 17:32	06:30 19:23	05:28 20:11	18:55-19:31/36 20:54	04:45 20:54	05:12-05:30/18 21:08	05:17 20:38	19:03-19:41/38 19:39	06:51 18:32	06:42 16:29	07:30 15:51		
2	07:54 15:58	07:27 16:44	06:36 17:33	06:28 19:25	05:26 20:13	18:54-19:31/37 20:55	04:44 20:55	05:13-05:30/17 21:08	05:19 20:37	19:03-19:41/38 19:37	06:52 18:30	06:43 16:27	07:32 15:50		
3	07:53 15:59	07:26 16:46	06:34 17:35	06:26 19:26	05:24 20:14	18:53-19:31/38 20:57	04:44 20:57	05:14-05:30/16 21:07	05:20 20:35	19:03-19:42/39 19:35	06:54 18:28	06:45 16:25	07:33 15:50		
4	07:53 16:00	07:24 16:48	06:32 17:37	06:24 19:28	05:23 20:16	18:52-19:31/39 20:57	04:43 20:57	05:13-05:16/3 21:07	04:45 20:33	05:14-05:29/15 20:33	19:02-19:41/39 19:32	06:59 18:25	06:55 16:23	07:34 15:49	
5	07:53 16:01	07:23 16:50	06:30 17:38	06:21 19:29	05:21 20:17	18:53-19:32/39 20:58	04:42 20:58	05:10-05:19/9 21:07	04:46 20:32	05:15-05:28/13 20:32	19:03-19:42/39 19:30	06:10 18:23	06:57 16:22	07:35 15:49	
6	07:53 16:02	07:21 16:51	06:27 17:40	06:19 19:31	05:19 20:19	18:52-19:32/40 20:59	04:42 20:59	05:10-05:21/11 21:06	04:46 20:30	05:16-05:28/12 20:30	19:02-19:42/40 19:28	06:12 18:21	06:59 16:20	07:37 15:48	
7	07:52 16:04	07:20 16:53	06:25 17:42	06:17 19:33	05:17 20:20	18:53-19:32/39 21:00	04:41 21:00	05:09-05:22/13 21:06	04:47 20:28	05:17-05:27/10 20:28	19:02-19:41/39 19:26	06:13 18:19	07:00 16:19	07:38 15:48	
8	07:52 16:05	07:18 16:55	06:23 17:44	06:15 19:34	05:16 20:22	18:52-19:32/40 21:01	04:41 21:01	05:09-05:23/14 21:05	04:48 20:27	05:17-05:24/7 20:27	19:02-19:41/39 19:24	06:15 18:17	07:02 16:17	07:39 15:47	
9	07:52 16:06	07:16 16:57	06:21 17:45	06:13 19:36	05:14 20:24	18:52-19:31/39 21:02	04:40 21:02	05:09-05:25/16 21:04	04:49 20:25	05:29 20:25	19:02-19:41/39 19:21	06:17 18:15	07:03 16:15	07:40 15:47	
10	07:51 16:07	07:15 16:58	06:19 17:47	06:10 19:37	05:12 20:25	18:53-19:31/38 21:03	04:40 21:03	05:08-05:25/17 21:04	04:50 20:23	05:31 20:23	19:03-19:41/38 19:19	06:18 18:12	07:05 16:14	07:41 15:47	
11	07:51 16:09	07:13 17:00	06:17 17:49	06:08 19:39	05:11 20:27	18:52-19:30/38 21:03	04:40 21:03	05:08-05:26/18 21:03	04:51 20:21	05:32 20:21	19:02-19:40/38 19:17	06:20 18:10	07:07 16:12	07:42 15:47	
12	07:50 16:10	07:11 17:02	06:14 17:50	06:06 19:41	05:09 20:28	05:34-05:35/1 18:53-19:31/38	04:39 21:04	05:08-05:27/19 21:02	04:52 20:19	05:34-05:40/6 20:19	19:02-19:39/37 19:15	06:21 18:08	07:08 16:11	07:43 15:47	
13	07:49 16:12	07:09 17:04	06:12 17:52	06:04 19:42	05:08 20:30	05:33-05:36/3 18:54-19:31/37	04:39 21:05	05:08-05-27/19 21:01	04:53 20:18	05:33-05:41/8 20:18	19:03-19:39/36 19:12	06:23 18:06	07:10 16:09	07:44 15:47	
14	07:49 16:13	07:07 17:06	06:10 17:54	06:02 19:44	05:06 20:31	05:31-05:36/5 18:54-19:30/36	04:39 21:05	05:08-05-28/20 21:00	04:54 20:16	05:32-05:43/11 20:16	19:03-19:37/34 19:10	06:24 18:04	07:11 16:08	07:45 15:47	
15	07:48 16:15	07:06 17:07	06:08 17:55	06:00 19:45	05:05 20:33	05:30-05:37/7 18:54-19:29/35	04:39 21:06	05:08-05-29/21 21:00	04:55 20:14	05:31-05:44/13 20:14	19:05-19:37/32 19:08	06:26 18:02	07:13 16:07	07:46 15:47	
16	07:47 16:16	07:04 17:09	06:06 17:57	05:58 19:47	05:03 20:34	05:29-05:38/9 18:55-19:29/34	04:39 21:06	05:08-05-29/21 21:05	04:56 20:12	05:30-05:44/14 20:12	19:05-19:35/30 19:06	06:27 18:00	07:15 16:05	07:47 15:47	
17	07:46 16:18	07:02 17:11	06:03 17:59	05:56 19:49	05:02 20:35	05:27-05:37/10 18:55-19:28/33	04:39 21:07	05:08-05-29/21 21:05	04:57 20:10	05:30-05:45/15 20:10	19:06-19:34/28 19:03	06:29 17:58	07:16 16:04	07:48 15:47	
