

Project:

**FW Cierpice**

Description:

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

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2014-11-11 21:44 / 1

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Calculated:

2014-11-11 21:27/2.9.285

**SHADOW - Main Result****Calculation:** ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1**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	Rotor diameter	Hub height	Calculation distance	RPM	
data/Description							[kW]	[m]	[m]	[m]	[RPM]	
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

**Shadow receptor-Input**

Polish GK 1992/19-ETRS89											
No.	Name	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode	
				[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

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]	
A 01	Cierpice 1	33:56	66	0:41	1:52	
B 02	Cierpice 2	20:55	74	0:23	1:13	
C 03	Cierpice 3	37:32	104	0:33	2:15	
D 04	Gołaczów 1	41:59	85	0:40	6:19	
E 05	Konary 1	8:40	58	0:18	1:14	
F 06	Konary 2	40:51	65	0:56	5:52	

Project:

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## SHADOW - Main Result

**Calculation:** ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1

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

No. Name Worst case Expected

		[h/year]	[h/year]
1	EW1	48:47	5:31
2	EW2	36:20	2:14
3	EW3	42:33	3:08
4	EW4	19:30	2:20
5	EW5	54:35	8:06

Project:

FW Cierpice

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## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1 Shadow 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 (2)	07:29	06:38	06:30	05:28	04:45	04:43	05:17	06:04	06:51	06:42
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
3	15:58	40	15:22 (1)	16:44	17:33	19:25	20:13	20:56	21:08	20:37	19:37	18:30
4	16:00	40	15:24 (1)	16:48	17:37	19:28	20:16	20:58	21:07	20:33	19:32	18:25
5	16:01	39	15:23 (1)	16:46	17:35	19:26	20:14	20:57	21:07	20:35	19:35	18:28
6	16:02	39	15:25 (1)	16:51	17:40	19:31	20:19	20:59	21:06	20:30	19:28	18:21
7	16:03	38	15:25 (1)	16:53	17:42	19:33	20:21	21:00	21:06	20:28	19:26	18:19
8	16:05	38	15:27 (1)	16:55	17:44	19:34	20:22	21:01	21:05	20:27	19:24	18:17
9	16:06	37	15:27 (1)	16:57	17:45	19:36	20:24	21:02	21:04	20:25	19:21	18:15
10	16:07	35	15:28 (1)	16:58	17:47	19:37	20:25	21:03	21:04	20:23	19:19	18:12
11	16:09	33	15:28 (1)	17:00	17:49	19:39	20:27	21:03	21:03	20:21	19:17	18:10
12	16:10	29	15:28 (1)	17:02	17:50	19:41	20:28	21:04	21:02	20:19	19:15	18:08
13	16:12	23	15:28 (1)	17:04	17:52	19:42	20:30	21:05	21:01	20:18	19:12	18:06
14	16:13	19	15:29 (1)	17:06	17:54	19:44	20:31	21:05	21:01	20:16	19:10	18:04
15	16:15	20	15:30 (1)	17:07	17:55	19:46	20:33	21:06	21:00	20:14	19:08	18:02
16	16:16	19	15:30 (1)	17:09	17:57	19:47	20:34	21:06	20:59	20:12	19:06	18:00
17	16:18	19	15:30 (1)	17:11	17:59	19:49	20:35	21:07	20:58	20:10	19:03	17:58
18	16:19	18	15:30 (1)	17:13	18:00	19:50	20:37	21:07	20:57	20:08	19:01	17:56
19	16:21	16	15:29 (1)	17:14	18:02	19:52	20:38	21:08	20:56	20:06	18:59	17:54
20	16:22	15	15:29 (1)	17:16	18:03	19:54	20:40	21:08	20:54	20:04	18:57	17:52
21	16:24	13	15:28 (1)	17:18	18:05	19:55	20:41	21:08	20:53	20:02	18:54	17:49
22	16:26	11	15:27 (1)	17:20	18:07	19:57	20:42	21:08	20:52	20:00	18:52	17:48
23	16:27	6	15:25 (1)	17:21	18:08	19:58	20:44	21:09	20:51	19:58	18:50	17:46
24	16:29		17:23	18:10	20:00	20:45	21:09	20:50	19:56	18:48	17:44	15:56
25	16:31		17:25	18:12	20:02	20:46	21:09	20:48	19:54	18:45	17:42	15:55
26	16:33		17:27	18:13	20:03	20:48	21:09	20:47	19:52	18:43	17:40	15:54
27	16:34		17:28	18:15	20:05	20:49	21:09	20:46	19:50	18:41	17:38	15:54
28	16:36		17:30	18:16	20:06	20:50	21:09	20:44	19:47	18:39	17:36	15:53
29	16:37			18:18	20:08	20:51	21:08	20:43	19:45	18:37	17:34	15:52
30	16:39			18:20	20:10	20:52	21:08	20:41	19:43	18:34	17:32	15:51
31	16:41			18:22	20:12	20:54	21:10	20:43	19:45	18:36	17:33	15:52
Potential sun hours	264	280	367	414	480	492	496	450	380	333	271	250
Total, worst case	626										207	1203
Sun reduction	0,24										0,19	0,17
Oper. time red.	0,47										0,47	0,47
Wind dir. red.	0,60										0,60	0,60
Total reduction	0,07										0,05	0,05
Total, real	43										11	59

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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## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1 Shadow 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

