

Project:  
2009-06-25 Sky 8

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**SeeBA Energiesysteme**  
Tielger Allee 60  
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wla  
Calculated:  
12.08.2009 13:08/2.6.1.252

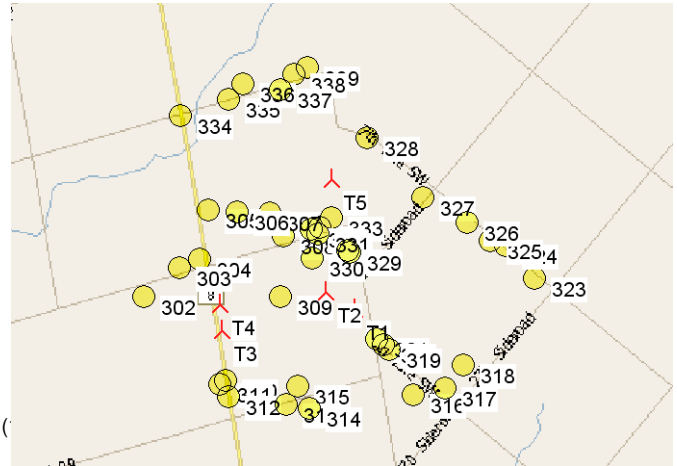
### SHADOW - Main Result

Calculation: 2009-08-12 5x E82, 78,3m

#### 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
- The calculated times are "worst case" given by the following assumptions:
  - The sun is shining all the day, from sunrise to sunset
  - The rotor plane is always perpendicular to the line from the WTG to the sun
  - The WTG is always operating

To avoid flicker from WTGs not visible a ZVI calculation is performed before the flicker calculation. The ZVI calculation is based on the following assumptions  
Height contours used: Höhenlinien: CONTOURLINE\_ONLINEDATA\_0.wpo ( )  
Obstacles used in calculation  
Eye height: 1,5 m  
Grid resolution: 10 m



Scale 1:100.000  
New WTG Shadow receptor

#### WTGs

WTG type	UTM NAD83 Zone: 17			Row data/Description	Shadow data	
	East	North	Z		Calculation distance	RPM
Valid Manufact. Type-generator Power, Rotor diameter Hub height			[m]		[m]	[RPM]
Yes ENERCON E-82-2.000 2.000 82,0 78,3	1	549.068	4.881.273	493,8 Turbine 1	1.552	19,5
Yes ENERCON E-82-2.000 2.000 82,0 78,3	2	548.690	4.881.500	498,1 Turbine 2	1.552	19,5
Yes ENERCON E-82-2.000 2.000 82,0 78,3	3	547.312	4.880.990	494,9 Turbine 3	1.552	19,5
Yes ENERCON E-82-2.000 2.000 82,0 78,3	4	547.285	4.881.326	495,0 Turbine 4	1.552	19,5
Yes ENERCON E-82-2.000 2.000 82,0 78,3	5	548.759	4.882.982	495,0 Turbine 5	1.552	19,5

#### Shadow receptor-Input

No. Name	UTM NAD83 Zone: 17			Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	East	North	Z						
A Receptor 300	548.605	4.882.349	496,9	0,1	0,1	2,0	0,0	90,0	"Green house mode"
B Receptor 302	546.279	4.881.419	491,5	0,1	0,1	2,0	0,0	90,0	"Green house mode"
C Receptor 303	546.754	4.881.810	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
D Receptor 304	547.016	4.881.917	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
E Receptor 305	547.122	4.882.564	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
F Receptor 306	547.509	4.882.550	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
G Receptor 307	547.943	4.882.537	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
H Receptor 308	548.124	4.882.236	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
I Receptor 309	548.086	4.881.436	495,8	0,1	0,1	2,0	0,0	90,0	"Green house mode"
J Receptor 310	547.377	4.880.321	490,5	0,1	0,1	2,0	0,0	90,0	"Green house mode"
K Receptor 311	547.291	4.880.272	490,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
L Receptor 312	547.413	4.880.109	490,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
M Receptor 313	548.178	4.880.011	490,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
N Receptor 314	548.487	4.879.967	490,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
O Receptor 315	548.331	4.880.255	490,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
P Receptor 316	549.855	4.880.156	490,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
Q Receptor 317	550.277	4.880.243	490,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
R Receptor 318	550.523	4.880.549	490,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
S Receptor 319	549.539	4.880.749	494,8	0,1	0,1	2,0	0,0	90,0	"Green house mode"
T Receptor 320	549.458	4.880.817	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
U Receptor 321	549.372	4.880.891	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
V Receptor 323	551.461	4.881.705	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
W Receptor 324	551.066	4.882.136	493,8	0,1	0,1	2,0	0,0	90,0	"Green house mode"
X Receptor 325	550.863	4.882.195	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"
Y Receptor 326	550.554	4.882.433	494,9	0,1	0,1	2,0	0,0	90,0	"Green house mode"
Z Receptor 327	549.973	4.882.759	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"

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**SHADOW - Main Result****Calculation:** 2009-08-12 5x E82, 78,3m

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**UTM NAD83 Zone: 17**

No.	Name	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
				[m]	[m]	[m]	[m]	[°]	[°]	
AA Receptor 328	549.220	4.883.535	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AB Receptor 329	549.010	4.882.022	499,9	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AC Receptor 330	548.509	4.881.945	499,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AD Receptor 331	548.584	4.882.257	497,3	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AE Receptor 332	548.489	4.882.325	495,1	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AF Receptor 333	548.765	4.882.478	497,3	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AG Receptor 334	546.748	4.883.804	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AH Receptor 335	547.385	4.884.025	495,2	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AI Receptor 336	547.576	4.884.231	496,2	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AJ Receptor 337	548.079	4.884.157	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AK Receptor 338	548.249	4.884.367	496,2	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AL Receptor 339	548.424	4.884.460	495,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"	
AM Receptor 340	548.977	4.882.050	500,0	0,1	0,1	2,0	0,0	90,0	"Green house mode"	

**Calculation Results**

Shadow receptor

**Shadow, worst case**

No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A Receptor 300	0:00	0	0:00	
B Receptor 302	9:33	47	0:18	
C Receptor 303	18:54	50	0:28	
D Receptor 304	0:00	0	0:00	
E Receptor 305	0:00	0	0:00	
F Receptor 306	2:55	22	0:12	
G Receptor 307	15:58	56	0:22	
H Receptor 308	0:00	0	0:00	
I Receptor 309	40:10	120	0:34	
J Receptor 310	0:00	0	0:00	
K Receptor 311	0:00	0	0:00	
L Receptor 312	0:00	0	0:00	
M Receptor 313	0:00	0	0:00	
N Receptor 314	0:00	0	0:00	
O Receptor 315	0:00	0	0:00	
P Receptor 316	0:00	0	0:00	
Q Receptor 317	0:00	0	0:00	
R Receptor 318	0:00	0	0:00	
S Receptor 319	0:00	0	0:00	
T Receptor 320	0:00	0	0:00	
U Receptor 321	0:00	0	0:00	
V Receptor 323	0:00	0	0:00	
W Receptor 324	0:00	0	0:00	
X Receptor 325	0:00	0	0:00	
Y Receptor 326	0:00	0	0:00	
Z Receptor 327	2:48	19	0:13	
AA Receptor 328	0:00	0	0:00	
AB Receptor 329	0:00	0	0:00	
AC Receptor 330	5:16	47	0:10	
AD Receptor 331	0:00	0	0:00	
AE Receptor 332	0:00	0	0:00	
AF Receptor 333	0:00	0	0:00	
AG Receptor 334	0:00	0	0:00	
AH Receptor 335	0:00	0	0:00	
AI Receptor 336	0:00	0	0:00	
AJ Receptor 337	0:00	0	0:00	
AK Receptor 338	0:00	0	0:00	
AL Receptor 339	0:00	0	0:00	

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**SHADOW - Main Result****Calculation:** 2009-08-12 5x E82, 78,3m

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**Shadow, worst case**

No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
AM Receptor 340		0:00	0	0:00

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

No.	Name	Worst case [h/year]
1	Turbine 1	4:55
2	Turbine 2	17:22
3	Turbine 3	17:25
4	Turbine 4	34:11
5	Turbine 5	21:41

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### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: A - Receptor 300

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:39 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:09	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 20:29	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:04 17:06	07:42 16:44
7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:42	06:47 19:20	06:50 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:53 19:45	07:28 18:50	07:08 17:03	07:45 16:44
10	07:56 17:03	07:30 17:44	06:45 19:21	06:49 19:59	06:02 20:34	05:39 21:04	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	06:43 19:22	06:47 20:01	06:01 20:35	05:39 21:04	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 17:01	07:46 16:44
12	07:56 17:05	07:27 17:47	06:41 19:24	06:45 20:01	06:00 20:36	05:38 21:05	05:50 21:06	06:21 20:34	06:57 19:39	07:32 18:45	07:12 16:59	07:47 16:44
13	07:55 17:06	07:25 17:48	06:39 19:25	06:43 20:02	05:59 20:38	05:38 21:05	05:50 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:58	07:48 16:44
14	07:55 17:08	07:24 17:49	06:38 19:26	06:42 20:03	05:58 20:39	05:38 21:06	05:51 21:05	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
15	07:54 17:09	07:23 17:51	06:36 19:27	06:40 20:04	05:57 20:40	05:38 21:06	05:52 21:04	06:25 20:29	07:00 19:34	07:36 18:39	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:55 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:01 19:32	07:37 18:38	07:18 16:55	07:50 16:44
17	07:53 17:11	07:20 17:53	06:32 19:30	06:37 20:07	05:54 20:42	05:38 21:07	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:54	07:51 16:45
18	07:53 17:13	07:18 17:55	06:30 19:31	06:35 20:08	05:53 20:43	05:38 21:08	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	06:29 19:32	06:33 20:09	05:52 20:44	05:38 21:08	05:56 21:01	06:29 20:23	07:05 19:26	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:58	06:27 19:34	06:32 20:10	05:51 20:45	05:39 21:08	05:57 21:00	06:31 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	06:25 19:35	06:30 20:11	05:50 20:46	05:39 21:09	05:58 20:59	06:32 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	06:23 19:36	06:28 20:13	05:50 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:49	05:39 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:48
26	07:47 17:23	07:05 18:06	06:16 19:41	06:22 20:17	05:46 20:51	05:40 21:09	06:03 20:55	06:37 20:12	07:13 19:13	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	06:14 19:42	06:21 20:19	05:45 20:52	05:40 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	06:12 19:43	06:19 20:20	05:45 20:53	05:41 21:09	06:05 20:53	06:40 20:08	07:15 19:10	07:53 18:19	07:33 16:47	07:56 16:50
29	07:44 17:27		06:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:17 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:08 19:46	06:16 20:22	05:43 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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

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

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### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: B - Receptor 302

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December			
1	07:57	07:41	07:00	07:05	06:15	05:42	05:42	06:09	06:44	07:19	07:40 (4)	06:58	07:20 (3)	07:36	
	16:54	17:31	18:10	19:48	20:24	20:57	21:09	20:48	20:01	19:04	2	17:13	9	07:29 (3)	16:45
2	07:57	07:40	06:59	07:03	06:13	05:42	05:43	06:10	06:46	07:20		06:59		07:22 (3)	07:38
	16:55	17:33	18:11	19:50	20:25	20:58	21:09	20:47	20:00	19:03		06:59	6	07:28 (3)	16:45
3	07:57	07:38	06:57	07:01	06:12	05:41	05:44	06:11	06:47	07:21		07:01		07:23 (3)	07:39
	16:56	17:34	18:12	19:51	20:26	20:59	21:09	20:46	19:56	19:01		07:10	3	07:26 (3)	16:45
4	07:57	07:37	06:55	06:59	06:10	05:41	05:44	06:13	06:48	07:23		07:02			07:40
	16:57	17:36	18:14	19:52	20:27	20:59	21:09	20:45	19:54	18:59		07:02			16:45
5	07:57	07:36	06:54	06:58	06:09	05:41	05:45	06:14	06:49	07:24		07:03			07:41
	16:58	17:37	18:15	19:53	20:28	21:00	21:09	20:43	19:52	18:57		07:08			16:44
6	07:57	07:35	06:52	06:56	06:08	05:40	05:45	06:15	06:50	07:25		07:05			07:42
	16:59	17:38	18:16	19:55	20:30	21:01	21:08	20:42	19:51	18:55		07:07			16:44
7	07:57	07:34	06:50	06:54	06:06	05:40	05:46	06:16	06:51	07:26		07:06			07:43
	17:00	17:40	18:17	19:56	20:31	21:02	21:08	20:41	19:49	18:54		07:05			16:44
8	07:57	07:32	07:53 (3)	07:48	06:52	06:05	05:39	05:47	06:17	06:52		07:07			07:44
	17:01	17:41	4	07:57 (3)	19:19	19:57	20:32	21:02	21:08	20:39		17:04			16:44
9	07:57	07:31	07:52 (3)	07:47	06:51	06:04	05:39	05:47	06:18	06:54		07:09			07:45
	17:02	17:43	7	07:59 (3)	19:20	19:58	20:33	21:03	21:07	20:38		18:50			16:44
10	07:56	07:30	07:51 (3)	07:45	06:49	06:03	05:39	05:48	06:19	06:55		07:10			07:46
	17:03	17:44	9	08:00 (3)	19:21	19:59	20:34	21:04	21:07	20:37		18:46			16:44
11	07:56	07:28	07:49 (3)	07:43	06:47	06:01	05:39	05:49	06:20	06:56		07:11			07:47
	17:04	17:45	11	08:00 (3)	19:23	20:01	20:35	21:04	21:06	20:35		18:46			16:44
12	07:56	07:27	07:48 (3)	07:41	06:45	06:00	05:39	05:50	06:22	06:57		07:32			07:47
	17:05	17:47	13	08:01 (3)	19:24	20:01	20:37	21:06	21:04	20:34		18:45			16:44
13	07:55	07:26	07:46 (3)	07:40	08:00 (4)	06:44	05:59	05:51	06:23	06:58		07:33			07:48
	17:07	17:48	15	08:01 (3)	19:25	5	08:05 (4)	20:02	20:38	21:05		18:43			16:44
14	07:55	07:24	07:45 (3)	07:38	07:58 (4)	06:42	05:58	05:38	05:51	06:24		07:35			07:49
	17:08	17:49	16	08:01 (3)	19:26	9	08:07 (4)	20:03	20:39	21:06		18:41			16:44
15	07:54	07:23	07:45 (3)	07:36	07:56 (4)	06:40	05:57	05:38	05:52	06:25		07:30			07:50
	17:09	17:51	16	08:01 (3)	19:28	12	08:08 (4)	20:04	20:40	21:06		18:40			16:44
16	07:54	07:21	07:45 (3)	07:34	07:54 (4)	06:38	05:56	05:38	05:53	06:26		07:37			07:51
	17:10	17:52	15	08:00 (3)	19:29	14	08:08 (4)	20:05	20:41	21:07		18:38			16:45
17	07:53	07:20	07:45 (3)	07:32	07:52 (4)	06:37	05:55	05:38	05:54	06:27		07:38			07:51
	17:11	17:54	14	07:59 (3)	19:30	16	08:08 (4)	20:07	20:42	21:07		18:36			16:45
18	07:53	07:18	07:47 (3)	07:30	07:50 (4)	06:35	05:54	05:38	05:55	06:28		07:40			07:52
	17:13	17:55	11	07:58 (3)	19:31	18	08:08 (4)	20:08	20:43	21:08		18:35			16:45
19	07:52	07:17	07:50 (3)	07:29	07:50 (4)	06:33	05:53	05:39	05:56	06:30		07:41			07:53
	17:14	17:56	4	07:54 (3)	19:33	18	08:08 (4)	20:09	20:44	21:08		18:33			16:46
20	07:51	07:15	07:27	07:27	07:50 (4)	06:32	05:52	05:39	05:57	06:31		07:42			07:53
	17:15	17:58	17	08:07 (4)	20:10	20:45	21:08	21:00	20:22	19:25		9	07:48 (4)	18:31	16:52
21	07:51	07:14	07:25	07:25	07:50 (4)	06:30	05:51	05:39	05:58	06:32		07:44			07:54
	17:17	17:59	16	08:06 (4)	20:12	20:46	21:09	21:00	20:20	19:23		13	07:49 (4)	18:30	16:46
22	07:50	07:12	07:23	07:23	07:51 (4)	06:29	05:50	05:39	05:59	06:33		07:45			07:54
	17:18	18:00	13	08:04 (4)	20:13	20:48	21:09	20:59	20:18	19:21		15	07:50 (4)	18:28	16:50
23	07:49	07:10	07:21	07:21	07:52 (4)	06:27	05:49	05:39	06:00	06:34		07:10			07:55
	17:19	18:02	10	08:02 (4)	20:14	20:49	21:09	20:58	20:17	19:19		17	07:51 (4)	18:27	16:47
24	07:48	07:09	07:20	07:20	06:25	05:48	05:40	06:01	06:35	07:11		07:33 (4)	07:47		07:55
	17:21	18:03	19:39	19:39	20:15	20:50	21:09	20:57	20:15	19:17		18	07:51 (4)	18:25	16:48
25	07:48	07:07	07:18	07:18	06:24	05:47	05:40	06:02	06:36	07:12		07:33 (4)	07:49		07:56
	17:22	18:04	19:40	19:40	20:16	20:51	21:09	20:56	20:13	19:15		18	07:51 (4)	18:23	16:49
26	07:47	07:05	07:16	07:16	06:22	05:46	05:40	06:03	06:38	07:13		07:34 (4)	07:50		07:56
	17:23	18:06	19:41	19:41	20:18	20:52	21:09	20:55	20:12	19:14		16	07:50 (4)	18:22	16:49
27	07:46	07:04	07:14	07:14	06:21	05:46	05:41	06:04	06:39	07:14		07:35 (4)	07:51		07:56
	17:25	18:07	19:42	19:42	20:19	20:52	21:09	20:54	20:10	19:12		15	07:50 (4)	18:20	16:50
28	07:45	07:02	07:12	07:12	06:19	05:45	05:41	06:05	06:40	07:15		07:36 (4)	07:53		07:57
	17:26	18:08	19:44	19:44	20:20	20:53	21:10	20:53	20:08	19:10		12	07:48 (4)	18:19	16:51
29	07:44	07:01	07:10	07:10	06:18	05:44	05:41	06:06	06:41	07:17		07:38 (4)	07:54		07:57
	17:27	18:09	19:45	19:45	20:21	20:54	21:09	20:52	20:07	19:08		10	07:48 (4)	18:17	16:51
30	07:43	07:00	07:09	07:09	06:16	05:44	05:42	06:07	06:42	07:18		07:39 (4)	07:55		07:57
	17:29	18:11	19:46	19:46	20:22	20:55	21:09	20:51	20:05	19:06		7	07:46 (4)	18:16	16:52
31	07:42	07:07	07:17	07:17	06:23	05:49	05:46	06:08	06:43	07:19		07:57			07:57
	17:30	18:12	19:47	19:47	20:23	20:56	21:11	20:50	20:03	19:11		11	08:30 (3)	18:15	16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342		290	18	277	
Total, worst case		135		148					150	122					