18	07:46 16:19	07:00 17:13	06:01 18:00	05:54 19:50	05:01 20:37	05:26-05:38/12 18:56-19:28/32	04:39 21:07	05:08-05-30/22 21:07	04:59 20:57	05:30-05:47/17 20:57	19:07-19:32/25 20:08	06:30 19:01	07:18 17:56	07:10 16:03	07:49 15:48
19	07:45 16:21	06:58 17:14	05:59 18:02	05:52 19:52	04:59 20:38	05:25-05:38/13 18:57-19:27/30	04:39 21:07	05:08-05-30/22 21:07	05:00 20:56	05:30-05:47/17 20:56	19:09-19:31/22 20:06	06:32 18:59	07:20 17:54	07:12 16:02	07:49 15:48
20	07:44 16:22	06:56 17:16	05:57 18:03	05:49 19:54	04:58 20:40	05:24-05:38/14 18:58-19:27/29	04:39 21:08	05:08-05-30/22 21:08	05:01 20:54	05:30-05:47/17 20:54	19:11-19:28/17 20:04	06:33 18:57	07:21 17:51	07:14 16:01	07:50 15:48
21	07:43 16:24	06:54 17:18	05:55 18:05	05:47 19:55	04:57 20:41	05:23-05:38/15 19:00-19:26/26	04:39 21:08	05:08-05-30/22 21:08	05:02 20:53	05:31-05:48/17 20:53	19:14-19:23/9 20:02	06:35 18:54	07:23 17:49	07:15 15:59	07:50 15:49
22	07:42 16:26	06:52 17:20	05:52 18:07	05:45 19:57	04:55 20:42	05:22-05:38/16 19:00-19:24/24	04:39 21:08	05:08-05-30/22 21:08	05:04 20:52	05:32-05:48/16 20:52	19:10-19:35/25 20:00	06:37 18:52	07:25 17:47	07:17 15:58	07:51 15:49
23	07:40 16:27	06:50 17:21	05:50 18:08	05:43 19:58	04:54 20:44	05:21-05:38/17 19:01-19:23/22	04:39 21:08	05:09-05-31/22 21:08	05:05 20:51	05:33-05:48/15 19:09-19:36/27	19:05-19:36/27 19:58	06:38 18:50	07:26 17:46	07:18 15:57	07:52 15:50
24	07:39 16:29	06:48 17:23	05:48 18:10	05:41 20:00	04:53 20:45	05:19-05:37/18 19:02-19:22/20	04:40 21:09	05:09-05-31/22 21:09	05:06 20:50	05:35-05:49/14 19:08-19:37/29	19:37/29 19:56	06:40 18:48	07:28 17:44	07:20 15:56	07:52 15:50
25	07:38 16:31	06:46 17:25	05:46 18:12	05:39 20:02	04:52 20:46	05:20-05:37/17 19:04-19:21/17	04:40 21:09	05:09-05-31/22 21:09	05:08 20:48	05:36-05:48/12 19:07-19:38/31	19:38/31 19:54	06:41 18:45	06:30 16:42	07:21 15:55	07:52 15:51
26	07:37 16:32	06:44 17:27	05:43 18:13	05:38 20:03	04:51 20:47	05:21-05:37/16 19:06-19:19/13	04:40 21:09	05:10-05-31/21 21:09	05:09 20:47	05:37-05:48/11 19:06-19:38/32	19:38/32 19:52	06:43 18:43	06:31 16:40	07:23 15:54	07:53 15:51
27	07:36 16:34	06:42 17:28	05:41 18:15	05:36 20:05	04:50 20:49	05:21-05:36/15 19:09-19:18/9	04:41 21:09	05:10-05-31/21 21:09	05:10 20:46	05:38-05:48/10 19:05-19:39/34	19:39/34 19:50	06:44 18:41	06:33 16:38	07:24 15:54	07:53 15:52
28	07:34 16:36	06:40 17:30	05:39 18:16	05:34 20:06	04:49 20:50	05:22-05:36/14 18:57-19:29/32	04:41 21:09	05:11-05-31/20 21:09	05:12 20:44	05:40-05:48/8 19:06-19:40/34	19:40/34 19:47	06:46 18:39	06:35 16:36	07:26 15:53	07:53 15:53
29	07:33 16:37	6:35 17:31	05:32 18:18	05:32 20:08	04:48 20:51	05:23-05:35/12 19:05-19:30/35	04:42 21:08	05:11-05-31/20 21:08	05:13 20:43	05:41-05-47/6 19:05-19:40/35	19:40/35 19:45	06:47 18:37	06:36 16:34	07:27 15:52	07:53 15:54
30	07:32 16:39	6:35 17:33	05:30 18:20	05:30 20:10	04:47 20:52	05:24-05:34/10 18:55-19:30/35	04:42 21:08	05:12-05-31/19 21:08	05:14 20:41	05:42-05-47/5 19:04-19:40/36	19:40/36 19:43	06:49 18:34	06:38 16:32	07:29 15:51	07:53 15:55
31	07:30 16:41	6:32 17:34	05:32 18:21	05:32 20:10	04:46 20:53	05:25-05:32/7 18:56-19:30/35	04:42 21:08	05:12-05-31/19 21:08	05:16 20:40	05:44-05:46/2 19:04-19:41/37	19:41/37 19:41	06:03 16:30	06:40 15:56	07:54 15:56	07:54 15:56
Potential sun hours	264	280	367	414	480	1089	492	754	696	380	333	271	250		
Sum of minutes with flicker	0	0	0	236	1089	500	496	754	696	380	333	271	250		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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2014-11-11 21:47 / 19