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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	15	14:25 (3)	16:43	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		
4	15:58	14	14:25 (3)	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		
6	15:59	11	14:24 (3)	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		
8	16:00	9	14:24 (3)	16:48	17:37	19:28	20:16	20:58	21:07	20:33	19:32	18:25	16:23	15:49		
9	07:53	14:16 (3)	07:23	15:34	06:30	06:21	05:21	04:42	04:46	05:23	06:10	06:57	06:48	07:36		
10	16:01	6	14:22 (3)	16:50	17:38	19:29	20:17	20:58	21:07	20:32	19:30	18:23	16:22	15:49		
11	07:53	14:17 (3)	07:22	15:35	06:27	06:19	05:19	04:42	04:46	05:25	06:12	06:59	06:50	07:37		
12	16:02	16:51	07:21	16:51	17:40	19:31	20:19	20:59	21:06	20:30	19:28	18:21	16:20	15:48		
13	07:53	07:20	16:53	06:25	06:17	05:17	04:41	04:47	05:26	06:13	07:00	06:52	07:38	14:04 (3)		
14	16:04	16:18	16:53	17:42	19:33	20:21	21:00	21:06	20:28	19:26	18:19	16:19	15:48	14:09 (3)		
15	07:52	07:18	16:55	06:23	06:15	05:16	04:41	04:48	05:28	06:15	07:02	06:54	15:03 (2)	07:39	14:02 (3)	
16	16:05	16:16	16:55	17:44	19:34	20:22	21:01	21:05	20:27	19:24	18:17	16:17	15:13 (2)	15:47	14:11 (3)	
17	07:52	07:16	16:57	06:21	06:13	05:14	04:40	04:49	05:29	06:17	07:03	06:55	15:02 (2)	07:40	14:02 (3)	
18	16:06	16:17	16:57	17:45	19:36	20:24	21:02	21:04	20:25	19:21	18:15	16:15	15:15 (2)	15:47	14:13 (3)	
19	07:51	07:15	16:58	06:19	06:10	05:12	04:40	04:50	05:31	06:18	07:05	06:57	15:00 (2)	07:41	14:01 (3)	
20	16:07	16:18	16:58	17:47	19:37	20:25	21:03	21:04	20:23	19:19	18:12	16:14	15:16 (2)	15:47	14:15 (3)	
21	07:51	07:13	16:59	06:17	06:08	05:11	04:40	04:51	05:32	06:20	07:07	06:59	15:00 (2)	07:42	14:01 (3)	
22	16:09	16:10	16:59	17:49	19:39	20:27	21:03	21:03	20:21	19:17	18:10	16:12	15:18 (2)	15:47	14:16 (3)	
23	07:50	07:11	17:02	06:14	06:06	05:09	04:39	04:52	05:34	06:21	07:08	07:00	14:59 (2)	07:43	14:01 (3)	
24	16:10	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)	15:47	14:17 (3)	
25	07:49	15:29 (2)	07:09	06:12	06:04	05:08	04:39	04:53	05:35	06:23	07:10	07:02	14:59 (2)	07:44	14:01 (3)	
26	16:12	6	15:35 (2)	17:52	19:42	20:30	21:05	21:01	20:18	19:12	18:06	16:09	15:20 (2)	15:47	14:17 (3)	
27	07:49	15:28 (2)	07:07	06:10	06:02	05:06	04:39	04:54	05:37	06:24	07:11	07:04	14:58 (2)	07:45	14:01 (3)	
28	16:13	10	15:32 (2)	17:06	17:54	19:44	20:31	21:05	21:01	20:16	19:10	18:04	16:08	15:19 (2)	15:47	14:18 (3)
29	07:48	15:27 (2)	07:06	06:08	06:00	05:05	04:39	04:55	05:38	06:26	07:13	07:05	14:58 (2)	07:46	14:00 (3)	
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)	15:47	14:18 (3)
31	07:47	15:26 (2)	07:04	06:06	05:58	05:03	04:39	04:56	05:40	06:27	07:15	07:07	14:58 (2)	07:47	14:01 (3)	
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)	15:47	14:19 (3)
33	07:46	15:26 (2)	07:02	06:03	05:56	05:02	04:38	04:57	05:41	06:29	07:16	07:09	14:59 (2)	07:48	14:01 (3)	
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	15:21 (2)	15:47	14:20 (3)
35	07:46	15:25 (2)	07:00	06:01	05:54	05:01	04:38	04:59	05:43	06:30	07:18	07:10	14:59 (2)	07:49	14:02 (3)	
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	15:21 (2)	15:47	14:21 (3)
37	07:45	15:25 (2)	06:58	05:59	05:52	04:59	04:39	05:00	05:44	06:32	07:20	07:12	14:59 (2)	07:49	14:01 (3)	
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	15:21 (2)	15:48	14:21 (3)
39	07:44	15:25 (2)	06:56	05:57	05:49	04:58	04:39	05:01	05:46	06:33	07:21	07:14	14:59 (2)	07:50	14:02 (3)	
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	15:21 (2)	15:48	14:22 (3)
41	07:43	15:24 (2)	06:54	05:55	05:47	04:57	04:39	05:02	05:47	06:35	07:23	07:15	15:00 (2)	07:51	14:03 (3)	
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	15:21 (2)	15:49	14:23 (3)
43	07:42	15:24 (2)	06:52	05:52	05:45	04:55	04:39	05:04	05:49	06:37	07:25	07:17	15:01 (2)	07:51	14:03 (3)	
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	15:21 (2)	15:49	14:23 (3)
45	07:41	15:25 (2)	06:50	05:50	05:43	04:54	04:39	05:05	05:50	06:38	07:26	07:18	15:01 (2)	07:52	14:03 (3)	
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)	15:50	14:24 (3)
47	07:39	15:25 (2)	06:48	05:48	05:41	04:53	04:39	05:06	05:52	06:40	07:28	07:20	15:02 (2)	07:52	14:04 (3)	
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)	15:50	14:24 (3)
49	07:38	15:25 (2)	06:46	05:46	05:39	04:52	04:40	05:07	05:53	06:41	07:30	07:21	15:04 (2)	07:52	14:04 (3)	
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)	15:51	14:24 (3)
51	07:37	15:25 (2)	06:44	05:43	05:38	04:51	04:40	05:09	05:55	06:43	07:31	07:23	15:04 (2)	07:53	14:05 (3)	
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	15:19 (2)	15:51	14:24 (3)
53	07:36	15:26 (2)	06:42	05:41	05:36	04:50	04:41	05:10	05:57	06:44	07:32	07:24	15:06 (2)	07:53	14:06 (3)	
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	15:19 (2)	15:52	14:25 (3)
55	07:34	15:26 (2)	06:40	05:39	05:34	04:49	04:41	05:12	05:58	06:46	07:34	07:26	15:07 (2)	07:53	14:07 (3)	
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	15:17 (2)	15:53	14:25 (3)
57	07:33	15:27 (2)	06:40	05:37	05:32	04:48	04:40	05:13	06:00	06:47	07:35	07:27	15:10 (2)	07:53	14:08 (3)	
58	16:37	21	15:48 (2)	17:31	18:18	20:08	20:51	21:08	20:43	19:45	18:37	17:34	15:52	15:16 (2)	15:54	14:25 (3)
59	07:32	15:27 (2)	06:40	05:35	05:30	04:47	04:40	05:14	06:01	06:49	07:37	07:29	15:08 (2)	07:54	14:08 (3)	
60	16:39	20	15:47 (2)	17:32	18:20	20:10	20:52	21:08	20:41	19:43	18:34	17:32	15:51	15:15	14:25 (3)	
61	07:30	15:29 (2)	06:40	05:32	05:29	04:46	04:40	05:16	06:03	06:51	07:39	07:31	15:09 (2)	07:54	14:09 (3)	
62	16:41	18	15:47 (2)	17:33	18:21	20:11	20:53	21:09	20:40	19:41	18:32	17:29	15:56	15:17	14:26 (3)	
Potential sun hours	264	280	36	367	414	480	492	496	450	380	333	271	250	424		
Total, worst case	406	36	0.24	0.31								389	0.19	0.17		
Sun reduction	0.47	0.47	0.61	0.61								0.61	0.61	0.61		
Oper. time red.	0.07	0.09										0.06	0.05			
Wind dir. red.	28	3										22	21			