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:  
2009-06-25 Sky 8

Printed/Page  
12.08.2009 13:30 / 6  
Licensed user:  
**SeeBA Energiesysteme**  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222  
wla  
Calculated:  
12.08.2009 13:08/2.6.1.252

**SHADOW - Calendar**

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: C - Receptor 303

**Assumptions for shadow calculations**

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:57 16:54	08:39 (4) 09:05 (4)	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13		08:28 (4)
2	07:57 16:55	08:39 (4) 09:05 (4)	07:40 17:33	18:10 18:11	19:48 19:50	20:24 20:25	20:57 20:58	21:09 21:09	20:48 20:47	20:01 19:58	19:04 19:03	17:13 17:12	18	08:46 (4)
3	07:57 16:56	08:39 (4) 09:04 (4)	07:38 17:34	18:11 18:12	19:50 19:51	20:25 20:26	20:58 20:59	21:09 21:09	20:47 20:46	19:58 19:56	19:03 19:01	17:12 17:10	20	08:48 (4)
4	07:57 16:57	08:39 (4) 09:04 (4)	07:37 17:36	18:12 18:14	19:51 19:52	20:26 20:27	20:59 20:59	21:09 21:09	20:46 20:45	19:56 19:54	19:01 18:59	17:10 17:09	21	08:49 (4)
5	07:57 16:58	08:40 (4) 09:05 (4)	07:36 17:37	18:14 18:15	19:52 19:53	20:27 20:28	20:59 21:00	21:09 21:09	20:45 20:43	19:54 19:52	18:59 18:57	17:09 17:08	21	08:49 (4)
6	07:57 16:59	08:40 (4) 09:05 (4)	07:36 17:38	18:15 18:16	19:53 19:55	20:28 20:30	21:00 21:01	21:09 21:08	20:43 20:42	19:52 19:51	18:57 18:55	17:08 17:07	22	08:50 (4)
7	07:57 17:00	08:41 (4) 09:05 (4)	07:35 17:40	18:16 18:17	19:55 19:56	20:30 20:31	21:01 21:02	21:08 21:08	20:42 20:41	19:51 19:49	18:55 18:54	17:07 17:05	23	08:51 (4)
8	07:57 17:01	08:42 (4) 09:05 (4)	07:34 17:41	18:17 18:17	19:56 19:57	20:31 20:32	21:02 21:02	21:08 21:08	20:41 20:39	19:49 19:47	18:54 18:52	17:04 17:04	24	08:52 (4)
9	07:57 17:02	08:44 (4) 09:05 (4)	07:32 17:43	18:17 19:20	19:57 19:58	20:32 20:33	21:02 21:03	21:08 21:07	20:39 20:38	19:47 19:45	18:52 18:50	17:04 17:03	25	08:53 (4)
10	07:56 17:03	08:44 (4) 09:05 (4)	07:32 17:44	19:20 19:21	19:58 19:59	20:33 20:34	21:03 21:04	21:07 21:07	20:38 20:37	19:45 19:43	18:50 18:48	17:03 17:02	26	08:54 (4)
11	07:56 17:04	08:45 (4) 09:04 (4)	07:30 17:45	19:21 19:23	19:59 20:01	20:34 20:35	21:04 21:04	21:07 21:06	20:37 20:35	19:43 19:41	18:48 18:46	17:02 17:01	26	08:54 (4)
12	07:56 17:05	08:46 (4) 09:04 (4)	07:28 17:47	19:23 20:01	19:59 20:01	20:35 20:35	21:04 21:04	21:07 21:06	20:37 20:35	19:43 19:40	18:48 18:45	17:02 17:00	26	08:54 (4)
13	07:55 17:07	08:46 (4) 09:04 (4)	07:27 17:47	19:23 20:01	19:59 20:01	20:35 20:35	21:04 21:04	21:07 21:06	20:37 20:35	19:43 19:40	18:48 18:45	17:02 17:00	26	08:54 (4)
14	07:55 17:08	08:49 (4) 09:02 (4)	07:26 17:48	19:23 19:25	19:59 20:02	20:35 20:38	21:04 21:05	21:07 21:05	20:37 20:32	19:43 19:38	18:45 18:43	17:00 16:58	27	08:55 (4)
15	07:54 17:09	08:51 (4) 09:02 (4)	07:24 17:49	19:25 19:26	19:59 20:03	20:38 20:39	21:05 21:06	21:07 21:05	20:37 20:31	19:45 19:36	18:50 18:41	17:03 16:57	27	08:55 (4)
16	07:54 17:10	08:53 (4) 08:59 (4)	07:23 17:51	19:26 19:28	19:59 20:04	20:39 20:40	21:06 21:06	21:05 21:04	20:32 20:29	19:38 19:34	18:43 18:40	16:58 16:56	27	08:56 (4)
17	07:54 17:11	07:21 17:52	07:34 19:29	19:29 20:05	19:59 20:05	20:41 20:41	21:07 21:07	21:03 21:03	20:28 20:28	19:32 19:32	18:38 18:38	16:56 16:56	27	08:57 (4)
18	07:53 17:13	07:20 17:54	07:32 19:30	19:30 20:07	19:55 20:07	20:42 20:42	21:07 21:07	21:03 21:03	20:26 20:26	19:30 19:30	18:36 18:36	16:55 16:55	28	08:58 (4)
19	07:52 17:14	07:18 17:55	07:30 19:31	19:31 20:08	19:53 20:08	20:43 20:43	21:08 21:08	21:02 21:02	20:25 20:25	19:28 19:28	18:35 18:35	16:54 16:54	28	08:58 (4)
20	07:51 17:15	07:17 17:56	07:29 19:33	19:33 20:09	19:52 20:09	20:44 20:44	21:08 21:08	21:01 21:01	20:23 20:23	19:27 19:27	18:33 18:33	16:53 16:53	28	08:59 (4)
21	07:51 17:15	07:15 17:58	07:27 19:34	19:34 20:10	19:52 20:10	20:45 20:45	21:08 21:08	21:00 21:00	20:22 20:22	19:25 19:25	18:31 18:31	16:52 16:52	28	08:59 (4)
22	07:51 17:17	07:14 17:59	07:25 19:35	19:35 20:12	19:51 20:12	20:46 20:46	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:30	16:51 16:51	28	09:00 (4)
23	07:50 17:18	07:12 18:00	07:23 19:36	19:36 20:13	19:50 20:13	20:48 20:48	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:30	16:51 16:50	28	09:00 (4)
24	07:49 17:19	07:10 18:02	07:21 19:37	19:37 20:14	19:52 20:14	20:49 20:49	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:30	16:51 16:50	28	09:00 (4)
25	07:48 17:21	07:09 18:03	07:19 19:39	19:39 20:15	19:54 20:15	20:49 20:50	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:30	16:51 16:49	28	09:01 (4)
26	07:48 17:22	07:07 18:04	07:18 19:40	19:40 20:16	19:54 20:16	20:49 20:51	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:23	16:48 16:48	27	09:01 (4)
27	07:47 17:23	07:05 18:06	07:16 19:41	19:41 20:18	19:52 20:18	20:48 20:52	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:22	16:48 16:48	27	09:02 (4)
28	07:46 17:25	07:04 18:07	07:14 19:42	19:42 20:19	19:53 20:19	20:48 20:52	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:20	16:47 16:47	5	08:34 (4)
29	07:45 17:26	07:02 18:08	07:12 19:44	19:44 20:20	19:54 20:20	20:49 20:53	21:09 21:10	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:19	16:47 16:47	11	08:34 (4)
30	07:43 17:27	07:01 18:09	07:10 19:45	19:45 20:21	19:54 20:21	20:49 20:54	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:17	16:46 16:46	13	08:34 (4)
31	07:42 17:30	07:00 18:10	07:09 19:46	19:46 20:22	19:54 20:22	20:49 20:55	21:09 21:09	21:00 21:00	20:20 20:20	19:23 19:23	18:30 18:16	16:46 16:46	16	08:34 (4)
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277	45	790
Total, worst case	299													

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

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

2009-06-25 Sky 8

Printed/Page

12.08.2009 13:30 / 7

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: D - Receptor 304

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:40 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:46 19:58	07:20 19:03	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:01 17:10	07:39 16:45
4	07:57 16:57	07:37 17:36	06:55 18:14	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:23 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:09	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:55	06:08 20:30	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:51	07:25 18:55	07:05 17:07	07:42 16:44
7	07:57 17:00	07:34 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:54	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:43	06:47 19:20	06:51 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:54 19:45	07:29 18:50	07:09 17:03	07:45 16:44
10	07:56 17:03	07:30 17:44	06:45 19:21	06:49 19:59	06:03 20:34	05:39 21:04	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	06:43 19:22	06:47 20:01	06:01 20:35	05:39 21:04	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 17:01	07:47 16:44
12	07:56 17:05	07:27 17:47	06:41 19:24	06:45 20:01	06:00 20:37	05:39 21:05	05:50 21:06	06:21 20:34	06:57 19:40	07:32 18:45	07:13 17:00	07:47 16:44
13	07:55 17:07	07:25 17:48	06:39 19:25	06:44 20:02	05:59 20:38	05:38 21:05	05:51 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:58	07:48 16:44
14	07:55 17:08	07:24 17:49	06:38 19:26	06:42 20:03	05:58 20:39	05:38 21:06	05:51 21:05	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
15	07:54 17:09	07:23 17:51	06:36 19:28	06:40 20:04	05:57 20:40	05:38 21:06	05:52 21:04	06:25 20:29	07:00 19:34	07:36 18:40	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:56 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:02 19:32	07:37 18:38	07:18 16:55	07:51 16:44
17	07:53 17:11	07:20 17:54	06:32 19:30	06:37 20:07	05:54 20:42	05:38 21:07	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:55	07:51 16:45
18	07:53 17:13	07:18 17:55	06:30 19:31	06:35 20:08	05:53 20:43	05:38 21:08	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:35	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	06:29 19:33	06:33 20:09	05:52 20:44	05:38 21:08	05:56 21:01	06:29 20:23	07:05 19:27	07:41 18:33	07:22 16:53	07:53 16:45
20	07:51 17:15	07:15 17:58	06:27 19:34	06:32 20:10	05:51 20:45	05:39 21:08	05:57 21:00	06:31 20:22	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:17	07:14 17:59	06:25 19:35	06:30 20:12	05:51 20:46	05:39 21:09	05:58 21:00	06:32 20:20	07:07 19:23	07:44 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	06:23 19:36	06:28 20:13	05:50 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:26 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:49	05:39 21:09	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:50	05:40 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
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29	07:44 17:27		06:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:17 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:09 19:46	06:16 20:22	05:44 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:57 18:15		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 8

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: E - Receptor 305

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:40 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:46 19:58	07:20 19:03	06:59 17:12	07:38 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:01 17:10	07:39 16:45
4	07:57 16:57	07:37 17:36	06:55 18:14	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:23 18:59	07:02 17:09	07:40 16:44
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6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:55	06:08 20:30	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:51	07:25 18:55	07:05 17:07	07:42 16:44
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9	07:57 17:02	07:31 17:43	06:47 19:20	06:51 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:54 19:45	07:29 18:50	07:09 17:03	07:45 16:44
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25	07:48 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:51	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:56 16:48
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31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:50	06:43 20:03		07:57 18:15		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 9

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: F - Receptor 306

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	06:35 (5) 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:40 17:33	06:59 18:11	07:03 19:50	06:13 20:25	06:34 (5) 20:58	05:42 21:09	06:10 20:47	06:46 19:58	07:20 19:03	06:59 17:12	07:37 16:45
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Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case				7	79			89				

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

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

2009-06-25 Sky 8

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Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: G - Receptor 307

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	06:05 (5) 21:09	06:06 (5) 20:48	06:09 20:01	06:44 19:04	07:19 17:13	06:58 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	06:05 (5) 21:09	06:07 (5) 20:47	06:10 19:58	06:45 19:02	07:20 17:12	06:59 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	06:04 (5) 21:09	06:08 (5) 20:46	06:11 19:56	06:47 19:01	07:21 17:10	07:00 16:45
4	07:57 16:57	07:37 17:36	06:55 18:13	06:59 19:52	06:10 20:27	05:40 20:59	06:04 (5) 21:09	06:08 (5) 20:45	06:12 19:54	06:48 18:59	07:22 17:09	07:02 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	06:04 (5) 21:09	06:09 (5) 20:43	06:14 19:52	06:49 18:57	07:24 17:08	07:03 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 20:30	05:40 21:01	06:03 (5) 21:08	06:09 (5) 20:42	06:15 19:50	07:25 18:55	07:04 17:07	07:42 16:44
7	07:57 17:00	07:34 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	06:03 (5) 21:08	06:10 (5) 20:41	06:16 19:49	06:51 18:53	07:26 17:05	07:06 16:44
8	07:57 17:01	07:32 17:41	07:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	06:03 (5) 21:08	06:11 (5) 20:39	06:17 19:47	06:52 18:52	07:27 17:04	07:07 16:44
9	07:57 17:02	07:31 17:42	07:47 19:20	06:50 19:58	06:04 20:33	05:39 21:03	06:03 (5) 21:07	06:11 (5) 20:38	06:18 19:45	06:53 18:50	07:29 17:03	07:08 16:44
10	07:56 17:03	07:30 17:44	07:45 19:21	06:49 19:59	06:02 20:34	05:39 21:04	06:02 (5) 21:07	06:12 (5) 20:37	06:19 19:43	06:55 18:48	07:30 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	07:43 19:22	06:47 20:01	06:01 20:35	05:39 21:04	06:02 (5) 21:06	06:13 (5) 20:35	06:20 19:41	06:56 18:46	07:31 17:01	07:46 16:44
12	07:56 17:05	07:27 17:47	07:41 19:24	06:45 20:01	06:00 20:37	05:39 21:05	06:02 (5) 21:06	06:14 (5) 20:34	06:21 19:39	06:57 18:45	07:32 16:59	07:12 16:44
13	07:55 17:06	07:25 17:48	07:39 19:25	06:44 20:02	05:59 20:38	05:38 21:05	06:02 (5) 21:05	06:14 (5) 20:32	06:23 19:38	06:58 18:43	07:33 16:58	07:14 16:44
14	07:55 17:07	07:24 17:49	07:38 19:26	06:42 20:03	05:58 20:39	05:38 21:06	06:02 (5) 21:05	06:15 (5) 20:31	06:24 19:36	06:59 18:41	07:35 16:57	07:15 16:44
15	07:54 17:09	07:23 17:51	07:36 19:27	06:40 20:04	05:57 20:40	05:38 21:06	06:02 (5) 21:04	06:16 (5) 20:29	07:00 19:34	07:36 18:40	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	07:34 19:29	06:38 20:05	05:55 20:41	05:38 21:07	06:02 (5) 21:03	06:17 (5) 20:28	07:01 19:32	07:37 18:38	07:18 16:55	07:50 16:44
17	07:53 17:11	07:20 17:53	07:32 19:30	06:37 20:07	05:54 20:42	05:38 21:07	06:02 (5) 21:03	06:18 (5) 20:26	07:03 19:30	07:38 18:36	07:19 16:54	07:51 16:45
18	07:53 17:13	07:18 17:55	07:30 19:31	06:35 20:08	05:53 20:43	05:38 21:08	06:02 (5) 21:02	06:19 (5) 20:25	07:04 19:28	07:40 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	07:29 19:32	06:33 20:09	05:52 20:44	05:38 21:08	06:03 (5) 21:01	06:20 (5) 20:23	07:05 19:26	07:41 18:33	07:22 16:53	07:53 16:45
20	07:51 17:15	07:15 17:58	07:27 19:34	06:32 20:10	05:51 20:45	05:39 21:08	06:04 (5) 21:00	06:23 (5) 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	07:25 19:35	06:30 20:11	05:50 20:46	05:39 21:09	06:04 (5) 21:00	06:32 (5) 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	07:23 19:36	06:28 20:13	05:50 20:47	05:39 21:09	06:04 (5) 20:59	06:33 (5) 20:18	07:08 19:21	07:45 18:28	07:26 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	07:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:04 (5) 20:58	06:34 (5) 20:17	07:10 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	07:19 19:39	06:25 20:15	05:48 20:50	05:39 21:09	06:04 (5) 20:57	06:35 (5) 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:48 17:22	07:07 18:04	07:18 19:40	06:24 20:16	05:47 20:51	05:40 21:09	06:04 (5) 20:56	06:36 (5) 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:56 16:48
26	07:47 17:23	07:05 18:06	07:16 19:41	06:22 20:18	05:46 20:51	05:40 21:09	06:04 (5) 20:55	06:37 (5) 20:12	07:13 19:14	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	07:14 19:42	06:21 20:19	05:46 20:52	05:40 21:09	06:05 (5) 20:54	06:39 (5) 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	07:12 19:44	06:19 20:20	05:45 20:53	05:41 21:09	06:05 (5) 20:53	06:40 (5) 20:08	07:15 19:10	07:53 18:19	07:33 16:47	07:57 16:50
29	07:44 17:27	07:01 18:08	07:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:05 (5) 20:52	06:41 (5) 20:06	07:17 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29	07:00 18:09	07:08 19:46	06:16 20:22	05:43 20:55	05:42 21:09	06:06 (5) 20:51	06:42 (5) 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30	07:00 18:10	07:07 19:47	06:15 20:23	05:43 20:56	05:43 21:09	06:06 (5) 20:49	06:43 (5) 20:03	07:19 18:14	07:57 17:16	07:36 16:46	07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case					67	613	278					