Licensed user:

ProSilence Krzysztof Kreciproch

Ul. Spychalskiego 13/207

PL-45 716 Opole

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Krzysztof Kręciproch / prosilence@prosilence.pl

Calculated:

2014-11-11 21:28/2.9.285

## SHADOW - Calendar per WTG

Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 6 - EW6

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
2,08 3,09 3,64 5,36 7,46 7,03 8,08 7,26 4,75 4,21 1,76 1,39

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
177 155 173 127 144 326 604 321 392 619 710 350 4 098

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:54 14:45-14:59/14 15:57	07:29 16:43 17:32	06:38 17:32 19:23	06:30 19:23 20:11	05:28 20:11 20:54	04:45 20:54 21:08	04:43 21:08 20:38	05:17 20:38 19:39	06:04 19:39 18:32	06:51 18:32 16:29	06:42 16:29 15:51	
2	07:54 14:46-14:59/13 15:58	07:27 16:44 17:33	06:36 17:33 19:25	06:28 19:25 20:13	05:26 20:13 20:56	04:45 20:56 21:08	04:43 21:08 20:37	05:19 20:37 19:06	06:06 19:06 18:30	06:52 18:30 16:27	06:43 16:27 15:50	
3	07:53 14:47-15:00/13 15:59	07:26 16:46 17:35	06:34 17:35 19:26	06:26 19:26 20:14	05:24 20:14 20:57	04:44 20:57 21:07	04:44 21:07 20:35	05:20 20:35 19:35	06:07 19:35 18:28	06:54 18:28 16:25	06:45 16:25 15:50	
4	07:53 14:48-15:00/12 16:00	07:24 16:48 17:37	06:32 17:37 19:28	06:24 19:28 20:16	05:23 20:16 20:58	04:43 20:58 21:07	04:45 21:07 20:33	05:22 20:33 19:32	06:09 19:32 18:26	06:55 18:26 16:24	06:47 16:24 15:49	
5	07:53 14:49-14:59/10 16:01	07:23 16:50 17:39	06:30 17:39 19:29	06:21 19:29 20:17	05:21 20:17 20:58	04:43 20:58 21:07	04:46 21:07 20:32	05:23 20:32 19:30	06:10 19:30 18:23	06:57 18:23 16:22	06:48 16:22 15:49	14:39-14:43/4
6	07:53 14:51-14:59/8 16:02	07:21 16:51 17:40	06:28 17:40 19:31	06:19 19:31 20:19	05:19 20:19 20:59	04:42 20:59 21:06	04:46 21:06 20:30	05:25 20:30 19:28	06:12 19:28 18:21	06:59 18:21 16:20	06:50 16:20 15:48	14:37-14:44/7
7	07:53 14:52-14:57/5 16:04	07:20 16:53 17:42	06:25 17:42 19:33	06:17 19:33 20:21	05:18 20:21 21:00	04:41 21:00 21:06	04:47 21:06 20:28	05:26 20:28 19:26	06:14 19:26 18:19	07:00 18:19 16:19	06:52 16:19 15:48	14:36-14:46/10
8	07:52 16:05 16:05	07:18 16:55 17:44	06:23 17:44 19:34	06:15 19:34 20:22	05:16 20:22 21:01	04:41 21:01 21:05	04:48 21:05 20:27	05:28 20:27 19:24	06:15 19:24 18:17	07:02 18:17 16:17	06:54 16:17 15:48	14:35-14:47/12
9	07:52 16:06 16:06	07:16 16:57 17:45	06:21 17:45 19:36	06:13 19:36 20:24	05:14 20:24 21:02	04:40 21:02 21:04	04:49 21:04 20:25	05:29 20:25 19:21	06:17 19:21 18:15	07:03 18:15 16:15	06:55 16:15 15:47	14:36-14:49/13
10	07:51 16:08 16:08	07:15 16:59 17:47	06:19 17:47 19:37	06:11 19:37 20:25	05:13 20:25 21:03	04:40 21:03 21:04	04:50 21:04 20:23	05:31 20:23 19:19	06:18 19:19 18:12	07:05 18:12 16:14	06:57 16:14 15:47	14:36-14:49/13
11	07:51 16:09 16:09	07:13 17:00 17:49	06:17 17:49 19:39	06:08 19:39 20:27	05:11 20:27 21:03	04:40 21:03 21:03	04:51 21:03 20:21	05:32 20:21 19:17	06:20 19:17 18:10	07:07 18:10 16:12	06:59 16:12 15:47	14:36-14:50/14
12	07:50 16:10 16:10	07:11 17:02 17:50	06:15 17:50 19:41	06:06 19:41 20:28	05:09 20:28 21:04	04:39 21:04 21:02	04:52 21:02 20:19	05:34 20:19 19:15	06:21 19:15 18:08	07:08 18:08 16:11	07:00 16:11 15:47	14:36-14:51/15
13	07:49 16:12 16:12	07:09 17:04 17:52	06:12 17:52 19:42	06:04 19:42 20:30	05:08 20:30 21:05	04:39 21:05 21:01	04:53 21:01 20:18	05:35 20:18 19:12	06:23 19:12 18:06	07:10 18:06 16:10	07:02 16:10 15:47	14:36-14:52/16
14	07:49 16:13 16:13	07:08 17:06 17:54	06:10 17:54 19:44	06:02 19:44 20:31	05:06 20:31 21:05	04:39 21:05 21:01	04:54 21:01 20:16	05:37 20:16 19:10	06:24 19:10 18:04	07:11 18:04 16:08	07:04 16:08 15:47	14:36-14:52/16