Project:

**FW Cierpice**

Description:

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

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2014-11-11 21:44 / 5

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Krzysztof Kręciproch / prosilence@prosilence.pl

Calculated:

2014-11-11 21:27/2.9.285

**SHADOW - Calendar****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1 Shadow 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	14:16 (4)	07:29	15:59 (2)	06:38	06:30	05:28	04:45	04:43	05:17	06:04	06:51
3	07:53	14:15 (3)	07:26	15:58 (2)	06:34	06:26	05:24	04:44	04:44	05:20	06:07	06:54
4	07:53	14:15 (3)	07:26	15:58 (2)	06:34	06:26	05:24	04:44	04:44	05:20	06:07	06:54
5	07:53	14:15 (3)	07:26	15:58 (2)	06:34	06:26	05:24	04:44	04:44	05:20	06:07	06:54
6	07:53	14:15 (3)	07:26	15:58 (2)	06:34	06:26	05:24	04:44	04:44	05:20	06:07	06:54
7	07:52	14:15 (3)	07:25	15:57 (2)	06:33	06:25	05:23	04:43	04:43	05:19	06:06	06:52
8	07:52	14:15 (3)	07:25	15:57 (2)	06:33	06:25	05:23	04:43	04:43	05:19	06:06	06:52
9	07:52	14:15 (3)	07:25	15:57 (2)	06:33	06:25	05:23	04:43	04:43	05:19	06:06	06:52
10	07:51	14:14 (3)	07:24	15:56 (2)	06:32	06:24	05:22	04:42	04:42	05:18	06:05	06:51
11	07:51	14:14 (3)	07:24	15:56 (2)	06:32	06:24	05:22	04:42	04:42	05:18	06:05	06:51
12	07:50	14:13 (3)	07:23	15:55 (2)	06:31	06:23	05:21	04:41	04:41	05:17	06:04	06:50
13	07:49	14:12 (3)	07:22	15:54 (2)	06:30	06:22	05:20	04:40	04:40	05:16	06:03	06:49
14	07:49	14:12 (3)	07:22	15:54 (2)	06:30	06:22	05:20	04:40	04:40	05:16	06:03	06:49
15	07:48	14:11 (3)	07:21	15:53 (2)	06:29	06:21	05:19	04:39	04:39	05:15	06:02	06:48
16	07:47	14:10 (3)	07:20	15:52 (2)	06:28	06:20	05:18	04:38	04:38	05:14	06:01	06:47
17	07:46	14:09 (3)	07:19	15:51 (2)	06:27	06:19	05:17	04:37	04:37	05:13	05:59	06:46
18	07:46	14:09 (3)	07:19	15:51 (2)	06:27	06:19	05:17	04:37	04:37	05:13	05:59	06:46
19	07:45	14:08 (3)	07:18	15:50 (2)	06:26	06:18	05:16	04:36	04:36	05:12	05:58	06:45
20	07:44	14:07 (3)	07:17	15:49 (2)	06:25	06:17	05:15	04:35	04:35	05:11	05:57	06:44
21	07:43	14:06 (3)	07:16	15:48 (2)	06:24	06:16	05:14	04:34	04:34	05:10	05:56	06:43
22	07:42	14:05 (3)	07:15	15:47 (2)	06:23	06:15	05:13	04:33	04:33	05:09	05:55	06:42
23	07:41	14:04 (3)	07:14	15:46 (2)	06:22	06:14	05:12	04:32	04:32	05:08	05:54	06:41
24	07:39	14:03 (3)	07:12	15:45 (2)	06:20	06:12	05:10	04:30	04:30	05:06	05:52	06:39
25	07:38	14:02 (3)	07:11	15:44 (2)	06:19	06:11	05:09	04:29	04:29	05:05	05:51	06:38
26	07:37	14:01 (3)	07:10	15:43 (2)	06:18	06:10	05:08	04:28	04:28	05:04	05:50	06:37
27	07:36	14:00 (3)	07:09	15:42 (2)	06:17	06:09	05:07	04:27	04:27	05:03	05:49	06:36
28	07:34	13:59 (3)	07:07	15:41 (2)	06:16	06:08	05:06	04:26	04:26	05:02	05:48	06:35
29	07:33	13:58 (3)	07:06	15:40 (2)	06:15	06:07	05:05	04:25	04:25	05:01	05:47	06:34
30	07:32	13:57 (3)	07:05	15:39 (2)	06:14	06:06	05:04	04:24	04:24	05:00	05:46	06:33
31	07:30	13:56 (3)	07:03	15:38 (2)	06:13	06:05	05:03	04:23	04:23	04:59	05:45	06:32
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)	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 21:27/2.9.285

## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1 Shadow 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	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 (5) 20:54	04:45 21:08	04:43 21:08	05:17 20:38	19:03 (5) 19:39	06:04 18:32	06:51 16:29	07:30 15:51
2	07:54 15:58	07:27 16:44	06:36 17:33	06:28 19:24	05:26 20:13	18:54 (5) 20:55	04:44 21:08	04:43 21:08	05:19 20:37	19:03 (5) 19:37	06:06 18:30	06:52 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 (5) 20:56	04:44 21:07	04:44 21:07	05:20 20:35	19:03 (5) 19:35	06:07 18:28	06:54 16:25	07:33 15:49
4	07:53 16:00	07:24 16:48	06:32 17:37	06:24 19:28	05:23 20:16	18:52 (5) 20:57	04:43 21:07	04:45 21:07	05:22 20:33	19:02 (5) 19:32	06:09 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 (5) 20:58	04:42 21:06	04:46 21:06	05:23 20:32	19:03 (5) 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 (5) 20:59	04:42 21:06	04:46 21:06	05:25 20:30	19:02 (5) 19:28	06:12 18:21	06:58 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 (5) 21:00	04:41 21:05	04:47 21:05	05:26 20:28	19:02 (5) 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 (5) 21:01	04:41 21:05	04:48 21:05	05:28 20:27	19:02 (5) 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 (5) 21:02	04:40 21:04	04:49 21:04	05:29 20:25	19:02 (5) 19:21	06:16 18:14	07:03 16:15	07:40 15:47
10	07:51 16:07	07:14 16:58	06:19 17:47	06:10 19:37	05:12 20:25	18:53 (5) 21:03	04:40 21:04	04:50 21:04	05:31 20:23	19:03 (5) 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 (5) 21:03	04:40 21:03	04:51 21:03	05:32 20:21	19:02 (5) 19:17	06:20 18:10	07:06 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	18:53 (5) 21:04	04:39 21:02	04:52 21:02	05:34 20:19	19:02 (5) 19:39	06:21 19:15	07:08 18:08	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	18:54 (5) 21:05	04:39 21:01	04:53 21:01	05:35 20:17	19:03 (5) 19:39	06:23 19:12	07:10 18:06	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	18:54 (5) 21:05	04:39 21:00	04:54 21:00	05:37 20:16	19:03 (5) 19:37	06:24 19:10	07:11 18:04	07:45 15:47
15	07:48 16:15	07:06 17:07	06:08 17:55	06:00 19:45	05:05 20:32	18:54 (5) 21:06	04:39 21:00	04:55 21:00	05:38 20:14	19:05 (4) 19:37	06:26 19:08	07:13 18:02	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	18:55 (5) 21:06	04:39 21:06	04:56 20:59	05:40 20:12	19:04 (4) 19:35	06:27 19:06	07:15 18:00	07:47 15:47
17	07:46 16:18	07:02 17:11	06:03 17:58	05:56 19:49	05:02 20:35	18:55 (5) 21:07	04:39 21:07	04:57 20:58	05:41 20:10	19:04 (4) 19:34	06:29 19:03	07:16 17:56	07:48 15:47
18	07:45 16:19	07:00 17:13	06:01 18:00	05:54 19:50	05:01 20:37	18:56 (5) 21:07	04:38 21:07	04:59 20:57	05:43 20:08	19:03 (4) 19:32	06:30 19:01	07:18 17:56	07:49 15:47
19	07:45 16:21	06:58 17:14	05:59 18:02	05:51 19:52	05:01 20:38	18:57 (5) 21:07	04:39 21:07	05:00 20:55	05:44 20:06	19:03 (4) 19:31	06:32 18:59	07:20 17:53	07:50 15:48
20	07:44 16:22	06:56 17:16	05:57 18:03	05:49 19:53	05:00 20:40	18:58 (5) 21:08	04:39 21:08	05:01 20:54	05:46 20:04	19:03 (4) 19:33	06:33 18:57	07:21 17:51	07:50 15:48
21	07:43 16:24	06:54 17:18	05:55 18:05	05:47 19:55	05:00 20:41	19:00 (5) 21:08	04:39 21:08	05:02 20:53	05:47 20:02	19:11 (5) 19:34	06:35 18:54	07:23 17:49	07:51 15:49
22	07:42 16:26	06:52 17:20	05:52 18:07	05:45 19:57	05:00 20:42	19:00 (5) 21:08	04:39 21:08	05:04 20:52	05:49 20:00	19:10 (5) 19:35	06:36 18:52	07:25 17:47	07:52 15:49
23	07:40 16:27	06:50 17:21	05:50 18:08	05:43 19:58	05:00 20:44	19:01 (5) 21:08	04:39 21:08	05:05 20:51	05:50 19:58	19:09 (5) 19:36	06:38 18:50	07:26 17:45	07:53 15:50
24	07:39 16:29	06:48 17:23	05:48 18:10	05:41 20:00	05:01 20:45	18:57 (4) 21:08	04:53 21:08	05:06 20:50	05:52 19:56	19:08 (5) 19:37	06:40 18:48	07:28 17:44	07:50 15:50
25	07:38 16:30	06:46 17:25	05:46 18:12	05:39 20:01	05:00 20:46	18:56 (4) 21:09	04:52 21:09	05:07 20:48	05:53 19:54	19:07 (5) 19:38	06:41 18:45	07:30 16:42	07:52 15:51
26	07:37 16:32	06:44 17:26	05:43 18:13	05:37 20:03	05:00 20:47	18:57 (4) 21:09	04:51 21:09	05:09 20:47	05:55 19:52	19:06 (5) 19:38	06:43 18:43	07:31 16:40	07:53 15:51
27	07:36 16:34	06:42 17:28	05:41 18:15	05:36 20:05	05:00 20:49	18:57 (4) 21:09	04:50 21:09	05:10 20:45	05:57 19:50	19:09 (4) 19:39	06:44 18:41	07:32 16:38	07:54 15:52
28	07:34 16:36	06:40 17:30	05:39 18:16	05:34 20:06	05:00 20:50	18:57 (4) 21:09	04:49 21:08	05:12 20:44	05:58 19:40	19:06 (5) 19:35	06:46 18:39	07:33 16:36	07:55 15:53
29	07:33 16:37	06:37 17:31	05:32 18:18	05:28 20:08	05:00 20:51	18:56 (5) 21:10	04:48 21:08	05:13 20:43	06:00 19:45	19:05 (5) 19:36	06:47 18:36	07:34 16:34	07:56 15:54
30	07:32 16:39	06:35 17:32	05:30 18:20	05:25 20:09	05:00 20:52	18:55 (5) 21:11	04:47 21:08	05:14 20:41	06:01 19:40	19:04 (5) 19:37	06:49 18:34	07:35 16:32	07:57 15:55
31	07:30 16:41	06:32 17:33	05:28 18:21	05:22 20:10	05:00 20:53	19:04 (5) 21:12	04:46 21:09	05:16 20:40	06:03 19:41	19:04 (5) 19:38	06:50 18:30	07:36 16:30	07:58 15:56
Potential sun hours	264	280	367	414	480		492	496	450		380	333	271
Total, worst case				395	858			412	854				
Sun reduction				0,39	0,48			0,51	0,50				
Oper. time red.				0,47	0,47			0,47	0,47				
Wind dir. red.				0,68	0,67			0,67	0,68				
Total reduction				0,12	0,15			0,16	0,16				
Total, real				49	131			66	135				

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)



Project:

FW Cierpice

Description:

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

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2014-11-11 21:44 / 7

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Calculated:

2014-11-11 21:27/2.9.285

## SHADOW - Calendar

Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1 Shadow 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) 05:30 (5)	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	07:54 15:58	07:27 16:44	06:36 17:33	06:28 19:25	05:26 20:13	04:45 20:56		04:44 21:08	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	05:25 20:14	04:44 20:57		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	07:53 16:00	07:24 16:48	06:32 17:37	06:24 19:28	05:23 20:16	04:43 20:58		04:45 21:07	05:22 20:33	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		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	07:53 16:02	07:21 16:51	06:28 17:40	06:19 19:31	05:19 20:19	04:42 20:59		04:47 21:06	05:25 20:30	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		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	07:52 16:05	07:18 16:55	06:23 17:44	06:15 19:34	05:16 20:22	04:41 21:01		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	07:52 16:06	07:16 16:57	06:21 17:45	06:13 19:36	05:14 20:24	04:40 21:02		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	07:51 16:08	07:15 16:59	06:19 17:47	06:11 19:37	05:13 20:25	04:40 21:03		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	07:51 16:09	07:13 17:00	06:17 17:49	06:08 19:39	05:11 20:27	04:40 21:03		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	07:50 16:10	07:11 17:02	06:15 17:50	06:06 19:41	05:09 20:28	05:34 (5) 05:35 (5)	04:39 21:04	04:52 21:02	05:34 (5) 05:33 (5)	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	05:33 (5) 05:36 (5)	04:39 21:05	04:53 21:01	05:33 (5) 05:41 (5)	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	05:31 (5) 05:36 (5)	04:39 21:05	04:54 21:01	05:32 (5) 05:43 (5)	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	05:30 (5) 05:37 (5)	04:39 21:06	04:55 21:00	05:31 (5) 05:44 (5)	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	05:29 (5) 05:38 (5)	04:39 21:06	04:56 20:59	05:30 (5) 05:44 (5)	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	05:27 (5) 05:37 (5)	04:39 21:07	04:58 20:58	05:30 (5) 05:45 (5)	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	05:26 (5) 05:38 (5)	04:39 21:07	04:59 20:57	05:30 (5) 05:47 (5)	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 (5) 05:38 (5)	04:39 21:08	05:00 20:56	05:30 (5) 05:47 (5)	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	05:24 (5) 05:38 (5)	04:39 21:08	05:01 20:54	05:30 (5) 05:47 (5)	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	05:23 (5) 05:38 (5)	04:39 21:08	05:02 20:53	05:31 (5) 05:48 (5)	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	05:22 (5) 05:38 (5)	04:39 21:08	05:04 20:52	05:32 (5) 05:48 (5)	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	05:21 (5) 05:38 (5)	04:39 21:08	05:05 20:51	05:33 (5) 05:48 (5)	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 19:50	04:53 20:45	05:19 (5) 05:37 (5)	04:40 21:09	05:06 20:50	05:35 (5) 05:49 (5)	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	05:20 (5) 05:37 (5)	04:40 21:09	05:08 20:48	05:36 (5) 05:48 (5)	06:41 18:46	07:30 17:41	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	05:21 (5) 05:37 (5)	04:40 21:09	05:09 20:47	05:37 (5) 05:48 (5)	06:43 18:43	07:31 17:40	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	05:21 (5) 05:36 (5)	04:41 21:09	05:10 20:46	05:38 (5) 05:48 (5)	06:44 18:41	07:33 17:38	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 (5) 05:36 (5)	04:41 21:09	05:12 20:44	05:40 (5) 05:48 (5)	06:46 18:39	07:35 17:36	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	05:23 (5) 05:35 (5)	04:42 21:08	05:13 20:43	05:41 (5) 05:47 (5)	06:48 18:37	07:37 17:34	07:27 15:52	07:53 15:54
30	07:32 16:39	06:35 17:32	05:30 18:20	05:30 20:10	04:47 20:52	05:24 (5) 05:34 (5)	04:42 21:08	05:15 20:41	05:42 (5) 05:47 (5)	06:01 19:43	06:49 18:34	06:38 17:32	07:54 15:55
31	07:30 16:41	06:32 17:33	05:32 18:21	05:32 20:10	04:46 20:53	05:25 (5) 05:32 (5)		05:16 20:40	05:44 (5) 05:46 (5)	06:03 19:41	06:40 18:34	07:54 15:51	
Potential sun hours	264	280	367	413	480	492	496	450	380	333	271	250	
Total, worst case					231	55	234						
Sun reduction					0,48	0,43	0,51						
Oper. time red.					0,47	0,47	0,47						
Wind dir. red.					0,63	0,62	0,63						
Total reduction					0,14	0,12	0,15						
Total, real					33	7	35						

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

Printed/Page

2014-11-11 21:44 / 8

Licensed user:

ProSilence Krzysztof Kreciproch

Ul. Spychalskiego 13/207

PI -45 716 Opole

+48 77 550 11 43

Krzysztof Kreciproch / [prosilence@prosilence.pl](mailto:prosilence@prosilence.pl)

Calculated:

2014-11-11 21:27/2.9.285

## SHADOW - Calendar

**Calculation:** ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1 **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 17:42	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 17:40	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 17:38	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 17:36	07:26 15:53	07:53 15:53
	29	07:33 16:37		06:37 18:18	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 17:34	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 17:32	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		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

Printed/Page

2014-11-11 21:44 / 9

Licensed user:

**ProSilence Krzysztof Kreciproch**

Ul. Spychalskiego 13/207

PL-45 716 Opole

+48 77 550 11 43

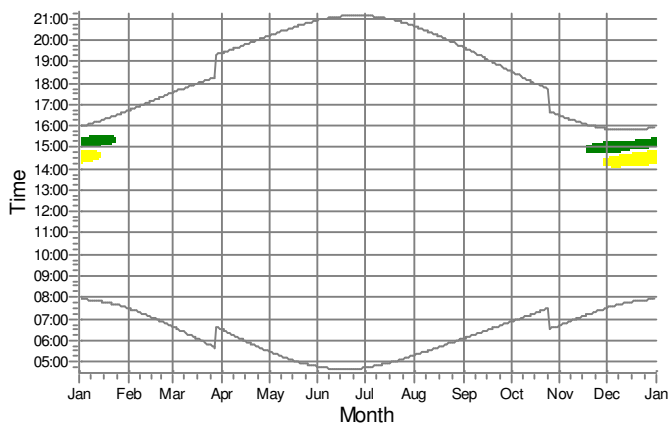
Krzysztof Kręciproch / prosilence@prosilence.pl

Calculated:

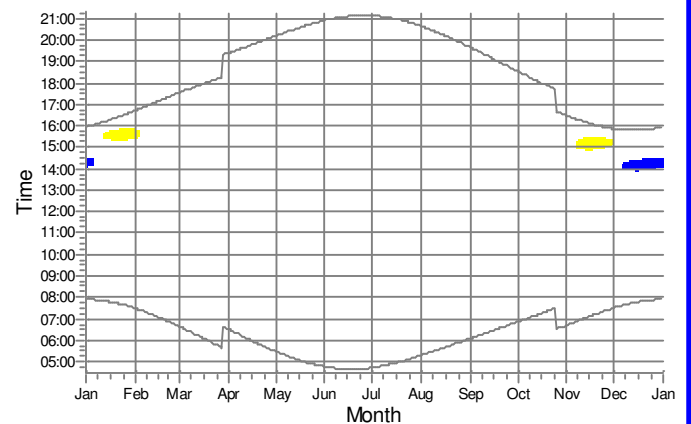
2014-11-11 21:27/2.9.285

**SHADOW - Calendar, graphical****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1**

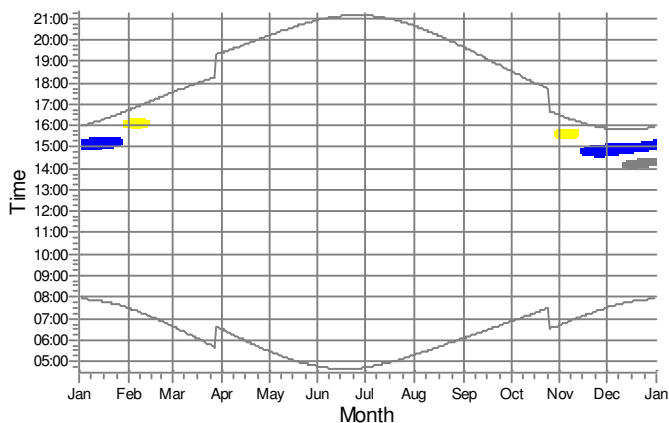
A: 01 Cierpice 1



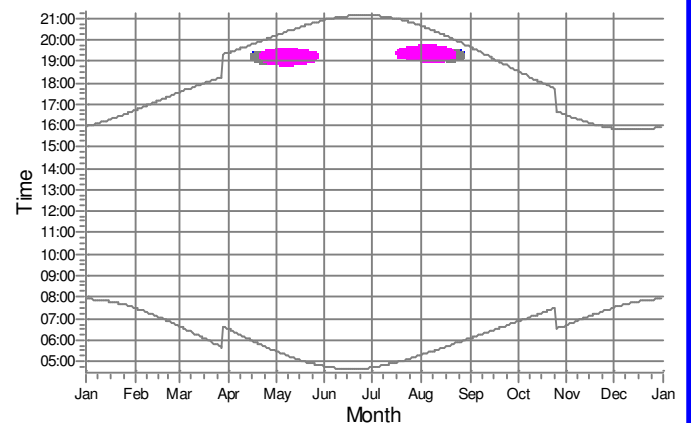
B: 02 Cierpice 2



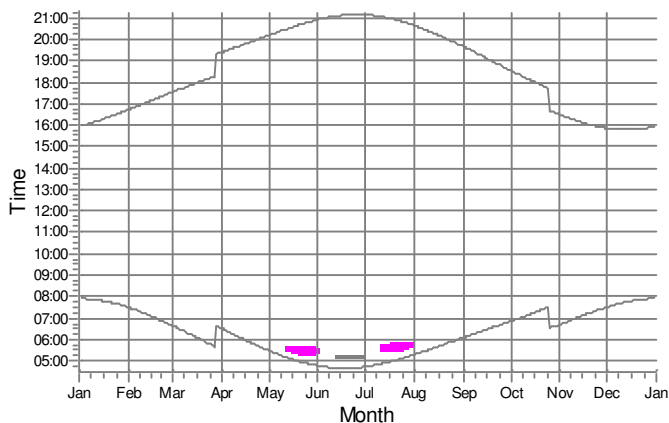
C: 03 Cierpice 3



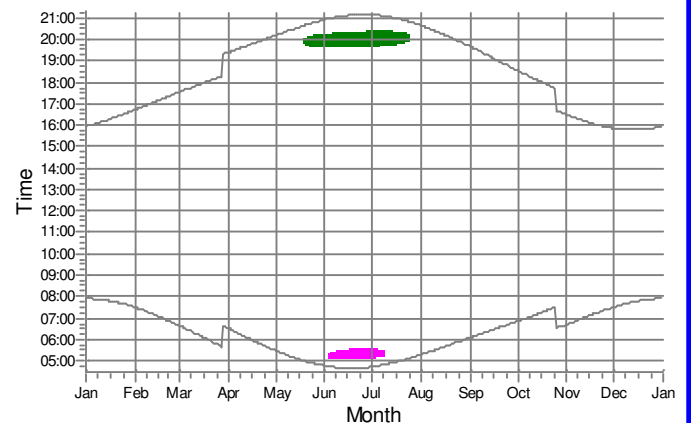
D: 04 Gołaczów 1



E: 05 Konary 1



F: 06 Konary 2



WTGs

<span style="display: inline-block; width: 20px; height: 10px; background-color: green; margin-right: 5px;"></span> 1: EW1	<span style="display: inline-block; width: 20px; height: 10px; background-color: yellow; margin-right: 5px;"></span> 2: EW2	<span style="display: inline-block; width: 20px; height: 10px; background-color: blue; margin-right: 5px;"></span> 3: EW3	<span style="display: inline-block; width: 20px; height: 10px; background-color: gray; margin-right: 5px;"></span> 4: EW4	<span style="display: inline-block; width: 20px; height: 10px; background-color: pink; margin-right: 5px;"></span> 5: EW5
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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 21:44 / 10

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Calculated:

2014-11-11 21:27/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1WTG: 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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**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1WTG: 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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Sunshine probability S (Average daily sunshine hours) []