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

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

2009-06-25 Sky 8

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12.08.2009 13:30 / 11

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: H - Receptor 308

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:39 16:45
4	07:57 16:57	07:37 17:36	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:09	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
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7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:42	06:47 19:20	06:50 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:53 19:45	07:29 18:50	07:08 17:03	07:45 16:44
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13	07:55 17:06	07:25 17:48	06:39 19:25	06:44 20:02	05:59 20:38	05:38 21:05	05:51 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:58	07:48 16:44
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15	07:54 17:09	07:23 17:51	06:36 19:27	06:40 20:04	05:57 20:40	05:38 21:06	05:52 21:04	06:25 20:29	07:00 19:34	07:36 18:40	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:55 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:01 19:32	07:37 18:38	07:18 16:55	07:50 16:44
17	07:53 17:11	07:20 17:53	06:32 19:30	06:37 20:07	05:54 20:42	05:38 21:07	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:54	07:51 16:45
18	07:53 17:13	07:18 17:55	06:30 19:31	06:35 20:08	05:53 20:43	05:38 21:08	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	06:29 19:32	06:33 20:09	05:52 20:44	05:38 21:08	05:56 21:01	06:29 20:23	07:05 19:26	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:58	06:27 19:34	06:32 20:10	05:51 20:45	05:39 21:08	05:57 21:00	06:31 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	06:25 19:35	06:30 20:11	05:50 20:46	05:39 21:09	05:58 21:00	06:32 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	06:23 19:36	06:28 20:13	05:50 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:49	05:39 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:48 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:56 16:48
26	07:47 17:23	07:05 18:06	06:16 19:41	06:22 20:18	05:46 20:51	05:40 21:09	06:03 20:55	06:37 20:12	07:13 19:13	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	06:14 19:42	06:21 20:19	05:46 20:52	05:40 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	06:12 19:44	06:19 20:20	05:45 20:53	05:41 21:09	06:05 20:53	06:40 20:08	07:15 19:10	07:53 18:19	07:33 16:47	07:56 16:50
29	07:44 17:27		06:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:17 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:08 19:46	06:16 20:22	05:43 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: I - Receptor 309

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	07:57 16:54	07:41 17:31	16:44 (3) 17:06 (3)	07:00 18:10	07:05 19:48	06:15 20:24
2	07:57 16:55	07:39 17:33	16:44 (3) 17:06 (3)	06:59 18:11	07:03 19:50	06:13 20:58
3	07:57 16:56	07:38 17:34	16:45 (3) 17:06 (3)	06:57 18:12	07:01 19:51	06:12 20:59
4	07:57 16:57	07:37 17:36	16:45 (3) 17:06 (3)	06:55 18:13	06:59 19:52	06:10 20:27
5	07:57 16:58	07:36 17:37	16:45 (3) 17:05 (3)	06:54 18:15	07:14 (1) 07:18 (1)	06:09 20:28
6	07:57 16:59	07:35 17:38	16:46 (3) 17:04 (3)	06:52 18:16	07:12 (1) 07:20 (1)	06:08 20:29
7	07:57 17:00	07:33 17:40	16:48 (3) 17:04 (3)	06:50 18:17	07:10 (1) 07:20 (1)	06:06 20:31
8	07:57 17:01	07:32 17:41	16:49 (3) 17:02 (3)	06:48 19:19	08:09 (1) 08:22 (1)	06:05 20:32
9	07:57 17:02	07:31 17:42	16:52 (3) 17:00 (3)	06:47 19:20	08:07 (1) 08:22 (1)	06:04 20:33
10	07:56 17:03	07:30 17:44	07:45 19:21	06:49 19:59	08:05 (1) 18:59 (4)	06:02 20:34
11	07:56 17:04	07:28 17:45	07:43 19:22	06:47 20:01	08:03 (1) 19:00 (4)	06:01 20:35
12	07:56 17:05	07:27 17:47	07:41 19:24	06:45 20:01	08:02 (1) 19:01 (4)	06:00 20:36
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14	07:55 17:08	07:24 17:49	07:38 19:26	06:42 20:03	08:04 (1) 19:04 (4)	05:58 20:39
15	07:54 17:09	07:23 17:51	07:36 19:27	06:40 20:04	08:05 (1) 19:05 (4)	05:57 20:40
16	07:54 17:10	07:21 17:52	07:34 19:29	06:38 20:05	08:08 (1) 19:06 (4)	05:56 20:41
17	07:53 17:11	07:20 17:54	07:32 19:30	06:37 20:07	18:43 (4) 19:06 (4)	05:54 20:42
18	07:53 17:13	07:18 17:55	07:30 19:31	06:35 20:08	18:42 (4) 19:05 (4)	05:53 20:43
19	07:52 17:14	07:17 17:56	07:29 19:32	06:33 20:09	18:43 (4) 19:05 (4)	05:52 20:44
20	07:51 17:15	07:15 17:58	07:27 19:34	06:32 20:10	18:44 (4) 19:04 (4)	05:51 20:45
21	07:51 17:16	07:13 17:59	07:25 19:35	06:30 20:11	18:44 (4) 19:02 (4)	05:50 20:46
22	07:50 17:18	07:12 18:00	07:23 19:36	06:28 20:13	18:45 (4) 19:00 (4)	05:50 20:47
23	07:49 17:19	07:10 18:02	07:21 19:37	06:27 20:14	18:47 (4) 18:58 (4)	05:49 20:48
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26	07:47 17:23	07:05 18:06	07:16 19:41	06:22 20:18	06:22 20:18	05:46 20:51
27	07:46 17:24	07:04 18:07	07:14 19:42	06:21 20:19	06:21 20:19	05:46 20:52
28	07:45 17:26	07:02 18:08	07:12 19:44	06:19 20:20	06:19 20:20	05:45 20:53
29	07:44 17:27	07:01 18:09	07:10 19:45	06:18 20:21	06:18 20:21	05:44 20:54
30	07:43 17:29	07:00 18:10	07:08 19:46	06:16 20:22	06:16 20:22	05:44 20:55
31	07:42 17:30	06:59 18:11	07:07 19:47	06:15 20:23	06:15 20:23	05:43 20:56
Potential sun hours	289	293	369	403	457	463
Total, worst case	125	161	395	517		

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 13

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: I - Receptor 309

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	July	August	September	October	November	December
1	05:42 21:09	06:09 20:48	06:44 20:01	07:12 (2) 07:19	07:19 18:41 (4)	06:58 17:13
2	05:43 21:09	06:10 20:47	06:45 19:58	07:12 (2) 07:20	07:41 (1) 18:39 (4)	06:59 17:12
3	05:43 21:09	06:11 20:46	06:47 19:56	07:12 (2) 07:21	07:42 (1) 18:37 (4)	07:00 17:10
4	05:44 21:09	06:12 20:45	06:48 19:54	07:13 (2) 07:22	07:43 (1) 18:35 (4)	07:02 17:09
5	05:45 21:09	06:14 20:43	06:49 19:52	07:13 (2) 07:24	07:45 (1) 07:59 (1)	07:03 17:08
6	05:45 21:08	06:15 20:42	06:50 19:50	07:15 (2) 07:25	07:46 (1) 07:57 (1)	07:04 17:07
7	05:46 21:08	06:16 20:41	06:51 19:49	07:16 (2) 07:26	07:47 (1) 07:56 (1)	07:06 17:05
8	05:47 21:08	06:17 20:39	06:52 19:47	07:18 (2) 07:27	07:48 (1) 07:54 (1)	07:07 17:04
9	05:47 21:07	06:18 20:38	06:53 19:45	07:23 (2) 07:29	07:50 (1) 07:52 (1)	07:08 17:03
10	05:48 21:07	06:19 20:37	06:55 19:43	07:26 (2) 07:30	07:52 (1) 07:10	17:02 16:14 (3)
11	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 17:01	16:44 16:15 (3)
12	05:50 21:06	06:21 20:34	06:57 19:39	07:32 18:45	07:12 17:00	16:44 16:15 (3)
13	05:51 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:58	16:44 16:33 (3)
14	05:51 21:05	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	16:44 16:32 (3)
15	05:52 21:04	06:25 20:29	07:00 19:34	07:36 18:40	07:16 16:56	16:44 16:31 (3)
16	05:53 21:03	06:26 20:28	07:01 19:32	07:37 18:38	07:18 16:55	16:44 16:30 (3)
17	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:55	16:44 16:29 (3)
18	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:34	07:20 16:54	16:44 16:28 (3)
19	05:56 21:01	06:29 20:23	07:05 19:26	07:41 18:33	07:22 16:53	16:44 16:27 (3)
20	05:57 21:00	06:31 20:21	07:06 19:25	07:42 18:35 (4)	07:23 16:52	16:44 16:27 (3)
21	05:58 20:59	06:32 20:20	07:07 19:23	07:43 18:31 (4)	07:24 16:51	16:44 16:46
22	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:29 (4)	07:25 16:50	16:44 16:47
23	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:27 (4)	07:27 16:50	16:44 16:47
24	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:27 (4)	07:28 16:49	16:44 16:48
25	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:26 (4)	07:29 16:48	16:44 16:48
26	06:03 20:55	06:37 20:12	07:13 19:13	07:50 18:25 (4)	07:30 16:48	16:44 16:48
27	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:25 (4)	07:32 16:47	16:44 16:50
28	06:05 20:53	06:40 20:08	07:15 19:10	07:53 18:48 (4)	07:33 16:47	16:44 16:50
29	06:06 20:52	06:41 20:06	07:17 19:08	07:54 18:44 (1)	07:34 16:46	16:44 16:51
30	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:43 (4)	07:35 16:46	16:44 16:52
31	06:08 20:49	06:43 20:03	07:19 19:04	07:56 18:43 (4)	07:36 16:46	16:44 16:53
Potential sun hours	469	434	376	342	290	277
Total, worst case		329	442	553	688	827

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 14

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: J - Receptor 310

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:46 19:58	07:20 19:03	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:44 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:39 16:45
4	07:57 16:57	07:37 17:36	06:55 18:14	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:13 20:45	06:48 19:54	07:23 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:41 21:00	05:45 21:09	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 20:30	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:04 17:07	07:42 16:44
7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:54	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:43	06:47 19:20	06:51 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:54 19:45	07:29 18:50	07:08 17:03	07:45 16:44
10	07:56 17:03	07:30 17:44	06:45 19:21	06:49 19:59	06:03 20:34	05:39 21:04	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	06:43 19:22	06:47 20:01	06:01 20:35	05:39 21:04	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 17:01	07:46 16:44
12	07:56 17:05	07:27 17:47	06:41 19:24	06:45 20:01	06:00 20:36	05:39 21:05	05:50 21:06	06:22 20:34	06:57 19:40	07:32 18:45	07:12 17:00	07:47 16:44
13	07:55 17:07	07:25 17:48	06:39 19:25	06:44 20:02	05:59 20:38	05:38 21:05	05:51 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:59	07:48 16:44
14	07:55 17:08	07:24 17:49	06:38 19:26	06:42 20:03	05:58 20:39	05:38 21:06	05:51 21:05	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
15	07:54 17:09	07:23 17:51	06:36 19:28	06:40 20:04	05:57 20:40	05:38 21:06	05:52 21:04	06:25 20:29	07:00 19:34	07:36 18:40	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:56 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:02 19:32	07:37 18:38	07:18 16:56	07:50 16:45
17	07:53 17:11	07:20 17:54	06:32 19:30	06:37 20:07	05:55 20:42	05:38 21:07	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:55	07:51 16:45
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22	07:50 17:18	07:12 18:00	06:23 19:36	06:29 20:13	05:50 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:21	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:49	05:40 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:49
26	07:47 17:23	07:05 18:06	06:16 19:41	06:22 20:18	05:46 20:51	05:40 21:09	06:03 20:55	06:38 20:12	07:13 19:14	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:25	07:04 18:07	06:14 19:42	06:21 20:19	05:46 20:52	05:41 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	06:12 19:44	06:19 20:20	05:45 20:53	05:41 21:09	06:05 20:53	06:40 20:08	07:15 19:10	07:53 18:19	07:33 16:47	07:56 16:51
29	07:44 17:27		06:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:17 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:08 19:46	06:16 20:22	05:44 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:57 18:15		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 15

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: K - Receptor 311

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:46 19:58	07:20 19:03	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:41 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:39 16:45
4	07:57 16:57	07:37 17:36	06:55 18:14	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:13 20:45	06:48 19:54	07:23 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:41 21:00	05:45 21:09	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
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8	07:57 17:01	07:32 17:41	07:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
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10	07:56 17:03	07:30 17:44	07:45 19:21	06:49 19:59	06:03 20:34	05:39 21:04	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 17:02	07:46 16:44
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13	07:55 17:07	07:25 17:48	07:39 19:25	06:44 20:02	05:59 20:38	05:38 21:05	05:51 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:59	07:48 16:44
14	07:55 17:08	07:24 17:49	07:38 19:26	06:42 20:03	05:58 20:39	05:38 21:06	05:51 21:05	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
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17	07:53 17:11	07:20 17:54	07:32 19:30	06:37 20:07	05:55 20:42	05:38 21:07	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:55	07:51 16:45
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19	07:52 17:14	07:17 17:56	07:29 19:32	06:33 20:09	05:52 20:44	05:39 21:08	05:56 21:01	06:30 20:23	07:05 19:27	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:58	07:27 19:34	06:32 20:10	05:52 20:45	05:39 21:08	05:57 21:00	06:31 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:17	07:13 17:59	07:25 19:35	06:30 20:11	05:51 20:46	05:39 21:09	05:58 20:59	06:32 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	07:23 19:36	06:29 20:13	05:50 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	07:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:21	07:09 18:03	07:19 19:39	06:25 20:15	05:48 20:49	05:40 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	07:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:49
26	07:47 17:23	07:05 18:06	07:16 19:41	06:22 20:18	05:46 20:51	05:40 21:09	06:03 20:55	06:38 20:12	07:13 19:14	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:25	07:04 18:07	07:14 19:42	06:21 20:19	05:46 20:52	05:41 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	07:12 19:44	06:19 20:20	05:45 20:53	05:41 21:09	06:05 20:53	06:40 20:08	07:15 19:10	07:53 18:19	07:33 16:47	07:56 16:51
29	07:44 17:27		07:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:17 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:09 19:46	06:16 20:22	05:44 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:57 18:15		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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

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

2009-06-25 Sky 8

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12.08.2009 13:30 / 16

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: L - Receptor 312

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:46 19:58	07:20 19:03	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:41 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:39 16:45
4	07:57 16:57	07:37 17:36	06:55 18:14	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:13 20:45	06:48 19:54	07:23 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:41 21:00	05:45 21:08	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
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31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:57 18:15		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 17

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: M - Receptor 313

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:15		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	278
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 18

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: N - Receptor 314

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:49	05:40 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:48
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31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:15		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	278
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 19

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: O - Receptor 315

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:38 16:45
4	07:57 16:57	07:37 17:36	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
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Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 20

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: P - Receptor 316

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:40 17:31	07:00 18:09	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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Total, worst case												

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

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	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

2009-06-25 Sky 8

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12.08.2009 13:30 / 21

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: Q - Receptor 317

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

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Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 22

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: R - Receptor 318

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:40 17:31	07:00 18:09	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 23

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: S - Receptor 319

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:40 17:31	07:00 18:09	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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30	07:43 17:29		07:08 19:46	06:16 20:22	05:43 20:55	05:42 21:09	06:07 20:50	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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

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

2009-06-25 Sky 8

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12.08.2009 13:30 / 24

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: T - Receptor 320

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:40 17:31	07:00 18:09	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:38 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:53 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:08	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 20:29	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:04 17:06	07:42 16:44
7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:07	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:42	06:46 19:20	06:50 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:53 19:45	07:28 18:50	07:08 17:03	07:45 16:44
10	07:56 17:03	07:29 17:44	07:45 19:21	06:49 19:59	06:02 20:34	05:39 21:04	05:48 21:07	06:19 20:36	06:55 19:43	07:30 18:48	07:10 17:02	07:45 16:44
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12	07:56 17:05	07:27 17:47	07:41 19:24	06:45 20:00	06:00 20:36	05:38 21:05	05:50 21:06	06:21 20:34	06:57 19:39	07:32 18:45	07:12 16:59	07:47 16:44
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29	07:44 17:27		07:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:16 19:08	07:54 18:17	07:34 16:46	07:57 16:51
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31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 25