15	07:48 16:15 16:15	07:06 17:07 17:55	06:08 17:55 19:46	06:00 19:46 20:33	05:05 20:33 21:06	04:39 21:06 21:00	04:55 21:00 20:14	05:38 20:14 19:08	06:26 19:08 18:02	07:13 18:02 16:07	07:05 16:07 15:47	14:36-14:52/16
16	07:47 16:16 16:16	07:04 17:09 17:57	06:06 17:57 19:47	05:58 19:47 20:34	05:03 20:34 21:06	04:39 21:06 20:59	04:56 20:59 20:12	05:40 20:12 19:06	06:27 19:06 18:00	07:15 18:00 16:05	07:07 16:05 15:47	14:36-14:53/17
17	07:46 16:18 16:18	07:02 17:11 17:59	06:04 17:59 19:49	05:56 19:49 20:35	05:02 20:35 21:07	04:39 21:07 20:58	04:58 20:58 20:10	05:41 20:10 19:04	06:29 19:04 17:58	07:16 17:58 16:04	07:09 16:04 15:47	14:37-14:54/17
18	07:46 16:19 16:19	07:00 17:13 18:00	06:01 18:00 19:50	05:54 19:50 20:37	05:01 20:37 21:07	04:39 21:07 20:57	04:59 20:57 20:08	05:43 20:08 19:01	06:30 19:01 17:56	07:18 17:56 16:03	07:10 16:03 15:48	14:37-14:55/18
19	07:45 16:21 16:21	06:58 17:14 18:02	05:59 18:02 19:52	05:52 19:52 20:38	04:59 20:38 21:08	04:39 21:08 20:56	05:00 20:56 20:06	05:44 20:06 18:59	06:32 18:59 17:54	07:20 17:54 16:02	07:12 16:02 15:48	14:37-14:54/17
20	07:44 16:22 16:22	06:56 17:16 18:03	05:57 18:03 19:54	05:50 19:54 20:40	04:58 20:40 21:08	04:39 21:08 20:54	05:01 20:54 20:04	05:46 20:04 18:57	06:33 18:57 17:52	07:21 17:52 16:01	07:14 16:01 15:48	14:38-14:55/17
21	07:43 16:24 16:24	06:54 17:18 18:05	05:55 18:05 19:55	05:48 19:55 20:41	04:57 20:41 21:08	04:39 21:08 20:53	05:02 20:53 20:02	05:47 20:02 18:55	06:35 18:55 17:50	07:23 17:50 15:59	07:15 15:59 15:49	14:39-14:56/17
22	07:42 16:26 16:26	06:52 17:20 18:07	05:52 18:07 19:57	05:45 19:57 20:42	04:55 20:42 21:08	04:39 21:08 20:52	05:04 20:52 20:00	05:49 20:00 18:52	06:37 18:52 17:48	07:25 17:48 15:58	07:17 15:58 15:49	14:39-14:56/17
23	07:41 16:27 16:27	06:50 17:21 18:08	05:50 18:08 19:58	05:43 19:58 20:44	04:54 20:44 21:08	04:39 21:08 20:51	05:05 20:51 19:58	05:50 19:58 18:50	06:38 18:50 17:46	07:26 17:46 15:57	07:18 15:57 15:50	14:39-14:56/17
24	07:39 16:29 16:29	06:48 17:23 18:10	05:48 18:10 20:00	05:42 20:00 20:45	04:53 20:45 21:09	04:40 21:09 20:50	05:06 20:50 19:56	05:52 19:56 18:48	06:40 18:48 17:44	07:28 17:44 15:56	07:20 15:56 15:50	14:40-14:57/17
25	07:38 16:31 16:31	06:46 17:25 18:12	05:46 18:12 20:02	05:40 20:02 20:46	04:52 20:46 21:09	04:40 21:09 20:48	05:08 20:48 19:54	05:54 19:54 18:46	06:41 18:46 16:42	06:30 16:42 15:55	07:21 15:55 15:51	14:40-14:57/17
26	07:37 16:32 16:32	06:44 17:27 18:13	05:44 18:13 20:03	05:38 20:03 20:48	04:51 20:48 21:09	04:40 21:09 20:47	05:09 20:47 19:52	05:55 19:52 18:43	06:43 18:43 16:40	06:31 16:40 15:55	07:23 15:55 15:52	14:41-14:58/17
27	07:36 16:34 16:34	06:42 17:28 18:15	05:41 18:15 20:05	05:36 20:05 20:49	04:50 20:49 21:09	04:41 21:09 20:46	05:10 20:46 19:50	05:57 19:50 18:41	06:44 18:41 16:38	07:24 16:38 15:54	07:24 15:54 15:52	14:42-14:59/17
28	07:34 16:36 16:36	06:40 17:30 18:16	05:39 18:16 20:06	05:34 20:06 20:50	04:49 20:50 21:09	04:41 21:09 20:44	05:12 20:44 19:48	05:58 19:48 18:39	06:46 18:39 16:36	07:26 16:36 15:53	07:26 15:53 15:53	14:43-14:59/16
29	07:33 16:37 16:37	06:37 17:31 18:19	05:32 18:19 20:08	05:27 20:08 20:51	04:48 20:51 21:08	04:42 21:08 20:43	05:13 20:43 19:45	06:00 19:45 18:37	06:47 18:37 16:34	06:47 16:34 15:52	07:27 15:52 15:54	14:43-14:59/16
30	07:32 16:39 16:39	06:35 17:28 18:15	05:30 18:15 20:05	05:25 20:05 20:47	04:47 20:47 21:08	04:42 21:08 20:41	05:14 20:41 19:43	06:01 19:43 18:34	06:49 18:34 16:32	06:38 16:32 15:51	07:29 15:51 15:55	14:44-14:59/15
31	07:30 16:41 16:41	06:32 17:21 18:09	05:27 18:09 19:51	05:22 19:51 20:53	04:46 20:53 21:08	04:41 21:08 20:40	05:16 20:40 19:41	06:03 19:41 18:31	06:40 18:31 16:31	06:31 16:31 15:56	07:27 15:56 15:56	14:45-15:00/15
Potential sun hours												
Sum of minutes with flicker												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