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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			07:54	14:20-14:44/24	15:56									
	16:41	16:01-16:11/10			19:21		20:53		20:40	19:41		16:31			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 21:27/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1WTG: 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	
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 21:27/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1WTG: 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 17:28	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 21:27/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1WTG: 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 15:57	07:29 16:43	06:38 17:32	06:30 19:23		05:28 18:59-19:21/22 20:11		04:45 20:54	
2	07:54 15:58	07:27 16:44	06:36 17:33	06:28 19:25		05:26 19:00-19:19/19 20:13		04:45 20:56	
3	07:53 15:59	07:26 16:46	06:34 17:35	06:26 19:26		05:24 19:01-19:17/16 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 19:02-19:15/13 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 19:05-19:13/8 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		04:42 20:59	
7	07:52 16:04	07:20 16:53	06:25 17:42	06:17 19:33		05:17 20:21		04:41 21:00	
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	
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	
10	07:51 16:07	07:15 16:58	06:19 17:47	06:11 19:37		05:13 20:25		04:40 21:03	
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	
12	07:50 16:10	07:11 17:02	06:14 17:50	06:06 19:41		05:09 20:28		04:39 21:04	
13	07:49 16:12	07:09 17:04	06:12 17:52	06:04 19:42		05:08 20:30	05:08-05:09/1	04:39 21:05	
14	07:49 16:13	07:07 17:06	06:10 17:54	06:02 19:44		05:06 20:31	05:08-05:10/2	04:39 21:05	
15	07:48 16:15	07:06 17:07	06:08 17:55	06:00 19:46		05:05 20:33	05:08-05:11/3	04:39 21:06	
16	07:47 16:16	07:04 17:09	06:06 17:57	05:58 19:07-19:17/10 19:47		05:03 20:34	05:08-05:11/3	04:39 21:06	
17	07:46 16:18	07:02 17:11	06:03 17:59	05:56 19:04-19:19/15 19:49		05:02 20:35	05:08-05:12/4	04:39 21:07	
18	07:46 16:19	07:00 17:13	06:01 18:00	05:54 19:02-19:21/19 19:50		05:01 20:37	05:08-05:12/4	04:39 21:07	
19	07:45 16:21	06:58 17:14	05:59 18:02	05:52 19:01-19:22/21 19:52		04:59 20:38	05:08-05:12/4	04:39 21:08	
20	07:44 16:22	06:56 17:16	05:57 18:03	05:49 19:00-19:23/23 19:54		04:58 20:40	05:08-05:12/4	04:39 21:08	
21	07:43 16:24	06:54 17:18	05:55 18:05	05:47 18:59-19:23/24 19:55		04:57 20:41	05:08-05:12/4	04:39 21:08	
22	07:42 16:26	06:52 17:20	05:52 18:07	05:45 18:58-19:23/25 19:57		04:55 20:42	05:08-05:12/4	04:39 21:08	
23	07:41 16:27	06:50 17:21	05:50 18:08	05:43 18:57-19:24/27 19:58		04:54 20:44	05:09-05:13/4	04:39 21:08	
24	07:39 16:29	06:48 17:23	05:48 18:10	05:41 18:57-19:23/26 20:00		04:53 20:45	05:09-05:13/4	04:40 21:09	
25	07:38 16:31	06:46 17:25	05:46 18:12	05:39 18:56-19:23/27 20:02		04:52 20:46	05:09-05:13/4	04:40 21:09	
26	07:37 16:32	06:44 17:27	05:43 18:13	05:38 18:57-19:24/27 20:03		04:51 20:47	05:10-05:13/3	04:40 21:09	
27	07:36 16:34	06:42 17:28	05:41 18:15	05:36 18:57-19:23/26 20:05		04:50 20:49	05:10-05:13/3	04:41 21:09	
28	07:34 16:36	06:40 17:30	05:39 18:16	05:34 18:57-19:23/26 20:06		04:49 20:50	05:11-05:13/2	04:41 21:09	
29	07:33 16:37		06:37 19:18	05:32 18:57-19:22/25 20:08		04:48 20:51	05:11-05:12/1	04:42 21:08	
30	07:32 16:39		06:35 19:20	05:30 18:58-19:21/23 20:10		04:47 20:52		04:42 21:08	
31	07:30 16:41		06:32 19:21			04:46 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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**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 21:27/2.9.285

**SHADOW - Calendar per WTG****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1WTG: 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	06:30 16:42	07:21 15:55	07:52 14:09-14:23/14
26	05:09 20:47	05:55 19:52	06:43 18:43	06:31 16:40	07:23 15:54	07:53 14:09-14:23/14
27	05:10 20:46	05:57 19:50	06:44 18:41	06:33 16:38	07:24 15:54	07:53 14:11-14:24/13
28	05:12 20:44	05:58 19:47	06:46 18:39	06:35 16:36	07:26 15:53	07:53 14:11-14:24/13
29	05:13 20:43	06:00 19:45	06:47 18:37	06:36 16:34	07:27 15:52	07:53 14:12-14:24/12
30	05:14 20:41	06:01 19:43	06:49 18:34	06:38 16:32	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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+48 77 550 11 43

Krzysztof Kręciproch / prosilence@prosilence.pl

Calculated:

2014-11-11 21:27/2.9.285

## SHADOW - Calendar per WTG

Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1WTG: 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 19:32	06:55 18:25	06:47 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 19:30	06:57 18:23	06:48 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	05:16-05:28/12 20:30	19:02-19:42/40 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	05:17 20:20	18:53-19:32/39 21:00	04:41 21:00	05:09-05:22/13 21:06	05:17-05:27/10 20:28	19:02-19:41/39 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	18:52-19:32/40 21:01	04:41 21:01	05:09-05:23/14 21:05	05:17-05:24/7 20:27	19:02-19:41/39 19:24	07:02 18:17	06:54 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	05:29 20:25	19:02-19:41/39 19:21	07:03 18:15	06:55 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	05:31 20:23	19:03-19:41/38 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	18:52-19:30/38 21:03	04:40 21:03	05:08-05:26/18 21:03	05:32 20:21	19:02-19:40/38 19:17	07:07 18:10	06:59 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	05:34-05:40/6 20:19	19:02-19:39/37 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	05:33-05:36/3 18:54-19:31/37	04:39 21:05	05:08-05:27/19 21:01	05:33-05:41/8 20:18	19:03-19:39/36 19:12	07:10 18:06	07:02 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	05:32-05:43/11 20:16	19:03-19:37/34 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 19:45	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	05:31-05:44/13 20:14	19:05-19:37/32 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	05:29-05:38/9 18:55-19:29/34	04:39 21:06	05:08-05:29/21 21:05	05:30-05:44/14 20:12	19:05-19:35/30 19:06	07:15 18:00	07:07 16:05	07:47 15:48
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	05:30-05:45/15 20:10	19:06-19:34/28 19:03	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	05:26-05:38/12 18:56-19:28/32	04:39 21:07	05:08-05:30/22 21:05	05:30-05:47/17 20:08	19:07-19:32/25 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 21:05	05:30-05:47/17 20:06	19:09-19:31/22 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 21:05	05:30-05:47/17 20:04	19:11-19:28/17 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 21:05	05:31-05:48/17 20:02	19:14-19:23/9 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 21:05	05:32-05:48/16 20:00	19:05-19:35/25 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 21:05	05:33-05:48/15 19:58	19:08-19:36/27 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 21:05	05:35-05:49/14 19:56	19:08-19:37/29 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 21:05	05:36-05:48/12 19:54	19:09-19:38/31 18:45	07:29 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 21:05	05:37-05:48/11 19:52	19:07-19:38/32 18:43	07:31 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 21:05	05:38-05:48/10 19:50	19:05-19:39/34 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	05:22-05:36/14 18:57-19:29/32	04:41 21:09	05:11-05:31/20 21:05	05:40-05:48/8 19:47	19:05-19:40/34 18:39	07:35 16:36	07:26 15:53	07:53 15:53
29	07:33 16:37	06:37 17:31	05:37 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 21:05	05:41-05:47/6 19:45	19:05-19:40/35 18:37	07:36 16:34	07:27 15:52	07:53 15:54
30	07:32 16:39	06:35 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 21:05	05:42-05:47/5 19:43	19:05-19:40/36 18:34	07:38 16:32	07:29 15:51	07:53 15:55
31	07:30 16:41	06:32 17:35	05:32 18:21	05:32 20:10	04:46 20:53	05:25-05:32/7 19:00-19:26/26	04:42 21:08	05:12-05:31/19 21:05	05:44-05:46/2 19:41	19:04-19:41/37 18:30	07:40 16:30	07:30 15:56	07:54 15:56
Potential sun hours	264	280	367	414	480	1089	492	496	450	380	333	271	250
Sum of minutes with flicker	0	0	0	236	1089	500	754	696	0	0	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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2014-11-11 21:44 / 18