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: U - Receptor 321

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

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3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:38 16:45
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29	07:44 17:27		07:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:16 19:08	07:54 18:17	07:34 16:46	07:57 16:51
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Total, worst case												

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

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Project:

2009-06-25 Sky 8

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12.08.2009 13:30 / 26

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: V - Receptor 323

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

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16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:55 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:01 19:32	07:37 18:38	07:17 16:55	07:50 16:44
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31	07:41 17:30		06:06 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 27

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: W - Receptor 324

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

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2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:49	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:58	05:43 21:09	06:11 20:46	06:46 19:56	07:21 19:01	07:00 17:10	07:38 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:44	06:48 19:54	07:22 18:59	07:02 17:09	07:39 16:44
5	07:57 16:58	07:36 17:37	06:53 18:15	06:57 19:53	06:09 20:28	05:40 21:00	05:44 21:08	06:13 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
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Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 28

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: X - Receptor 325

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:40 17:31	07:00 18:09	07:05 19:48	06:14 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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Total, worst case												

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Project:

2009-06-25 Sky 8

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12.08.2009 13:30 / 29

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: Y - Receptor 326

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
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	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:40 17:31	07:00 18:09	07:05 19:48	06:14 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 30

Licensed user:

**SeeBA Energiesysteme**  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: Z - Receptor 327

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:57 16:54	07:41 17:31	07:00 18:09	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45	
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Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277	
Total, worst case				82				86					

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

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

2009-06-25 Sky 8

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12.08.2009 13:30 / 31

Licensed user:

**SeeBA Energiesysteme**  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AA - Receptor 328

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:09	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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19	07:52 17:14	07:17 17:56	06:28 19:32	06:33 20:09	05:52 20:44	05:38 21:08	05:56 21:01	06:29 20:23	07:05 19:26	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:57	06:27 19:34	06:32 20:10	05:51 20:45	05:38 21:08	05:57 21:00	06:30 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	06:25 19:35	06:30 20:11	05:50 20:46	05:39 21:09	05:58 20:59	06:32 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	06:23 19:36	06:28 20:13	05:49 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:00 20:58	06:34 20:17	07:09 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:49	05:39 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:48
26	07:47 17:23	07:05 18:06	06:16 19:41	06:22 20:17	05:46 20:51	05:40 21:09	06:03 20:55	06:37 20:12	07:13 19:13	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	06:14 19:42	06:21 20:19	05:45 20:52	05:40 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	06:12 19:43	06:19 20:20	05:45 20:53	05:41 21:09	06:05 20:53	06:40 20:08	07:15 19:10	07:53 18:19	07:33 16:47	07:56 16:50
29	07:44 17:27		06:10 19:45	06:17 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:16 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:28		06:08 19:46	06:16 20:22	05:43 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		06:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	288	293	369	403	457	463	469	435	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 32

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AB - Receptor 329

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:38 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:08	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 20:29	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:04 17:06	07:42 16:44
7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:42	06:47 19:20	06:50 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:53 19:45	07:28 18:50	07:08 17:03	07:45 16:44
10	07:56 17:03	07:30 17:44	06:45 19:21	06:49 19:59	06:02 20:34	05:39 21:04	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	06:43 19:22	06:47 20:01	06:01 20:35	05:39 21:04	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 17:01	07:46 16:44
12	07:56 17:05	07:27 17:47	06:41 19:24	06:45 20:01	06:00 20:36	05:38 21:05	05:50 21:06	06:21 20:34	06:57 19:39	07:32 18:45	07:12 16:59	07:47 16:44
13	07:55 17:06	07:25 17:48	06:39 19:25	06:43 20:02	05:59 20:38	05:38 21:05	05:50 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:58	07:48 16:44
14	07:55 17:08	07:24 17:49	06:38 19:26	06:42 20:03	05:58 20:39	05:38 21:06	05:51 21:02	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
15	07:54 17:09	07:23 17:51	06:36 19:27	06:40 20:04	05:57 20:40	05:38 21:06	05:52 21:04	06:25 20:29	07:00 19:34	07:36 18:39	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:55 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:01 19:32	07:37 18:38	07:18 16:55	07:50 16:44
17	07:53 17:11	07:20 17:53	06:32 19:30	06:37 20:07	05:54 20:42	05:38 21:07	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:54	07:51 16:45
18	07:53 17:13	07:18 17:55	06:30 19:31	06:35 20:08	05:53 20:43	05:38 21:08	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	06:29 19:32	06:33 20:09	05:52 20:44	05:38 21:08	05:56 21:01	06:29 20:23	07:05 19:26	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:58	06:27 19:34	06:32 20:10	05:51 20:45	05:39 21:08	05:57 21:00	06:31 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	06:25 19:35	06:30 20:11	05:50 20:46	05:39 21:08	05:58 20:59	06:32 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	06:23 19:36	06:28 20:13	05:50 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:00 20:58	06:34 20:17	07:09 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:49	05:39 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:48
26	07:47 17:23	07:05 18:06	06:16 19:41	06:22 20:17	05:46 20:51	05:40 21:09	06:03 20:55	06:37 20:12	07:13 19:13	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	06:14 19:42	06:21 20:19	05:45 20:52	05:40 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	06:12 19:43	06:19 20:20	05:45 20:53	05:41 21:09	06:05 20:53	06:40 20:08	07:15 19:10	07:52 18:19	07:33 16:47	07:56 16:50
29	07:44 17:27		06:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:16 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:08 19:46	06:16 20:22	05:43 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 33

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AC - Receptor 330

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	16:17 (3) 17:31	07:41 17:03 (4)	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13
2	07:57 16:55	16:18 (3) 17:33	07:39 17:03 (4)	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12
3	07:57 16:56	16:20 (3) 17:34	07:38 17:03 (4)	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:41 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10
4	07:57 16:57	16:22 (3) 17:37	07:37 17:03 (4)	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09
5	07:57 16:58	16:24 (3) 17:35	07:35 17:03 (4)	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:08	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08
6	07:57 16:59	16:25 (3) 17:36	07:34 17:04 (4)	06:52 18:16	06:56 19:54	06:08 20:29	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:04 17:06
7	07:57 17:00	16:26 (3) 17:37	07:33 17:05 (4)	06:50 18:17	06:54 19:54	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 17:05
8	07:57 17:01	16:27 (3) 17:38	07:32 17:06 (4)	07:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04
9	07:57 17:02	16:28 (3) 17:39	07:31 17:07 (4)	07:47 19:20	06:50 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:53 19:45	07:28 18:50	07:08 17:03
10	07:56 17:03	16:29 (3) 17:40	07:30 17:08 (4)	07:45 19:21	06:49 19:59	06:02 20:34	05:39 21:04	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 17:02
11	07:56 17:04	16:30 (3) 17:41	07:29 17:09 (4)	07:44 19:22	06:47 20:01	06:01 20:35	05:39 21:04	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 17:01
12	07:56 17:05	16:31 (3) 17:42	07:28 17:10 (4)	07:43 19:23	06:46 20:02	06:00 20:36	05:38 21:05	05:50 21:06	06:21 20:34	06:57 19:39	07:32 18:45	07:12 17:00
13	07:55 17:06	16:32 (3) 17:43	07:27 17:11 (4)	07:42 19:24	06:45 20:03	06:00 20:37	05:38 21:06	05:51 21:07	06:23 20:33	06:58 19:38	07:33 18:43	07:14 17:00
14	07:55 17:08	16:33 (3) 17:44	07:26 17:12 (4)	07:41 19:25	06:44 20:04	06:00 20:38	05:38 21:05	05:51 21:06	06:24 20:32	06:59 19:38	07:35 18:43	07:15 17:00
15	07:54 17:09	16:34 (3) 17:45	07:25 17:13 (4)	07:40 19:26	06:43 20:05	06:00 20:39	05:38 21:06	05:52 21:07	06:25 20:31	07:00 19:36	07:36 18:41	07:16 17:00
16	07:54 17:10	16:35 (3) 17:46	07:24 17:14 (4)	07:39 19:27	06:42 20:06	06:00 20:40	05:38 21:06	05:53 21:04	06:26 20:29	07:01 19:34	07:37 18:39	07:18 17:00
17	07:53 17:11	16:36 (3) 17:47	07:23 17:15 (4)	07:38 19:28	06:41 20:07	06:00 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:02 19:32	07:38 18:38	07:19 17:00
18	07:53 17:13	16:37 (3) 17:48	07:22 17:16 (4)	07:37 19:29	06:40 20:08	06:00 20:42	05:38 21:07	05:54 21:04	06:27 20:26	07:03 19:30	07:38 18:36	07:20 17:00
19	07:52 17:14	16:38 (3) 17:49	07:21 17:17 (4)	07:36 19:30	06:39 20:09	06:00 20:43	05:38 21:08	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:34	07:21 17:00
20	07:51 17:15	16:39 (3) 17:50	07:20 17:18 (4)	07:35 19:31	06:38 20:10	06:00 20:44	05:38 21:08	05:56 21:01	06:29 20:23	07:05 19:26	07:41 18:33	07:22 17:00
21	07:51 17:16	16:40 (3) 17:51	07:19 17:19 (4)	07:34 19:32	06:37 20:11	06:00 20:45	05:38 21:08	05:57 21:00	06:31 20:21	07:06 19:25	07:42 18:31	07:23 17:00
22	07:50 17:18	16:41 (3) 17:52	07:18 17:20 (4)	07:33 19:33	06:36 20:12	06:00 20:46	05:38 21:09	05:58 20:59	06:32 20:20	07:07 19:23	07:43 18:30	07:24 17:00
23	07:49 17:19	16:42 (3) 17:53	07:17 17:21 (4)	07:32 19:34	06:35 20:13	06:00 20:47	05:38 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:25 17:00
24	07:48 17:20	16:43 (3) 17:54	07:16 17:22 (4)	07:31 19:35	06:34 20:14	06:00 20:48	05:38 21:09	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:26	07:27 17:00
25	07:47 17:22	16:44 (3) 17:55	07:15 17:23 (4)	07:30 19:36	06:33 20:15	06:00 20:49	05:38 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 17:00
26	07:47 17:23	16:45 (3) 17:56	07:14 17:24 (4)	07:29 19:37	06:32 20:16	06:00 20:50	05:38 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 17:00
27	07:46 17:24	16:46 (3) 17:57	07:13 17:25 (4)	07:28 19:38	06:31 20:17	06:00 20:51	05:38 21:09	06:03 20:55	06:37 20:12	07:13 19:13	07:50 18:22	07:30 17:00
28	07:45 17:26	16:47 (3) 17:58	07:12 17:26 (4)	07:27 19:39	06:30 20:18	06:00 20:52	05:38 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 17:00
29	07:44 17:27	16:48 (3) 17:59	07:11 17:27 (4)	07:26 19:40	06:29 20:19	06:00 20:53	05:38 21:09	06:05 20:52	06:40 20:06	07:15 19:08	07:53 18:17	07:33 17:00
30	07:43 17:29	16:49 (3) 18:00	07:10 17:28 (4)	07:25 19:41	06:28 20:20	06:00 20:53	05:38 21:09	06:07 20:53	06:42 20:08	07:18 19:10	07:55 18:19	07:35 17:00
31	07:42 17:30	16:50 (3) 18:01	07:09 17:29 (4)	07:24 19:42	06:27 20:21	06:00 20:55	05:38 21:09	06:08 20:51	06:43 20:05	07:19 19:06	07:56 18:16	07:36 17:00
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case	24	56	60	60	60	60	60	60	60	60	60	176

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

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

2009-06-25 Sky 8

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12.08.2009 13:30 / 34

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AD - Receptor 331

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:39 16:45
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Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 35

Licensed user:

**SeeBA Energiesysteme**  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AE - Receptor 332

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 36

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AF - Receptor 333

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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25	07:47 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:48
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31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 37

Licensed user:

**SeeBA Energiesysteme**  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AG - Receptor 334

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:40 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:46 20:00	07:20 19:03	06:59 17:12	07:38 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:01 17:10	07:39 16:45
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5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:09	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
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Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 38

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AH - Receptor 335

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

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Project:

2009-06-25 Sky 8

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12.08.2009 13:30 / 39

Licensed user:

SeeBA Energiesysteme  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AI - Receptor 336

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
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Potential sun hours	288	293	369	403	457	463	469	435	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 40

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AJ - Receptor 337

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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Potential sun hours	288	293	369	403	457	463	469	435	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 41

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AK - Receptor 338

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
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Potential sun hours	288	293	369	403	457	463	469	435	376	342	290	277
Total, worst case												

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:

2009-06-25 Sky 8

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12.08.2009 13:30 / 42

Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AL - Receptor 339

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:40 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:01 17:10	07:39 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:09	06:13 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 20:30	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:05 17:06	07:42 16:44
7	07:57 17:00	07:34 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:42	06:47 19:20	06:50 19:58	06:04 20:33	05:39 21:03	05:47 21:07	06:18 20:38	06:53 19:45	07:29 18:50	07:09 17:03	07:45 16:44
10	07:56 17:03	07:30 17:44	06:45 19:21	06:49 19:59	06:02 20:34	05:39 21:04	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	06:43 19:22	06:47 20:01	06:01 20:35	05:39 21:04	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 17:01	07:47 16:44
12	07:56 17:05	07:27 17:47	06:41 19:24	06:45 20:01	06:00 20:37	05:38 21:05	05:50 21:06	06:21 20:34	06:57 19:39	07:32 18:45	07:13 16:59	07:47 16:44
13	07:55 17:06	07:25 17:48	06:39 19:25	06:43 20:02	05:59 20:38	05:38 21:05	05:50 21:02	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:58	07:48 16:44
14	07:55 17:08	07:24 17:49	06:38 19:26	06:42 20:03	05:58 20:39	05:38 21:06	05:51 21:05	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
15	07:54 17:09	07:23 17:51	06:36 19:27	06:40 20:04	05:57 20:40	05:38 21:06	05:52 21:04	06:25 20:29	07:00 19:34	07:36 18:39	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:55 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:01 19:32	07:37 18:38	07:17 16:55	07:51 16:44
17	07:53 17:11	07:20 17:53	06:32 19:30	06:37 20:07	05:54 20:42	05:38 21:07	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:54	07:51 16:45
18	07:53 17:13	07:18 17:55	06:30 19:31	06:35 20:08	05:53 20:43	05:38 21:08	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	06:29 19:32	06:33 20:09	05:52 20:44	05:38 21:08	05:56 21:01	06:29 20:23	07:05 19:26	07:41 18:33	07:22 16:53	07:53 16:45
20	07:51 17:15	07:15 17:58	06:27 19:34	06:32 20:10	05:51 20:45	05:38 21:08	05:57 21:00	06:31 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	06:25 19:35	06:30 20:11	05:50 20:46	05:39 21:09	05:58 21:00	06:32 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	06:23 19:36	06:28 20:13	05:49 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:26 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:49	05:39 21:09	06:00 20:58	06:34 20:17	07:10 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:50	05:39 21:09	06:01 20:57	06:35 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:48 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:51	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:56 16:48
26	07:47 17:23	07:05 18:06	06:16 19:41	06:22 20:18	05:46 20:52	05:40 21:09	06:03 20:55	06:37 20:12	07:13 19:13	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	06:14 19:42	06:21 20:19	05:45 20:52	05:40 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	06:12 19:43	06:19 20:20	05:45 20:53	05:41 21:10	06:05 20:53	06:40 20:08	07:15 19:10	07:53 18:19	07:33 16:47	07:57 16:50
29	07:44 17:27		06:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:17 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:08 19:46	06:16 20:22	05:43 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:57 18:14		07:57 16:53
Potential sun hours	288	293	369	403	457	463	469	435	376	342	290	277
Total, worst case												

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:

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Licensed user:

SeeBA Energiesysteme

Tielger Allee 60

DE-32351 Stemwede

+49 (0) 5773 912 222

wla

Calculated:

12.08.2009 13:08/2.6.1.252

## SHADOW - Calendar

Calculation: 2009-08-12 5x E82, 78,3m Shadow receptor: AM - Receptor 340

### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:39 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:08	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 20:29	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:04 17:06	07:42 16:44
7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
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10	07:56 17:03	07:30 17:44	06:45 19:21	06:49 19:59	06:02 20:34	05:39 21:04	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	06:43 19:22	06:47 20:01	06:01 20:35	05:39 21:04	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 17:01	07:46 16:44
12	07:56 17:05	07:27 17:47	06:41 19:24	06:45 20:01	06:00 20:36	05:38 21:05	05:50 21:06	06:21 20:34	06:57 19:39	07:32 18:45	07:12 16:59	07:47 16:44
13	07:55 17:06	07:25 17:48	06:39 19:25	06:43 20:02	05:59 20:38	05:38 21:05	05:50 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:58	07:48 16:44
14	07:55 17:08	07:24 17:49	06:38 19:26	06:42 20:03	05:58 20:39	05:38 21:06	05:51 21:02	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
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16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:55 20:41	05:38 21:07	05:53 21:03	06:26 20:28	07:01 19:32	07:37 18:38	07:17 16:55	07:50 16:44
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18	07:53 17:13	07:18 17:55	06:30 19:31	06:35 20:08	05:53 20:43	05:38 21:08	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	06:29 19:32	06:33 20:09	05:52 20:44	05:38 21:08	05:56 21:01	06:29 20:23	07:05 19:26	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:58	06:27 19:34	06:32 20:10	05:51 20:45	05:39 21:08	05:57 21:00	06:31 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	06:25 19:35	06:30 20:11	05:50 20:46	05:39 21:08	05:58 20:59	06:32 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	06:23 19:36	06:28 20:13	05:50 20:47	05:39 21:09	05:59 20:59	06:33 20:18	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:48	05:39 21:09	06:00 20:58	06:34 20:17	07:09 19:19	07:46 18:26	07:27 16:50	07:55 16:47
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25	07:47 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 20:50	05:40 21:09	06:02 20:56	06:36 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:48
26	07:47 17:23	07:05 18:06	06:16 19:41	06:22 20:17	05:46 20:51	05:40 21:09	06:03 20:55	06:37 20:12	07:13 19:13	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	06:14 19:42	06:21 20:19	05:45 20:52	05:40 21:09	06:04 20:54	06:39 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	06:12 19:43	06:19 20:20	05:45 20:53	05:41 21:09	06:05 20:53	06:40 20:08	07:15 19:10	07:52 18:19	07:33 16:47	07:56 16:50
29	07:44 17:27		06:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09	06:06 20:52	06:41 20:06	07:16 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:08 19:46	06:16 20:22	05:43 20:55	05:42 21:09	06:07 20:51	06:42 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47		05:43 20:56		06:08 20:49	06:43 20:03		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Total, worst case												