**FW Cierpice**

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 7 - EW7****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:54 15:57	07:29 16:43	06:38 17:32	06:30 19:23	18:21-18:32/11 20:11	05:28 20:54
2	07:54 15:58	07:27 16:44	06:36 17:33	06:28 19:25	05:26 20:13	04:45 20:55
3	07:53 15:59	07:26 16:46	06:34 17:35	06:26 19:26	05:24 20:14	04:44 20:57
4	07:53 16:00	07:24 16:48	06:32 17:37	06:24 19:28	05:23 20:16	04:43 20:58
5	07:53 16:01	07:23 16:50	06:30 17:39	06:21 19:29	05:21 20:17	04:42 20:58
6	07:53 16:02	07:21 16:51	06:27 17:40	06:19 19:31	05:19 20:19	05:43-05:49/6 20:59
7	07:52 16:04	07:20 16:53	06:25 17:42	06:17 19:33	05:17 20:21	05:42-05:51/9 21:00
8	07:52 16:05	07:18 16:55	06:23 17:44	06:15 19:34	05:16 20:22	05:40-05:52/12 21:01
9	07:52 16:06	07:16 16:57	06:21 17:45	06:13 19:36	05:14 20:24	05:39-05:54/15 21:02
10	07:51 16:08	07:15 16:59	06:19 17:47	06:11 19:37	05:13 20:25	05:37-05:54/17 21:03
11	07:51 16:09	07:13 17:00	06:17 17:49	06:08 19:39	05:11 20:27	05:36-05:56/20 21:03
12	07:50 16:10	07:11 17:02	06:14 17:50	06:06 19:41	05:09 20:28	05:34-05:56/22 21:04
13	07:49 16:12	07:09 17:04	06:12 17:52	06:04 19:42	05:08 20:30	05:33-05:57/24 21:05
14	07:49 16:13	07:07 17:06	06:10 17:54	06:02 19:44	05:06 20:31	05:31-05:56/25 21:05
15	07:48 16:15	07:06 17:07	06:08 17:55	06:00 19:46	05:05 20:33	05:30-05:57/27 21:06
16	07:47 16:16	07:04 17:09	06:06 17:57	05:58 19:47	05:03 20:34	05:29-05:58/29 21:06
17	07:46 16:18	07:02 17:11	06:03 17:59	05:56 19:49	05:02 20:35	05:27-05:57/30 21:07
18	07:46 16:19	07:00 17:13	06:01 18:00	05:54 19:50	05:01 20:37	05:27-05:57/30 21:07
19	07:45 16:21	06:58 17:14	05:59 18:02	05:52 19:52	04:59 20:38	05:27-05:58/31 21:08
20	07:44 16:22	06:56 17:16	05:57 18:03	05:50 19:54	04:58 20:40	05:27-05:58/31 21:08
21	07:43 16:24	06:54 17:18	05:55 18:05	05:47 19:55	04:57 20:41	05:27-05:58/31 21:08
22	07:42 16:26	06:52 17:20	05:52 18:07	05:45 19:57	04:55 20:42	05:28-05:58/30 21:08
23	07:40 16:27	06:50 17:21	05:50 18:08	05:43 19:58	04:54 20:44	05:28-05:58/30 21:08
24	07:39 16:29	06:48 17:23	05:48 18:10	05:41 20:00	04:53 20:45	05:27-05:57/30 21:09
25	07:38 16:31	06:46 17:25	05:46 18:12	05:40 20:02	04:52 20:46	05:28-05:58/30 21:09
26	07:37 16:32	06:44 17:27	05:43 18:13	05:38 20:03	04:51 20:47	05:29-05:58/29 21:09
27	07:36 16:34	06:42 17:28	05:41 18:15	05:36 20:05	04:50 20:49	05:29-05:57/28 21:09
28	07:34 16:36	06:40 17:30	05:39 18:16	05:34 20:06	04:49 20:50	05:29-05:57/28 21:09
29	07:33 16:37		06:37 19:18	05:32 20:08	04:48 20:51	05:30-05:57/27 21:08
30	07:32 16:39		06:35 19:20	05:30 20:10	04:47 20:52	05:30-05:56/26 21:08
31	07:30 16:41		06:32 19:21		04:46 20:53	05:30-05:56/26
Potential sun hours	264	280	367	414	480	492
Sum of minutes with flicker	0	0	275	11	643	351