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**ProSilence Krzysztof Kreciproch**

Ul. Spychalskiego 13/207

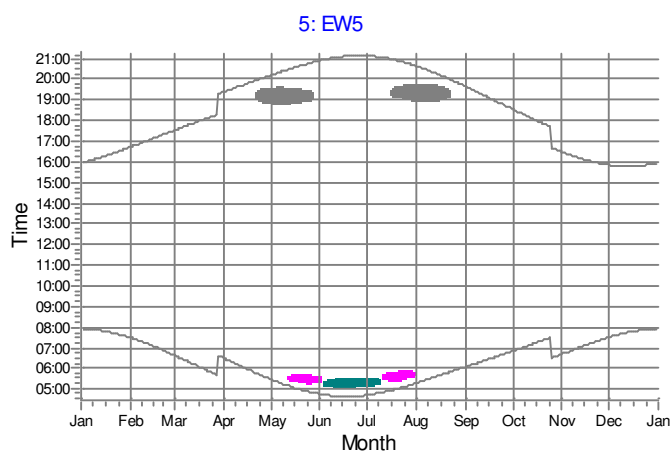
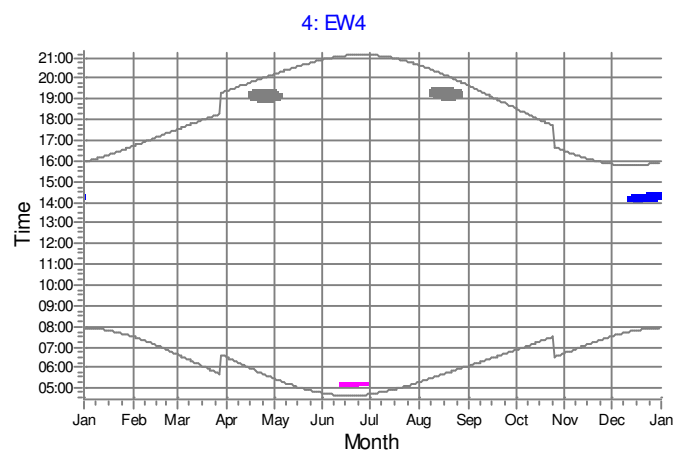
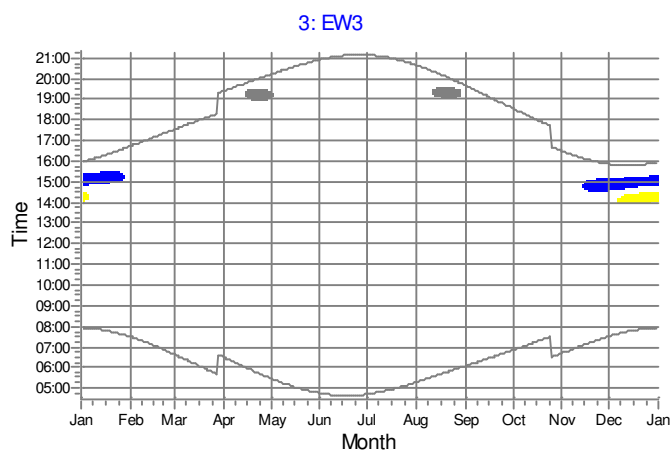
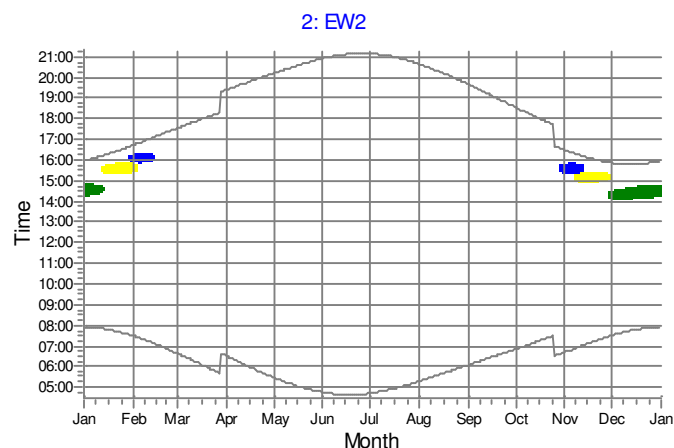
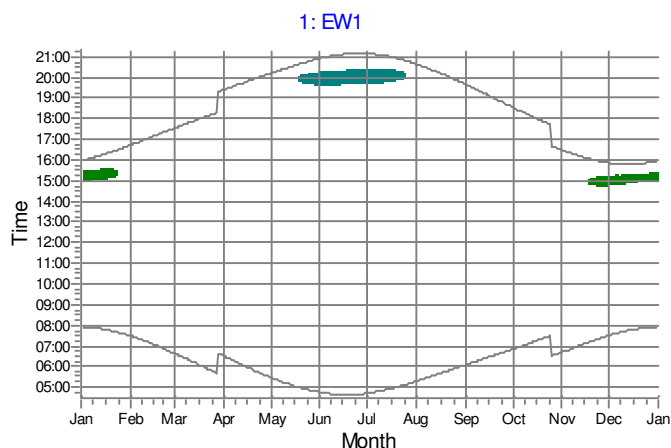
PL-45 716 Opole

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Calculated:

2014-11-11 21:27/2.9.285

**SHADOW - Calendar per WTG, graphical****Calculation: ZAŁĄCZNIK TEKSTOWY 16 - migotanie cienia wariant 1**

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