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Project:

2009-06-25 Sky 8

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SeeBA Energiesysteme

Tielger Allee 60

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wla

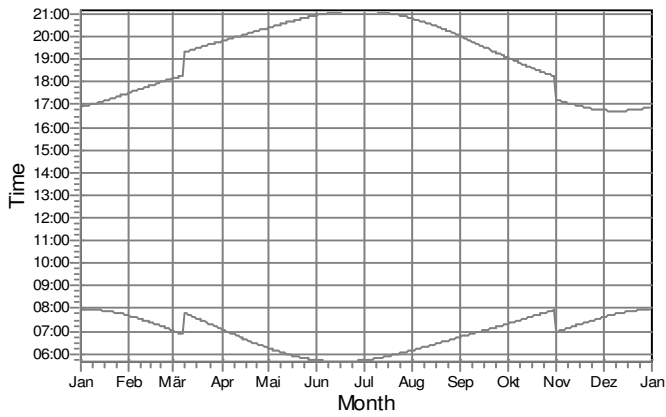
Calculated:

12.08.2009 13:08/2.6.1.252

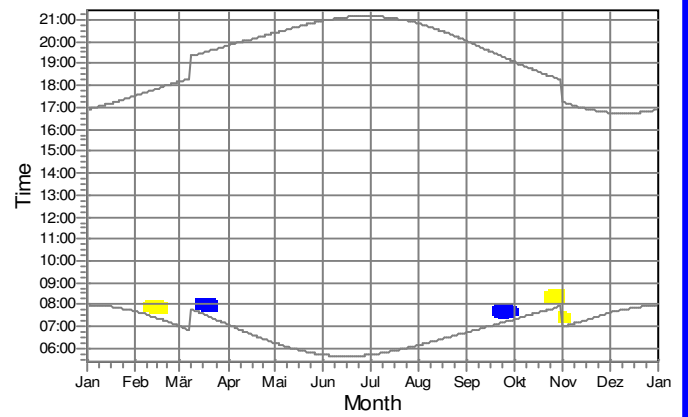
### SHADOW - Calendar, graphical

Calculation: 2009-08-12 5x E82, 78,3m

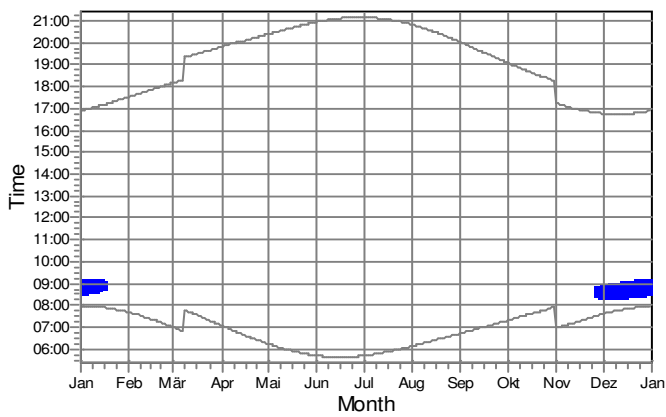
A: Receptor 300



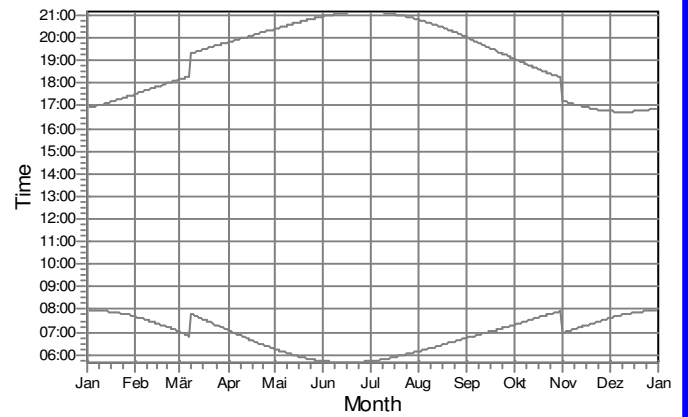
B: Receptor 302



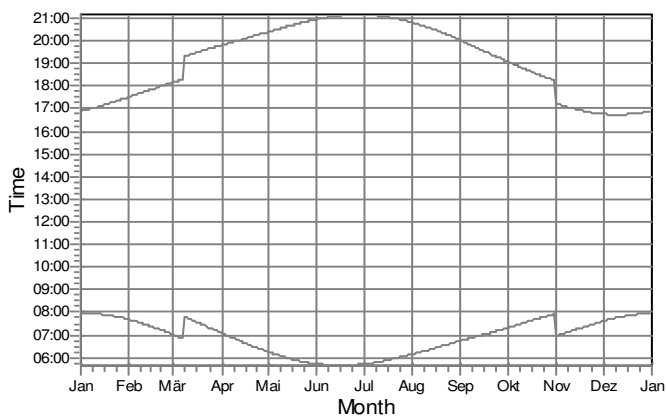
C: Receptor 303



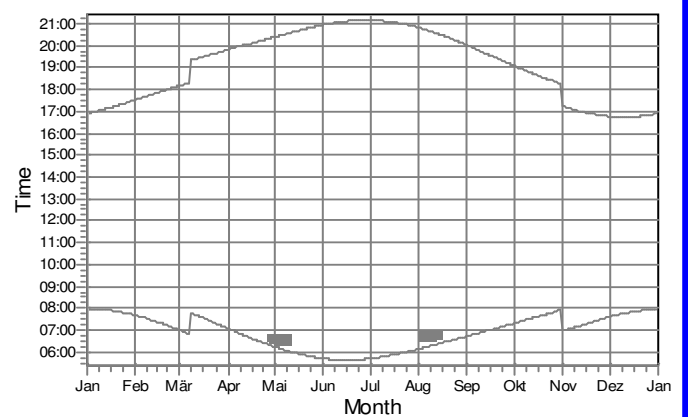
D: Receptor 304



E: Receptor 305



F: Receptor 306



WTGs



3: Turbine 3



4: Turbine 4



5: Turbine 5

Project:

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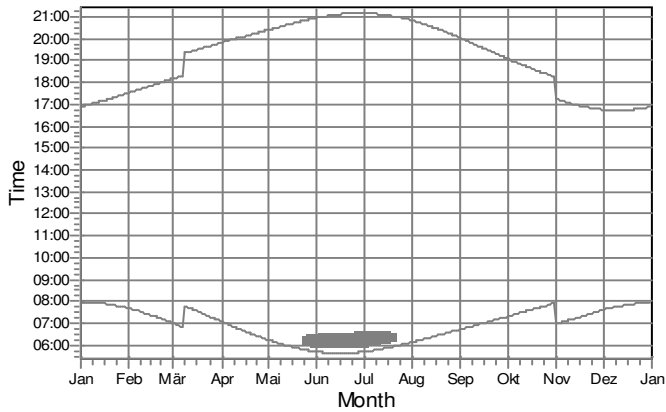
Calculated:

12.08.2009 13:08/2.6.1.252

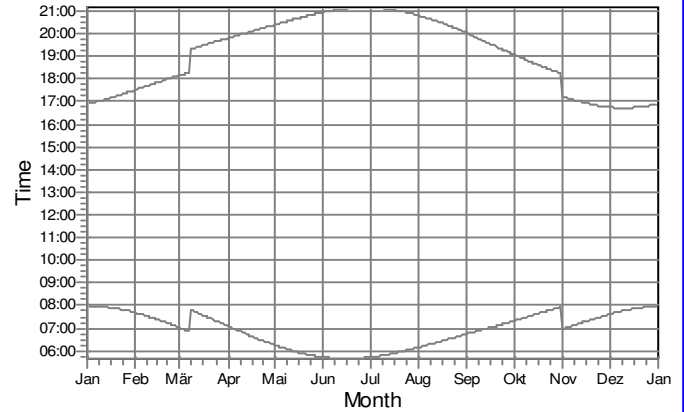
### SHADOW - Calendar, graphical

Calculation: 2009-08-12 5x E82, 78,3m

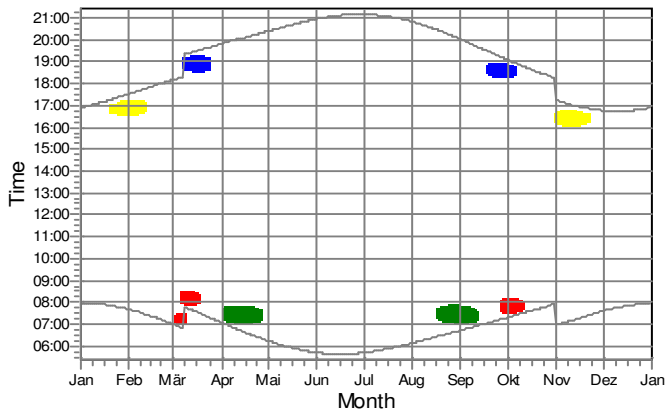
G: Receptor 307



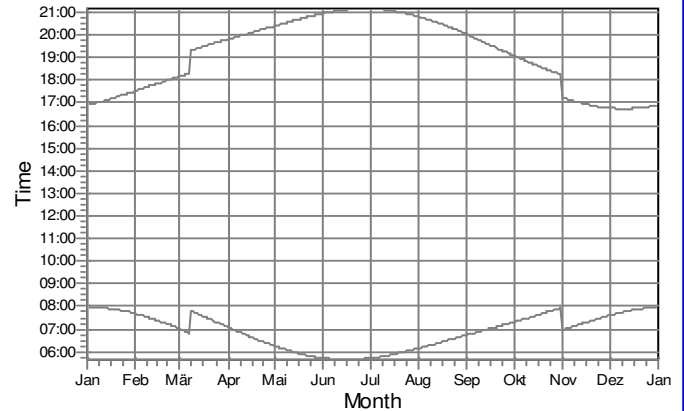
H: Receptor 308



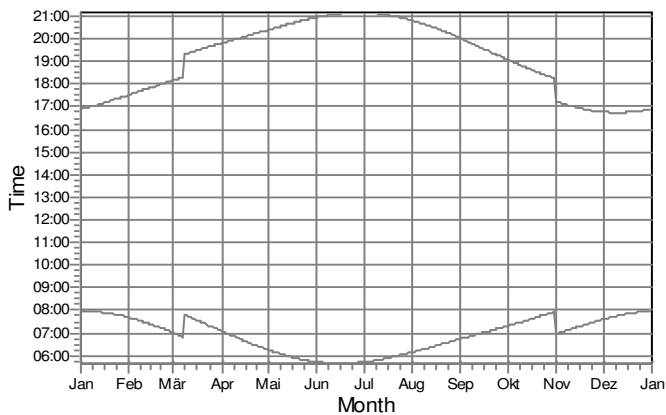
I: Receptor 309



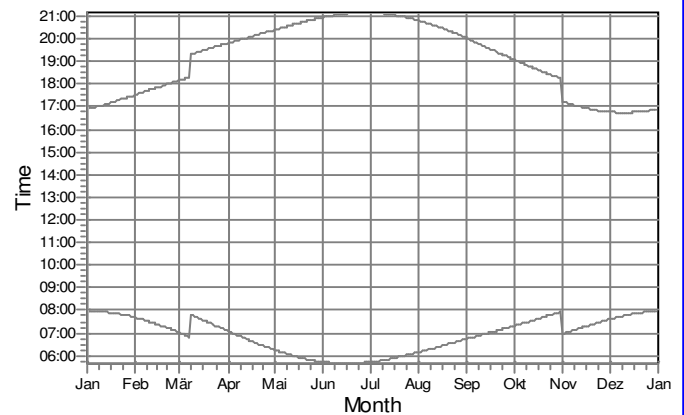
J: Receptor 310








K: Receptor 311



L: Receptor 312



WTGs

- |   |              |   |              |   |              |
|---|--------------|---|--------------|---|--------------|
|  | 1: Turbine 1 |  | 3: Turbine 3 |  | 5: Turbine 5 |
|  | 2: Turbine 2 |  | 4: Turbine 4 |   |              |

Project:

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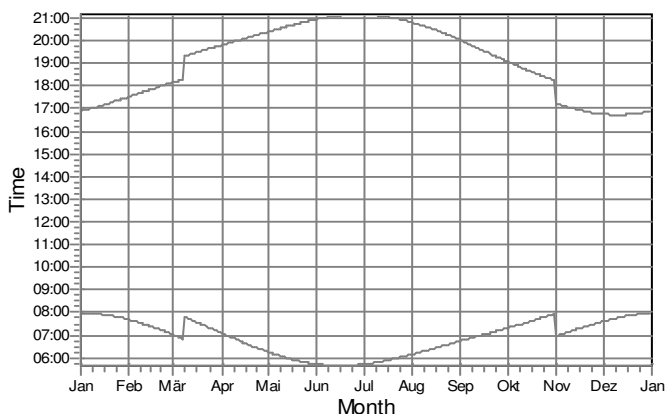
Calculated:

12.08.2009 13:08/2.6.1.252

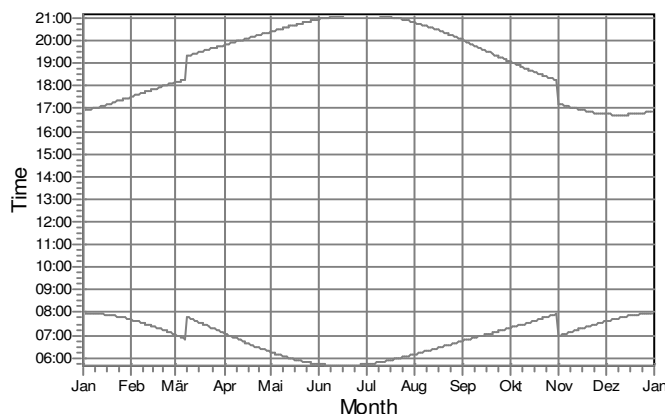
### SHADOW - Calendar, graphical

Calculation: 2009-08-12 5x E82, 78,3m

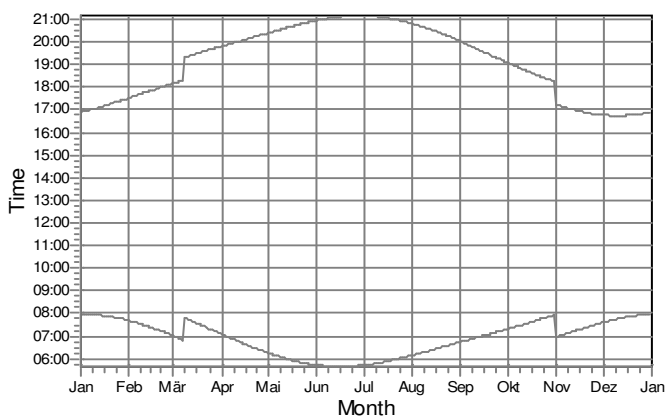
M: Receptor 313



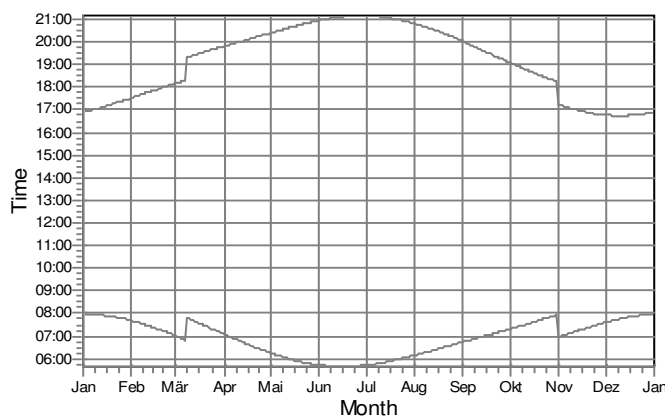
N: Receptor 314



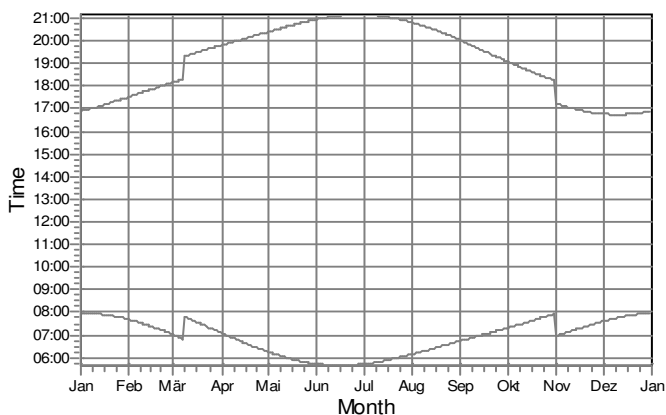
O: Receptor 315



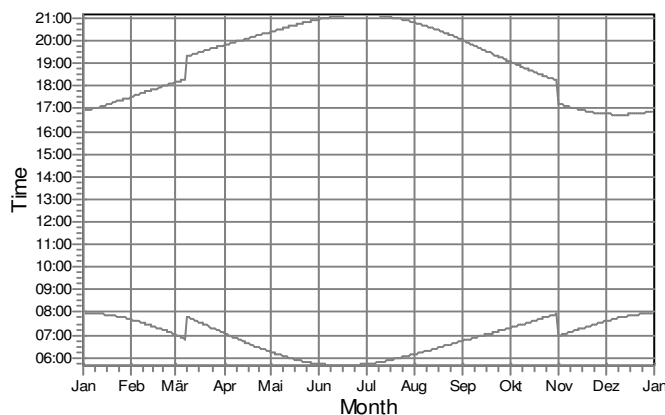
P: Receptor 316



Q: Receptor 317



R: Receptor 318



WTGs

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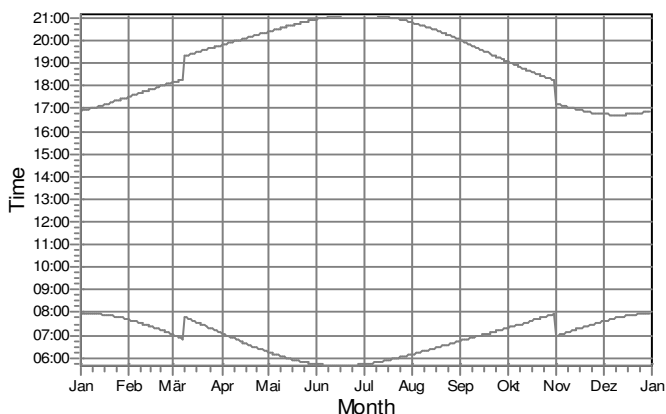
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12.08.2009 13:08/2.6.1.252