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker



Project:

FW Cierpice

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2WTG: 7 - EW7****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2,08	3,09	3,64	5,36	7,46	7,03	8,08	7,26	4,75	4,21	1,76	1,39

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
177	155	173	127	144	326	604	321	392	619	710	350	4 098

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:43 05:43-05:56/13 21:08	05:17 05:45-06:06/21 20:38	06:04 19:39	06:51 18:32	06:42 16:29	07:30 15:51
2	04:43 05:43-05:57/14 21:08	05:19 05:47-06:06/19 20:37	06:06 19:37	06:52 18:30	06:43 16:27	07:32 15:50
3	04:44 05:42-05:58/16 21:07	05:20 05:48-06:05/17 20:35	06:07 19:35	06:54 18:28	06:45 16:25	07:33 15:50
4	04:45 05:41-05:58/17 21:07	05:22 05:49-06:03/14 20:33	06:09 19:32	06:55 18:25	06:47 16:24	07:34 15:49
5	04:46 05:41-05:59/18 21:07	05:23 05:51-06:02/11 20:32	06:10 19:30	06:57 18:23	06:48 16:22	07:35 15:49
6	04:46 05:41-06:00/19 21:06	05:25 05:52-06:00/8 20:30	06:12 19:28	06:59 18:21	06:50 16:20	07:37 15:48
7	04:47 05:41-06:01/20 21:06	05:26 05:53-05:57/4 20:28	06:13 19:26	07:00 18:19	06:52 16:19	07:38 15:48
8	04:48 05:40-06:01/21 21:05	05:28 20:27	06:15 19:24	07:02 18:17	06:54 16:17	07:39 15:48
9	04:49 05:40-06:02/22 21:04	05:29 20:25	06:17 19:21	07:03 18:15	06:55 16:15	07:40 15:47
10	04:50 05:39-06:02/23 21:04	05:31 20:23	06:18 19:19	07:05 18:12	06:57 16:14	07:41 15:47
11	04:51 05:39-06:03/24 21:03	05:32 20:21	06:20 18:14-18:24/10 19:17	07:07 18:10	06:59 16:12	07:42 15:47
12	04:52 05:39-06:04/25 21:02	05:34 20:19	06:21 18:11-18:27/16 19:15	07:08 18:08	07:00 16:11	07:43 15:47
13	04:53 05:39-06:04/25 21:01	05:35 20:18	06:23 18:09-18:27/18 19:12	07:10 18:06	07:02 16:10	07:44 15:47
14	04:54 05:38-06:05/27 21:00	05:37 20:16	06:24 18:08-18:28/20 19:10	07:11 18:04	07:04 16:08	07:45 15:47
15	04:55 05:38-06:05/27 21:00	05:38 20:14	06:26 18:06-18:28/22 19:08	07:13 18:02	07:05 16:07	07:46 15:47
16	04:56 05:38-06:06/28 20:59	05:40 20:12	06:27 18:06-18:29/23 19:06	07:15 18:00	07:07 16:05	07:47 15:47
17	04:57 05:37-06:06/29 20:58	05:41 20:10	06:29 18:05-18:28/23 19:03	07:16 17:58	07:09 16:04	07:48 15:47
18	04:59 05:38-06:07/29 20:57	05:43 20:08	06:30 18:05-18:29/24 19:01	07:18 17:56	07:10 16:03	07:49 15:48
19	05:00 05:38-06:08/30 20:56	05:44 20:06	06:32 18:04-18:28/24 18:59	07:20 17:54	07:12 16:02	07:49 15:48
20	05:01 05:37-06:08/31 20:54	05:46 20:04	06:33 18:04-18:27/23 18:57	07:21 17:52	07:14 16:01	07:50 15:48
21	05:02 05:37-06:08/31 20:53	05:47 20:02	06:35 18:04-18:26/22 18:54	07:23 17:50	07:15 15:59	07:50 15:49
22	05:04 05:37-06:08/31 20:52	05:49 20:00	06:37 18:05-18:25/20 18:52	07:25 17:48	07:17 15:58	07:51 15:49
23	05:05 05:37-06:08/31 20:51	05:50 19:58	06:38 18:05-18:23/18 18:50	07:26 17:46	07:18 15:57	07:52 15:50
24	05:06 05:38-06:08/30 20:50	05:52 19:56	06:40 18:07-18:21/14 18:48	07:28 17:44	07:20 15:56	07:52 15:50
25	05:08 05:37-06:08/31 20:48	05:54 19:54	06:41 18:09-18:19/10 18:46	06:30 16:42	07:21 15:55	07:52 15:51
26	05:09 05:37-06:08/31 20:47	05:55 19:52	06:43 18:43	06:31 16:40	07:23 15:55	07:53 15:52
27	05:10 05:38-06:07/29 20:46	05:57 19:50	06:44 18:41	06:33 16:38	07:24 15:54	07:53 15:52
28	05:12 05:40-06:08/28 20:44	05:58 19:47	06:46 18:39	06:35 16:36	07:26 15:53	07:53 15:53
29	05:13 05:41-06:07/26 20:43	06:00 19:45	06:47 18:37	06:36 16:34	07:27 15:52	07:53 15:54
30	05:14 05:42-06:07/25 20:41	06:01 19:43	06:49 18:34	06:38 16:32	07:29 15:51	07:54 15:55
31	05:16 05:44-06:07/23 20:40	06:03 19:41		06:40 16:30		07:54 15:56
Potential sun hours	496	450	380	333	271	250
Sum of minutes with flicker	774	94	287	0	0	0

**Table layout: For each day in each month the following matrix apply**

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

**FW Cierpice**

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

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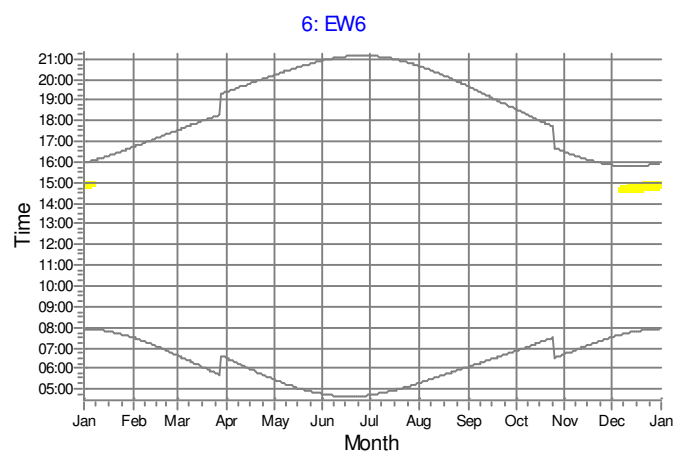
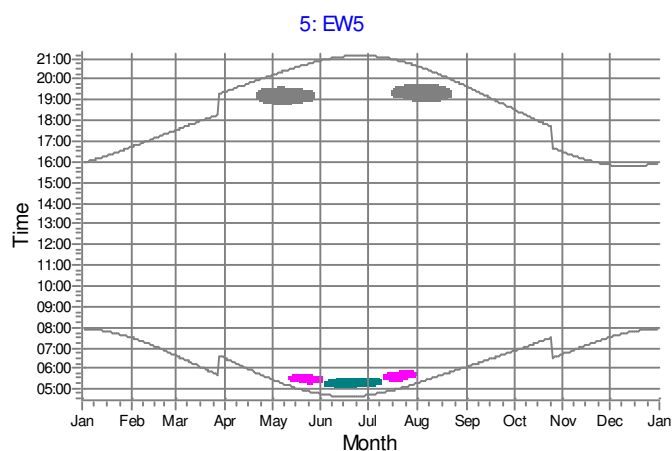
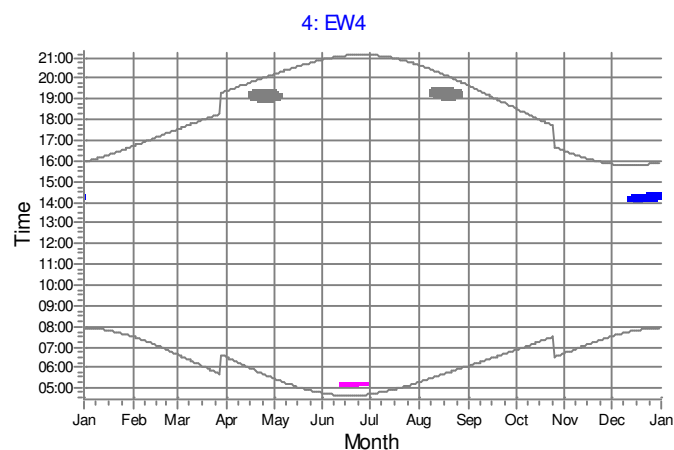
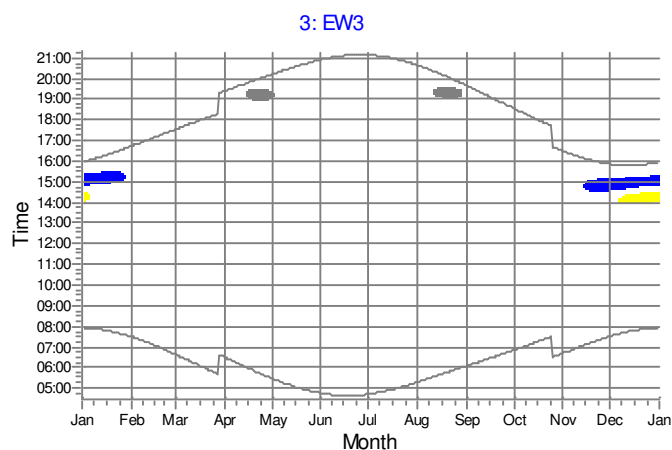
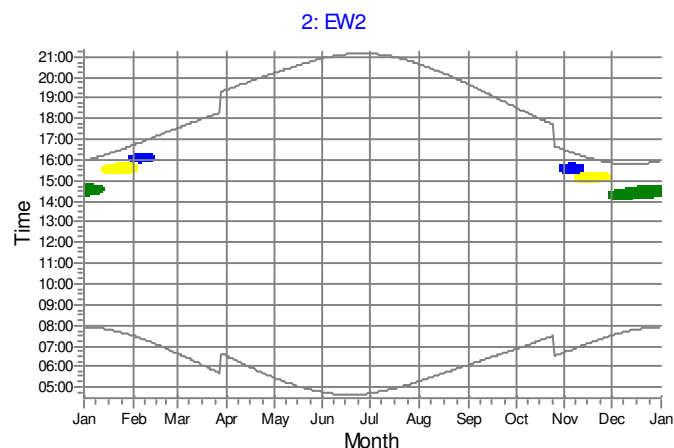
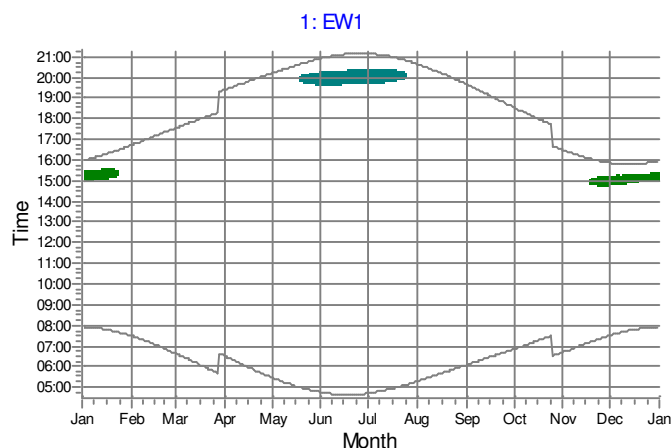
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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG, graphical****Calculation: ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2**

Shadow receptors