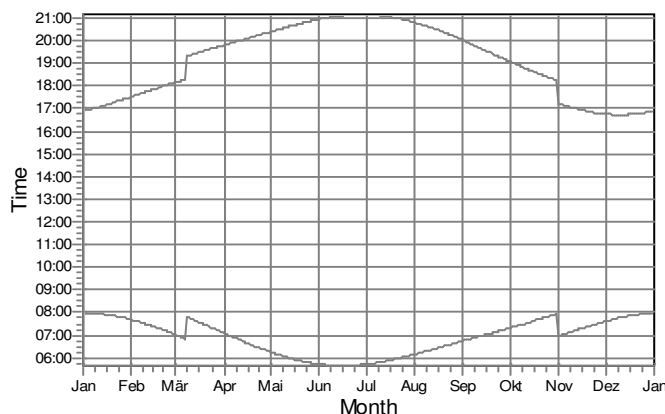
### SHADOW - Calendar, graphical

Calculation: 2009-08-12 5x E82, 78,3m

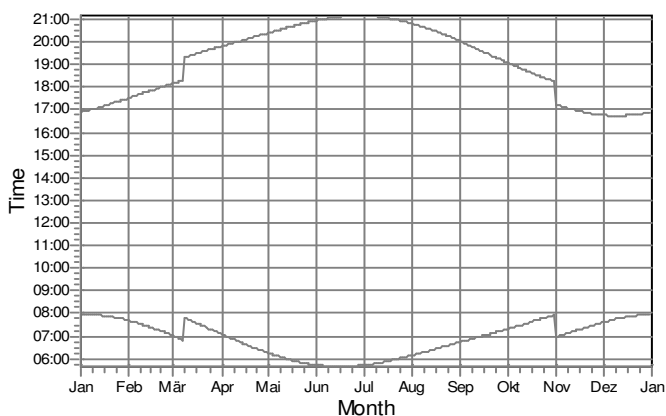
S: Receptor 319



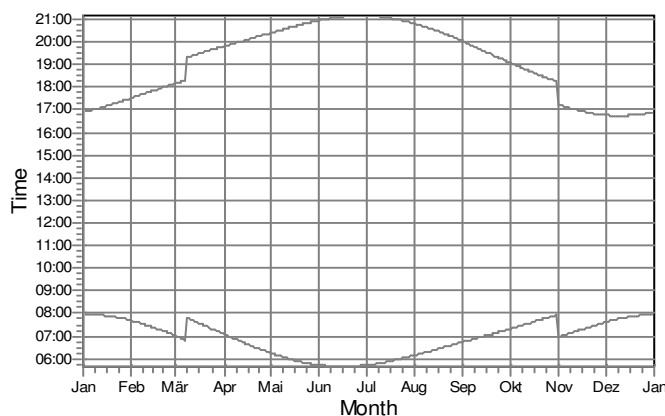
T: Receptor 320



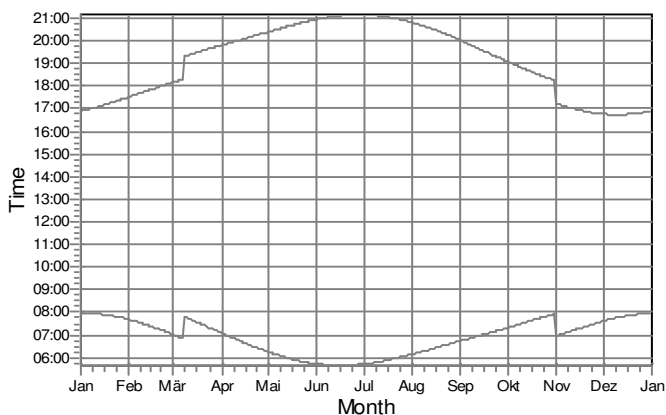
U: Receptor 321



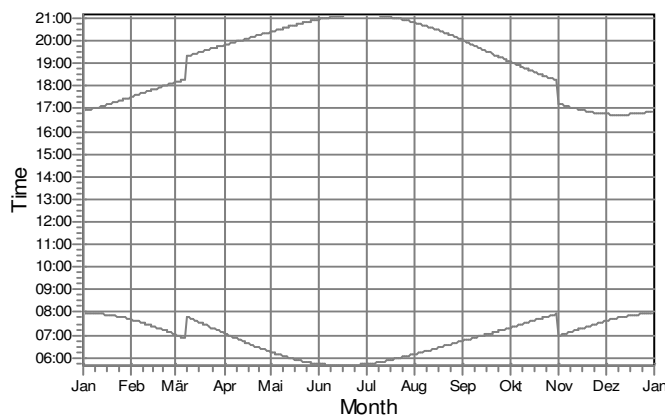
V: Receptor 323



W: Receptor 324



X: Receptor 325



WTGs

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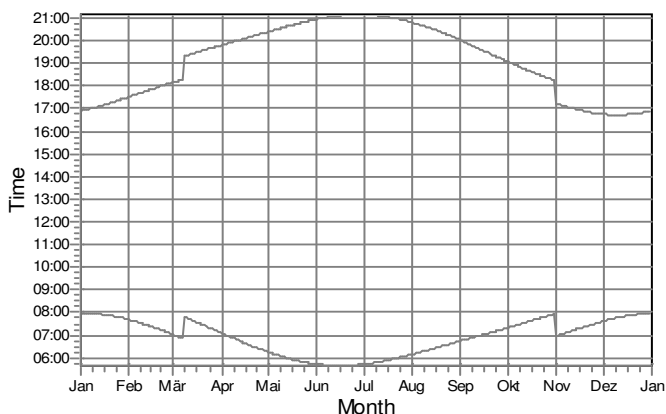
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12.08.2009 13:08/2.6.1.252

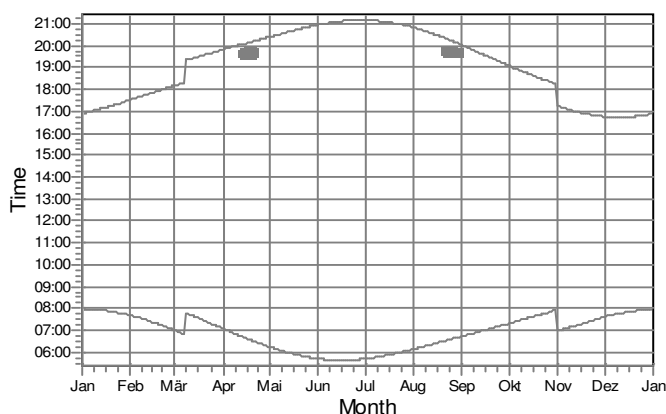
### SHADOW - Calendar, graphical

Calculation: 2009-08-12 5x E82, 78,3m

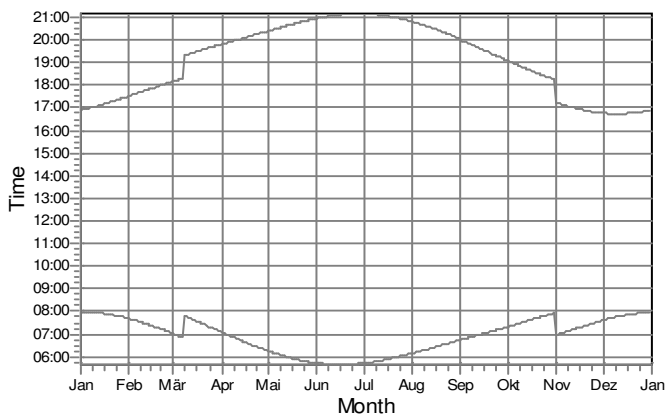
Y: Receptor 326



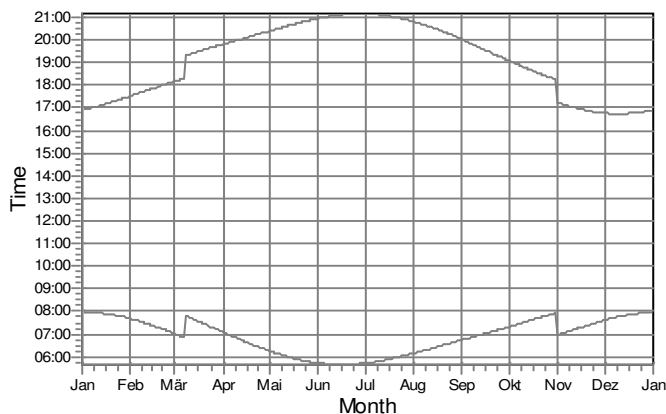
Z: Receptor 327



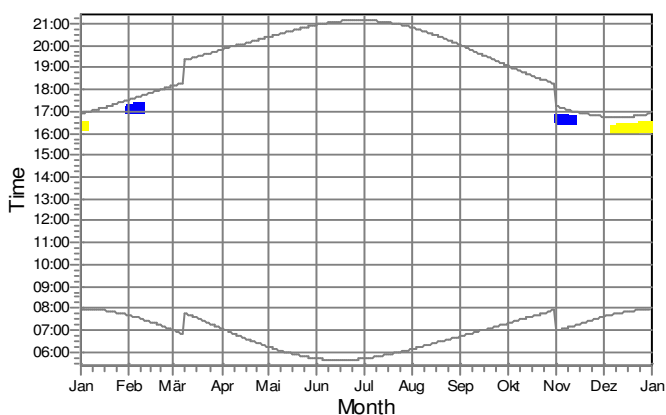
AA: Receptor 328



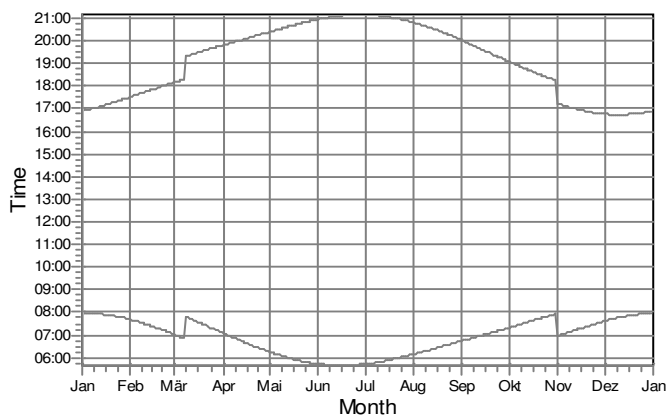
AB: Receptor 329



AC: Receptor 330



AD: Receptor 331



WTGs



3: Turbine 3



4: Turbine 4



5: Turbine 5

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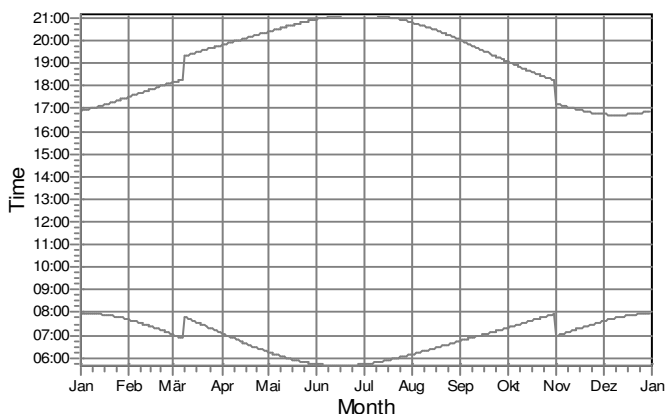
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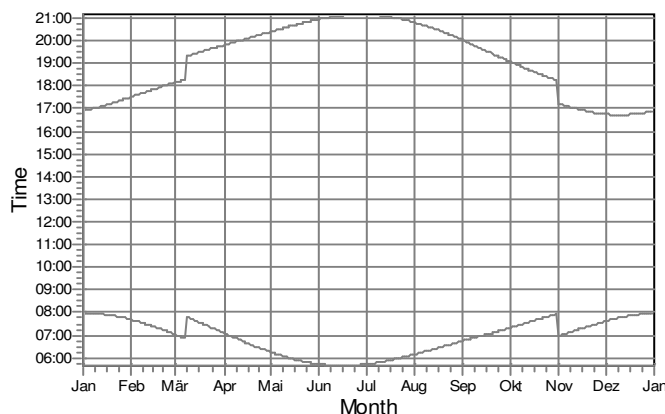
### SHADOW - Calendar, graphical

Calculation: 2009-08-12 5x E82, 78,3m

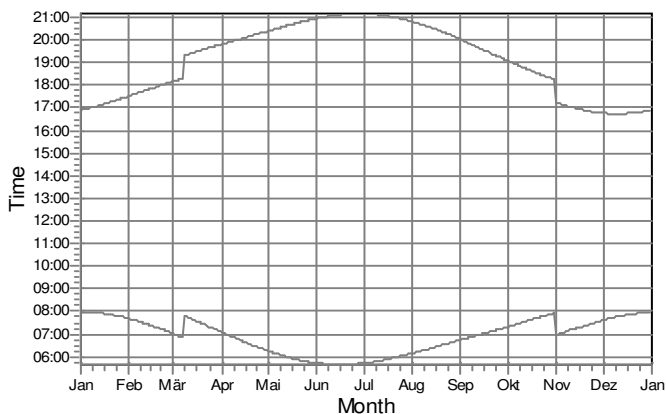
AE: Receptor 332



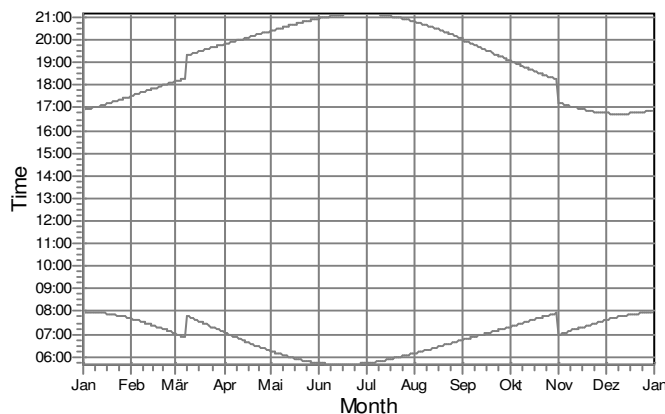
AF: Receptor 333



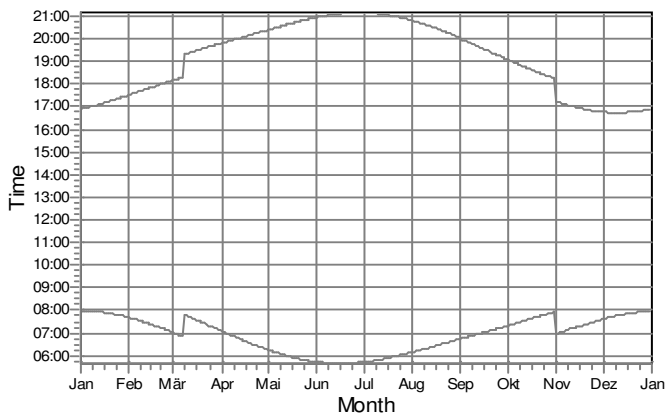
AG: Receptor 334



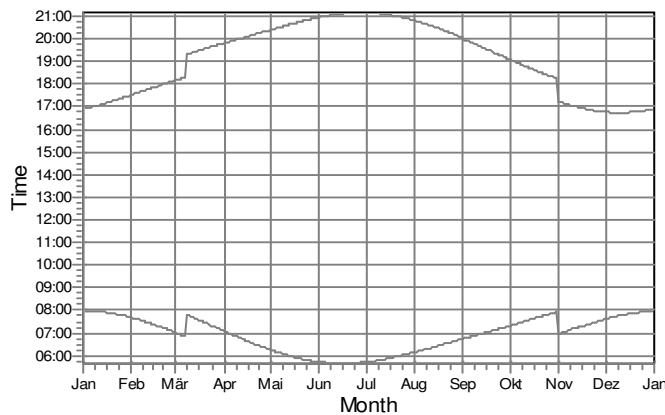
AH: Receptor 335



AI: Receptor 336



AJ: Receptor 337



WTGs

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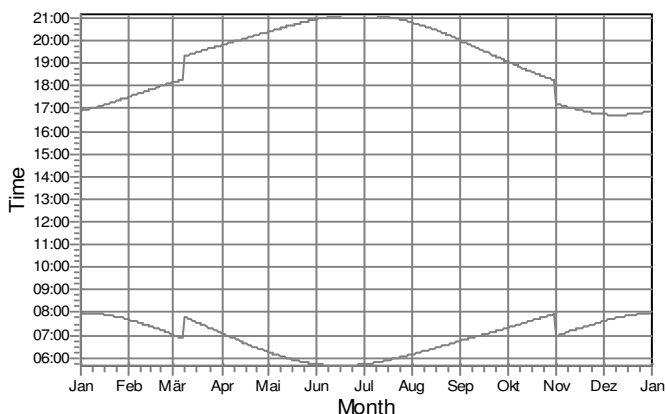
Calculated:

12.08.2009 13:08/2.6.1.252

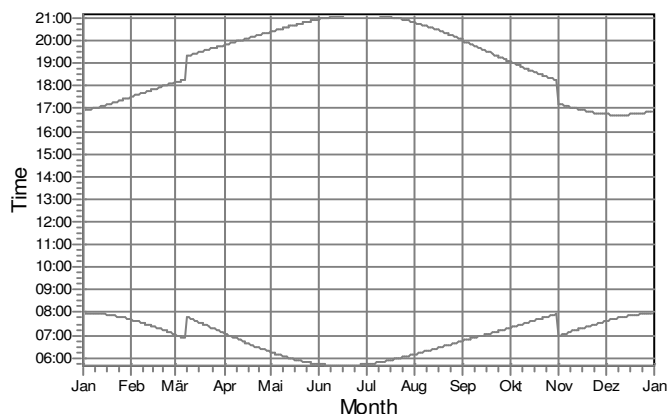
### SHADOW - Calendar, graphical

Calculation: 2009-08-12 5x E82, 78,3m

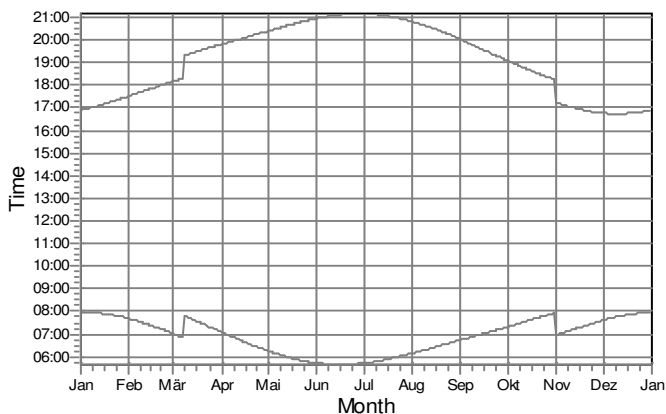
AK: Receptor 338



AL: Receptor 339



AM: Receptor 340



WTGs

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Calculated:

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### SHADOW - Calendar per WTG

Calculation: 2009-08-12 5x E82, 78,3m WTG: 1 - Turbine 1

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:38 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	06:10 20:27	05:41 20:59	05:44 21:09	06:12 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00	05:45 21:08	06:14 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 20:29	05:40 21:01	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:04 17:06	07:42 16:44
7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	07:48 19:19	08:09-08:22/13	06:52 19:57	06:05 20:32	05:39 21:02	06:17 21:07	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:42	07:46 19:20	08:07-08:22/15	06:50 19:58	06:04 20:33	05:39 21:03	06:18 21:07	06:53 19:45	07:28 18:50	07:08 17:03	07:45 16:44
10	07:56 17:03	07:30 17:44	07:45 19:21	08:05-08:21/16	06:49 19:59	06:02 20:34	05:39 21:04	06:19 21:07	06:55 19:43	07:30 18:48	07:10 17:02	07:45 16:44
11	07:56 17:04	07:28 17:45	07:43 19:22	08:03-08:21/18	06:47 20:00	06:01 20:35	05:39 21:04	06:20 21:06	06:56 19:41	07:31 18:46	07:11 17:01	07:46 16:44
12	07:56 17:05	07:27 17:47	07:41 19:24	08:02-08:20/18	06:45 20:00	06:00 20:36	05:38 21:05	06:21 21:06	06:57 19:39	07:32 18:45	07:12 16:59	07:47 16:44
13	07:55 17:06	07:25 17:48	07:39 19:25	08:02-08:19/17	06:43 20:02	05:59 20:38	05:38 21:05	06:23 21:05	06:58 19:38	07:33 18:43	07:14 16:58	07:48 16:44
14	07:55 17:08	07:24 17:49	07:38 19:26	08:04-08:18/14	06:42 20:03	05:58 20:39	05:38 21:06	06:24 21:05	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
15	07:54 17:09	07:23 17:51	07:36 19:27	08:05-08:16/11	06:40 20:04	05:57 20:40	05:38 21:06	06:25 21:04	07:00 19:34	07:36 18:39	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	07:34 19:29	08:08-08:12/4	06:38 20:05	05:55 20:41	05:38 21:07	06:26 21:03	07:01 19:32	07:37 18:38	07:18 16:55	07:50 16:44
17	07:53 17:11	07:20 17:53	07:32 19:30		06:37 20:07	05:54 20:42	05:38 21:07	06:27 21:03	07:03 19:30	07:38 18:36	07:19 16:54	07:51 16:45
18	07:53 17:13	07:18 17:55	07:30 19:31		06:35 20:08	05:53 20:43	05:38 21:08	06:28 21:02	07:04 19:28	07:40 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	07:28 19:32		06:33 20:09	05:52 20:44	05:38 21:08	06:29 21:01	07:05 19:26	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:58	07:27 19:34		06:32 20:10	05:51 20:45	05:39 21:08	06:31 21:00	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	07:25 19:35		06:30 20:11	05:50 20:46	05:39 21:08	06:32 20:59	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	07:23 19:36		06:28 20:13	05:50 20:47	05:39 21:09	06:33 20:59	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	07:21 19:37		06:27 20:14	05:49 20:48	05:39 21:09	06:34 20:58	07:09 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	07:19 19:39		06:25 20:15	05:48 20:49	05:39 21:09	06:35 20:57	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	07:18 19:40		06:24 20:16	05:47 20:50	05:40 21:09	06:36 20:56	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:48
26	07:47 17:23	07:05 18:06	07:16 19:41		06:22 20:17	05:46 20:51	05:40 21:09	06:37 20:55	07:13 19:13	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	07:14 19:42		06:21 20:19	05:45 20:52	05:40 21:09	06:39 20:54	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	07:12 19:43		06:19 20:20	05:45 20:53	05:41 21:09	06:40 20:53	07:15 19:10	07:52 18:19	07:33 16:47	07:56 16:50
29	07:44 17:27		07:10 19:45		06:18 20:21	05:44 20:54	05:41 21:09	06:41 20:52	07:16 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29		07:08 19:46		06:16 20:22	05:43 20:55	05:42 21:09	06:42 20:51	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30		07:07 19:47			05:43 20:56		06:43 20:49		07:56 18:14		07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Sum of minutes with flicker	0	0	148	0	0	0	0	0	38	109	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

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### SHADOW - Calendar per WTG

Calculation: 2009-08-12 5x E82, 78,3m WTG: 2 - Turbine 2

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
 Minimum sun height over horizon for influence 3 °  
 Day step for calculation 1 days  
 Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 20:23	05:42 20:57	05:42 21:09	06:09 20:48	06:44 20:01	07:12-07:42/30	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58	05:43 21:09	06:10 20:47	06:45 19:58	07:12-07:41/29	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59	05:43 21:09	06:11 20:46	06:47 19:56	07:12-07:40/28	07:21 19:01	07:00 17:10	07:38 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	07:23-07:37/14	06:10 20:27	05:41 20:59	06:12 20:45	06:48 19:54	07:13-07:39/26	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	07:20-07:39/19	06:09 20:28	05:40 21:00	06:14 20:43	06:49 19:52	07:13-07:38/25	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	07:19-07:41/22	06:08 20:29	05:40 21:01	06:15 20:42	06:50 19:50	07:15-07:37/22	07:25 18:55	07:04 17:06	07:42 16:44
7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	07:17-07:42/25	06:06 20:31	05:40 21:02	06:16 20:41	06:51 19:49	07:16-07:35/19	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	07:48 19:19	06:52 19:57	07:16-07:42/26	06:05 20:32	05:39 21:02	06:17 21:08	06:52 19:47	07:18-07:32/14	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:42	07:47 19:20	06:50 19:58	07:14-07:42/28	06:04 20:33	05:39 21:03	06:18 21:07	06:53 19:45	07:23-07:26/3	07:28 18:50	07:08 17:03	07:45 16:44
10	07:56 17:03	07:30 17:44	07:45 19:21	06:49 19:59	07:14-07:43/29	06:02 20:34	05:39 21:04	06:19 21:07	06:55 19:43	07:30	07:30 18:48	07:10 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	07:43 19:22	06:47 20:01	07:13-07:43/30	06:01 20:35	05:39 21:06	06:20 20:35	06:56 19:41	07:31	07:31 18:46	07:11 17:01	07:46 16:44
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14	07:55 17:08	07:24 17:49	07:38 19:26	06:42 20:03	07:12-07:43/31	05:58 20:39	05:38 21:06	06:24 21:05	06:59 19:36	07:34	07:35 18:41	07:15 16:57	07:49 16:44
15	07:54 17:09	07:23 17:51	07:36 19:27	06:40 20:04	07:12-07:42/30	05:57 20:40	05:38 21:06	06:25 20:29	07:00 19:34	07:35	07:36 18:39	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	07:34 19:29	06:38 20:05	07:11-07:41/30	05:55 20:41	05:38 21:07	06:26 21:03	07:01 19:32	07:36	07:37 18:38	07:18 16:55	07:50 16:44
17	07:53 17:11	07:20 17:53	07:32 19:30	06:37 20:07	07:12-07:41/29	05:54 20:42	05:38 21:07	06:27 21:03	07:03 19:30	07:37	07:38 18:36	07:19 16:54	07:51 16:45
18	07:53 17:13	07:18 17:55	07:30 19:31	06:35 20:08	07:12-07:40/28	05:53 20:43	05:38 21:08	06:28 21:02	07:04 19:28	07:38	07:39 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	07:29 19:32	06:33 20:09	07:13-07:39/26	05:52 20:44	05:38 21:08	06:29 21:01	07:05 19:26	07:39	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:58	07:27 19:34	06:32 20:10	07:14-07:38/24	05:51 20:45	05:39 21:08	06:15 21:02	07:06 19:25	07:40	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	07:25 19:35	06:30 20:11	07:14-07:36/22	05:50 20:46	05:39 21:08	06:32 20:20	07:07 19:23	07:41	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	07:23 19:36	06:28 20:13	07:16-07:35/19	05:50 20:47	05:39 21:09	06:33 20:18	07:08 19:21	07:42	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	07:21 19:37	06:27 20:14	07:17-07:32/15	05:49 20:48	05:39 21:09	06:34 20:58	07:10 19:19	07:43	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	07:19 19:39	06:25 20:15	07:21-07:29/8	05:48 20:49	05:39 21:09	06:35 20:57	07:11 19:17	07:44	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	07:18 19:40	06:24 20:16	07:18-07:24/1	05:47 20:50	05:40 21:09	06:36 20:56	07:12 19:15	07:45	07:49 18:23	07:29 16:48	07:55 16:48
26	07:47 17:23	07:05 18:06	07:16 19:41	06:22 20:17	07:16-07:35/19	05:46 20:51	05:40 21:09	06:37 20:55	07:13 19:13	07:46	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	07:14 19:42	06:21 20:19	07:14-07:44/30	05:45 20:52	05:40 21:09	06:39 20:54	07:14 19:12	07:47	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	07:12 19:43	06:19 20:20	07:13-07:44/31	05:45 20:53	05:41 21:09	06:40 20:08	07:15 19:10	07:48	07:53 18:19	07:33 16:47	07:56 16:50
29	07:44 17:27	07:01 19:45	07:10 19:45	06:18 20:21	07:13-07:44/31	05:44 20:54	05:41 21:09	06:41 20:06	07:17 19:08	07:49	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29	07:00 19:46	07:08 19:46	06:16 20:22	07:12-07:43/31	05:43 20:55	05:42 21:09	06:42 20:05	07:18 19:06	07:50	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30	07:00 19:47	07:07 19:47	06:15 20:22	07:12-07:43/31	05:43 20:56	05:43 20:56	06:43 20:03	07:19 19:06	07:51	07:56 18:14	07:36 16:46	07:57 16:53
Potential sun hours	289	293	369	403	517	457	463	434	376	196	342	290	277
Sum of minutes with flicker	0	0	0	517	0	0	0	329	196	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:

2009-06-25 Sky 8

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Licensed user:

SeeBA Energiesysteme  
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wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar per WTG