A: 01 Cierpice 1



B: 02 Cierpice 2



C: 03 Cierpice 3



D: 04 Gołaczów 1



E: 05 Konary 1



F: 06 Konary 2

Project:

**FW Cierpice**

Description:

Farma wiatrowa Cierpice w gminie Przeworno  
5 turbin wiatrowych o mocy 3MW każda

Printed/Page

2014-11-11 21:47 / 23

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**ProSilence Krzysztof Kreciproch**

Ul. Spychalskiego 13/207

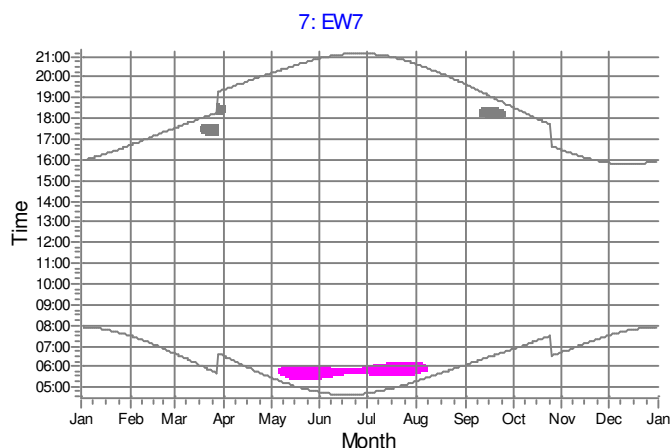
PL-45 716 Opole

+48 77 550 11 43

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Calculated:

2014-11-11 21:28/2.9.285

**SHADOW - Calendar per WTG, graphical****Calculation:** ZAŁĄCZNIK TEKSTOWY 17 - migotanie cienia wariant 2

Shadow receptors



D: 04 Gołaczów 1



E: 05 Konary 1