Calculation: 2009-08-12 5x E82, 78,3m WTG: 3 - Turbine 3

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:17-16:25/8	07:41 16:44-17:06/22	07:00 07:05 06:15 05:42	07:05 18:10 19:48 20:24	06:15 20:24 20:57 21:09	05:42 20:57 21:09 20:48	06:09 06:44 07:19	06:44 07:19	06:58 07:20-07:29/9	07:36	06:58 07:20-07:29/9	07:36
2	07:57 16:18-16:25/7	07:39 16:44-17:06/22	06:59 07:03 06:13 05:42	07:03 18:11 19:50 20:25	06:13 20:25 20:58 21:09	05:42 20:58 21:09 20:47	06:10 06:46 07:20	06:46 07:20	06:59 07:22-07:28/6	07:37	06:59 07:22-07:28/6	07:37
3	07:57 16:20-16:25/5	07:38 16:45-17:06/21	06:57 07:01 06:12 05:41	07:01 18:12 19:51 20:26	06:12 20:26 20:59 21:09	05:41 20:59 21:09 20:46	06:11 06:47 07:21	06:47 07:21	07:01 07:23-07:26/3	07:39	07:01 07:23-07:26/3	07:39
4	07:57 16:22-16:24/2	07:37 16:45-17:06/21	06:55 06:59 06:10 05:41	06:59 18:14 19:52 20:27	06:10 20:27 20:59 21:09	05:41 20:59 21:09 20:45	06:13 06:48 07:23	06:48 07:23	07:02 16:18-16:34/16	07:40	07:02 16:18-16:34/16	07:40
5	07:57 16:58	07:36 16:45-17:05/20	06:54 06:58 06:09 05:40	06:58 18:15 19:53 20:28	06:09 20:28 21:00 21:09	05:40 20:43 19:52 18:57	06:14 06:49 07:24	06:49 07:24	07:03 16:16-16:34/18	07:41	07:03 16:16-16:34/18	07:41
6	07:57 16:59	07:35 16:46-17:04/18	06:52 06:56 06:08 05:40	06:56 18:16 19:54 20:30	06:08 20:30 21:01 21:08	05:40 20:42 19:50 18:55	06:15 06:50 07:25	06:50 07:25	07:04 16:16-16:36/20	07:42	07:04 16:16-16:36/20	07:42
7	07:57 17:00	07:34 16:48-17:04/16	06:50 06:54 06:06 05:40	06:54 18:17 19:56 20:31	06:06 20:31 21:02 21:08	05:40 20:41 19:49 18:54	06:16 06:51 07:26	06:51 07:26	07:06 16:15-16:36/21	07:43	07:06 16:15-16:36/21	07:43
8	07:57 17:01	07:32 07:53-07:57/4	07:48 06:52 06:05 05:39	06:52 18:19 19:57 20:32	06:05 20:32 21:02 21:08	05:39 05:47 06:17	06:52 07:27	06:52 07:27	07:07 16:14-16:36/22	07:44	07:07 16:14-16:36/22	07:44
9	07:57 17:02	07:31 07:52-07:59/7	07:47 06:51 06:04 05:39	06:51 18:20 19:58 20:33	06:04 20:33 21:03 21:07	05:39 05:47 06:18	06:54 07:29	06:54 07:29	07:08 16:15-16:37/22	07:45	07:08 16:15-16:37/22	07:45
10	07:56 17:03	07:30 07:51-08:00/9	07:45 06:49 06:03 05:39	06:49 18:21 19:59 20:34	06:03 20:34 21:04 21:07	05:39 05:48 06:19	06:55 07:30	06:55 07:30	07:10 16:14-16:36/22	07:46	07:10 16:14-16:36/22	07:46
11	07:56 17:04	07:28 07:49-08:00/11	07:43 06:47 06:01 05:39	06:47 18:22 19:22 20:01	06:01 20:01 21:04 21:06	05:39 05:49 06:20	06:56 07:31	06:56 07:31	07:11 16:15-16:36/21	07:46	07:11 16:15-16:36/21	07:46
12	07:56 17:05	07:27 07:48-08:01/13	07:41 06:45 06:00 05:39	06:45 18:24 19:24 20:01	06:00 20:01 21:05 21:06	05:39 05:50 06:22	06:57 07:32	06:57 07:32	07:12 16:15-16:34/19	07:47	07:12 16:15-16:34/19	07:47
13	07:55 17:07	07:25 07:46-08:01/15	07:39 06:44 05:59 05:38	06:44 18:25 19:25 20:02	05:59 20:02 21:05 21:05	05:38 05:51 06:23	06:58 07:33	06:58 07:33	07:14 16:15-16:33/18	07:48	07:14 16:15-16:33/18	07:48
14	07:55 17:08	07:24 07:45-08:01/16	07:38 06:42 05:58 05:38	06:42 18:26 19:26 20:03	06:42 20:03 21:06 21:05	05:38 05:51 06:24	06:59 07:35	06:59 07:35	07:15 16:16-16:32/16	07:49	07:15 16:16-16:32/16	07:49
15	07:54 17:09	07:23 07:45-08:01/16	07:36 06:40 05:57 05:38	06:40 18:28 19:28 20:04	05:57 20:04 21:06 21:04	05:38 05:52 06:25	07:00 07:36	07:00 07:36	07:16 16:17-16:31/14	07:50	07:16 16:17-16:31/14	07:50
16	07:54 17:10	07:21 07:45-08:00/15	07:34 06:38 05:56 05:38	06:38 18:30 19:29 20:05	05:56 20:05 21:07 21:03	05:38 05:53 06:26	07:02 07:37	07:02 07:37	07:18 16:18-16:30/12	07:50	07:18 16:18-16:30/12	07:50
17	07:53 17:11	07:20 07:45-07:59/14	07:32 06:37 05:55 05:38	06:37 18:31 19:30 20:07	05:55 20:07 21:07 21:03	05:38 05:54 06:27	07:03 07:38	07:03 07:38	07:19 16:19-16:29/10	07:51	07:19 16:19-16:29/10	07:51
18	07:53 17:13	07:18 07:47-07:58/11	07:30 06:35 05:53 05:38	06:35 18:33 19:31 20:08	05:53 20:08 21:08 21:02	05:38 05:55 06:28	07:04 07:40	07:04 07:40	07:20 16:21-16:28/7	07:52	07:20 16:21-16:28/7	07:52
19	07:52 17:14	07:17 07:50-07:54/4	07:29 06:33 05:52 05:39	06:33 18:34 19:32 20:09	05:52 20:09 21:08 21:01	05:39 05:56 06:29	07:05 07:41	07:05 07:41	07:22 16:22-16:27/5	07:52	07:22 16:22-16:27/5	07:52
20	07:51 17:15	07:15 17:58	07:27 06:32 05:51 05:39	06:32 18:35 19:34 20:10	05:51 20:08 21:08 21:00	05:39 05:57 06:31	07:06 07:42	07:06 07:42	07:23 16:25-16:27/2	07:53	07:23 16:25-16:27/2	07:53
21	07:51 17:17	07:13 17:59	07:25 06:30 05:51 05:39	06:30 18:36 19:35 20:11	05:51 20:09 21:09 21:00	05:39 05:58 06:32	07:07 07:43	07:07 07:43	07:24 16:16-16:19/8	07:54	07:24 16:16-16:19/8	07:54
22	07:50 17:18	07:12 18:00	07:23 06:28 05:50 05:39	06:28 18:37 19:36 20:13	05:50 20:09 21:09 20:59	05:39 05:59 06:33	07:08 07:45	07:08 07:45	07:25 16:16-16:19/8	07:54	07:25 16:16-16:19/8	07:54
23	07:49 17:19	07:10 18:02	07:21 06:27 05:49 05:39	06:27 18:38 19:37 20:14	05:49 20:08 21:09 20:58	05:39 06:00 06:34	07:10 07:46	07:10 07:46	07:26 16:16-16:19/8	07:55	07:26 16:16-16:19/8	07:55
24	07:48 17:20	07:09 18:03	07:19 06:25 05:48 05:40	06:25 18:39 19:39 20:15	05:48 20:09 21:09 20:57	05:40 06:01 06:35	07:11 07:47	07:11 07:47	07:27 16:16-16:19/8	07:55	07:27 16:16-16:19/8	07:55
25	07:48 17:22	07:07 18:04	07:18 06:24 05:47 05:40	06:24 18:40 19:40 20:16	05:47 20:09 21:09 20:56	05:40 06:02 06:36	07:12 07:49	07:12 07:49	07:28 16:16-16:19/8	07:56	07:28 16:16-16:19/8	07:56
26	07:47 17:23	07:05 18:06	07:16 06:22 05:46 05:40	06:22 18:41 19:41 20:18	05:46 20:09 21:09 20:55	05:40 06:03 06:38	07:13 07:50	07:13 07:50	07:29 16:16-16:19/8	07:56	07:29 16:16-16:19/8	07:56
27	07:46 17:25	07:04 18:07	07:14 06:21 05:46 05:41	06:21 18:42 19:42 20:19	05:46 20:09 21:09 20:54	05:41 06:04 06:39	07:14 07:51	07:14 07:51	07:30 16:16-16:19/8	07:56	07:30 16:16-16:19/8	07:56
28	07:45 17:26	07:02 18:08	07:12 06:19 05:45 05:41	06:19 18:43 19:43 20:20	05:45 20:09 21:09 20:53	05:41 06:05 06:40	07:15 07:53	07:15 07:53	07:31 16:16-16:19/8	07:56	07:31 16:16-16:19/8	07:56
29	07:44 17:27	07:02 18:08	07:10 06:18 05:44 05:41	06:18 18:44 19:44 20:20	05:44 20:09 21:09 20:53	05:41 06:06 06:41	07:17 07:54	07:17 07:54	07:32 16:16-16:19/8	07:56	07:32 16:16-16:19/8	07:56
30	07:43 17:29	07:02 18:08	07:08 06:16 05:44 05:42	06:16 18:45 19:45 20:21	05:44 20:09 21:09 20:52	05:42 06:07 06:42	07:18 07:55	07:18 07:55	07:33 16:16-16:19/8	07:56	07:33 16:16-16:19/8	07:56
31	07:42 17:30	07:02 18:08	07:07 06:15 05:43 05:43	06:15 18:46 19:46 20:22	05:43 20:09 21:09 20:51	05:43 06:08 06:43	07:19 07:56	07:19 07:56	07:34 16:16-16:19/8	07:56	07:34 16:16-16:19/8	07:56
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Sum of minutes with flicker	147	296	0	0	0	0	0	0	0	120	306	176

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:

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Licensed user:

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wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar per WTG

Calculation: 2009-08-12 5x E82, 78,3m WTG: 4 - Turbine 4

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June
1	07:57 08:39-09:05/26 16:54	07:41 17:03-17:06/3 17:31	07:00 18:10	07:05 19:48	06:15 20:24	05:42 20:57
2	07:57 08:39-09:05/26 16:55	07:40 17:03-17:07/4 17:33	06:59 18:11	07:03 19:50	06:13 20:25	05:42 20:58
3	07:57 08:39-09:04/25 16:56	07:38 17:03-17:09/6 17:34	06:57 18:12	07:01 19:51	06:12 20:26	05:41 20:59
4	07:57 08:40-09:04/24 16:57	07:37 17:03-17:11/8 17:36	06:55 18:14	06:59 19:52	06:10 20:27	05:41 20:59
5	07:57 08:40-09:05/25 16:58	07:36 17:03-17:11/8 17:37	06:54 18:15	06:58 19:53	06:09 20:28	05:40 21:00
6	07:57 08:41-09:05/24 16:59	07:35 17:04-17:13/9 17:38	06:52 18:16	06:56 19:55	06:08 20:30	05:40 21:01
7	07:57 08:42-09:05/23 17:00	07:34 17:05-17:15/10 17:40	06:50 18:17	06:54 19:56	06:06 20:31	05:40 21:02
8	07:57 08:44-09:05/21 17:01	07:32 17:06-17:14/8 17:41	07:48 19:19	06:52 19:57	06:05 20:32	05:39 21:02
9	07:57 08:44-09:05/21 17:02	07:31 17:43	07:47 19:20	06:51 19:58	06:04 20:33	05:39 21:03
10	07:56 08:45-09:05/20 17:03	07:30 17:44	07:45 18:51-18:59/8 19:21	06:49 19:59	06:03 20:34	05:39 21:04
11	07:56 08:46-09:04/18 17:04	07:28 17:45	07:43 18:48-19:00/12 19:22	06:47 20:01	06:01 20:35	05:39 21:04
12	07:56 08:48-09:04/16 17:05	07:27 17:47	07:41 18:46-19:01/15 19:24	06:45 20:01	06:00 20:37	05:39 21:05
13	07:55 08:49-09:02/13 17:07	07:25 17:48	07:39 08:00-08:05/5 19:25	06:44 20:02	05:59 20:38	05:38 21:05
14	07:55 08:51-09:02/11 17:08	07:24 17:49	07:38 07:58-08:07/9 19:26	06:42 20:03	05:58 20:39	05:38 21:06
15	07:54 08:53-08:59/6 17:09	07:23 17:51	07:36 07:56-08:08/12 19:28	06:40 20:04	05:57 20:40	05:38 21:06
16	07:54 17:10	07:21 17:52	07:34 07:54-08:08/14 19:29	06:38 20:05	05:56 20:41	05:38 21:07
17	07:53 17:11	07:20 17:54	07:32 07:52-08:08/16 19:30	06:37 20:07	05:54 20:42	05:38 21:07
18	07:53 17:13	07:18 17:55	07:30 07:50-08:08/18 19:31	06:35 20:08	05:53 20:43	05:38 21:08
19	07:52 17:14	07:17 17:56	07:29 07:50-08:08/18 19:32	06:33 20:09	05:52 20:44	05:38 21:08
20	07:51 17:15	07:15 17:58	07:27 07:50-08:07/17 19:34	06:32 20:10	05:51 20:45	05:39 21:08
21	07:51 17:17	07:14 17:59	07:25 07:50-08:06/16 19:35	06:30 20:11	05:51 20:46	05:39 21:09
22	07:50 17:18	07:12 18:00	07:23 07:51-08:04/13 19:36	06:28 20:13	05:50 20:47	05:39 21:09
23	07:49 17:19	07:10 18:02	07:21 07:52-08:02/10 19:37	06:27 20:14	05:49 20:48	05:39 21:09
24	07:48 17:20	07:09 18:03	07:19 19:39	06:25 20:15	05:48 20:50	05:40 21:09
25	07:48 17:22	07:07 18:04	07:18 19:40	06:24 20:16	05:47 20:51	05:40 21:09
26	07:47 17:23	07:05 18:06	07:16 19:41	06:22 20:18	05:46 20:51	05:40 21:09
27	07:46 17:25	07:04 18:07	07:14 19:42	06:21 20:19	05:46 20:52	05:41 21:09
28	07:45 17:26	07:02 18:08	07:12 19:44	06:19 20:20	05:45 20:53	05:41 21:09
29	07:44 17:27		07:10 19:45	06:18 20:21	05:44 20:54	05:41 21:09
30	07:43 17:29		07:08 19:46	06:16 20:22	05:44 20:55	05:42 21:09
31	07:42 17:03-17:05/2 17:30		07:07 19:47		05:43 20:56	
Potential sun hours	289	293	369	403	457	463
Sum of minutes with flicker	301	56	395	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:

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Licensed user:

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wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar per WTG

Calculation: 2009-08-12 5x E82, 78,3m WTG: 4 - Turbine 4

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	July	August	September	October	November	December
1	05:42 21:09	06:09 20:48	06:44 20:01	07:19 07:40-07:42/2 19:04 18:25-18:41/16	06:58 17:13	07:36 08:28-08:46/18 16:45
2	05:43 21:09	06:10 20:47	06:46 19:58	07:20 18:26-18:39/13 19:03	06:59 16:39-16:42/3 17:12	07:37 08:28-08:48/20 16:45
3	05:43 21:09	06:11 20:46	06:47 19:56	07:21 18:27-18:37/10 19:01	07:01 16:35-16:44/9 17:10	07:39 08:28-08:49/21 16:45
4	05:44 21:09	06:12 20:45	06:48 19:54	07:23 18:30-18:35/5 18:59	07:02 16:35-16:45/10 17:09	07:40 08:28-08:49/21 16:44
5	05:45 21:09	06:14 20:43	06:49 19:52	07:24 18:57	07:03 16:34-16:43/9 17:08	07:41 08:28-08:50/22 16:44
6	05:45 21:08	06:15 20:42	06:50 19:50	07:25 18:55	07:05 16:33-16:41/8 17:07	07:42 08:28-08:51/23 16:44
7	05:46 21:08	06:16 20:41	06:51 19:49	07:26 18:53	07:06 16:33-16:40/7 17:05	07:43 08:28-08:52/24 16:44
8	05:47 21:08	06:17 20:39	06:52 19:47	07:27 18:52	07:07 16:33-16:39/6 17:04	07:44 08:28-08:52/24 16:44
9	05:47 21:07	06:18 20:38	06:54 19:45	07:29 18:50	07:09 16:34-16:38/4 17:03	07:45 08:28-08:53/25 16:44
10	05:48 21:07	06:19 20:37	06:55 19:43	07:30 18:48	07:10 16:34-16:36/2 17:02	07:46 08:28-08:54/26 16:44
11	05:49 21:06	06:20 20:35	06:56 19:41	07:31 18:46	07:11 16:35-16:37/2 17:01	07:46 08:29-08:55/26 16:44
12	05:50 21:06	06:21 20:34	06:57 19:40	07:32 18:45	07:12 17:00	07:47 08:29-08:55/26 16:44
13	05:51 21:05	06:23 20:32	06:58 19:38	07:33 18:43	07:14 16:58	07:48 08:28-08:55/27 16:44
14	05:51 21:05	06:24 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 08:29-08:56/27 16:44
15	05:52 21:04	06:25 20:29	07:00 19:34	07:36 18:40	07:16 16:56	07:50 08:30-08:57/27 16:44
16	05:53 21:03	06:26 20:28	07:02 19:32	07:37 18:38	07:18 16:55	07:50 08:30-08:57/27 16:44
17	05:54 21:03	06:27 20:26	07:03 19:30	07:38 18:36	07:19 16:55	07:51 08:30-08:57/27 16:45
18	05:55 21:02	06:28 20:25	07:04 19:28	07:40 18:35	07:20 16:54	07:52 08:31-08:58/27 16:45
19	05:56 21:01	06:29 20:23	07:05 19:27	07:41 18:33	07:22 16:53	07:52 08:32-08:59/27 16:45
20	05:57 21:00	06:31 20:21	07:06 07:39-07:48/9 19:25 18:35-18:43/8	07:42 18:31	07:23 16:52	07:53 08:32-08:59/27 16:46
21	05:58 21:00	06:32 20:20	07:07 07:36-07:49/13 19:23 18:31-18:45/14	07:43 18:30	07:24 16:51	07:54 08:32-09:00/28 16:46
22	05:59 20:59	06:33 20:18	07:08 07:35-07:50/15 19:21 18:29-18:46/17	07:45 18:28	07:26 16:50	07:54 08:32-09:00/28 16:47
23	06:00 20:58	06:34 20:17	07:10 07:34-07:51/17 19:19 18:27-18:47/20	07:46 18:26	07:27 16:50	07:55 08:33-09:01/28 16:47
24	06:01 20:57	06:35 20:15	07:11 07:33-07:51/18 19:17 18:27-18:48/21	07:47 18:25	07:28 16:49	07:55 08:34-09:01/27 16:48
25	06:02 20:56	06:36 20:13	07:12 07:33-07:51/18 19:15 18:26-18:48/22	07:49 18:23	07:29 16:48	07:56 08:34-09:01/27 16:48
26	06:03 20:55	06:38 20:12	07:13 07:34-07:50/16 19:14 18:25-18:48/23	07:50 18:22	07:30 16:48	07:56 08:35-09:02/27 16:49
27	06:04 20:54	06:39 20:10	07:14 07:35-07:50/15 19:12 18:25-18:48/23	07:51 18:20	07:32 08:34-08:39/5 16:47	07:56 08:35-09:02/27 16:50
28	06:05 20:53	06:40 20:08	07:15 07:36-07:48/12 19:10 18:24-18:46/22	07:53 18:19	07:33 08:31-08:42/11 16:47	07:57 08:36-09:02/26 16:51
29	06:06 20:52	06:41 20:06	07:17 07:38-07:48/10 19:08 18:24-18:44/20	07:54 18:17	07:34 08:30-08:43/13 16:46	07:57 08:36-09:03/27 16:51
30	06:07 20:51	06:42 20:05	07:18 07:39-07:46/7 19:06 18:25-18:43/18	07:55 18:16	07:35 08:29-08:45/16 16:46	07:57 08:36-09:03/27 16:52
31	06:08 20:49	06:43 20:03	 	07:57 18:15	 	07:57 08:38-09:04/26 16:53
Potential sun hours	469	434	376	342	290	277
Sum of minutes with flicker	0	0	358	46	105	790

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:

2009-06-25 Sky 8

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wla

Calculated:

12.08.2009 13:08/2.6.1.252

### SHADOW - Calendar per WTG

Calculation: 2009-08-12 5x E82, 78,3m WTG: 5 - Turbine 5

#### Assumptions for shadow calculations

Maximum distance for influence 2.000 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

The calculated times are "worst case" given by the following assumptions:

- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57 16:54	07:41 17:31	07:00 18:10	07:05 19:48	06:15 06:35-06:41/6 20:24	05:42 06:05-06:20/15 20:57	05:42 06:06-06:27/21 21:09	06:09 20:48	06:44 20:01	07:19 19:04	06:58 17:13	07:36 16:45
2	07:57 16:55	07:39 17:33	06:59 18:11	07:03 19:50	06:13 06:34-06:42/8 20:25	05:42 06:05-06:21/16 20:58	05:43 06:07-06:28/21 21:09	06:10 20:47	06:45 19:58	07:20 19:02	06:59 17:12	07:37 16:45
3	07:57 16:56	07:38 17:34	06:57 18:12	07:01 19:51	06:12 06:33-06:42/9 20:26	05:41 06:04-06:20/16 20:59	05:43 06:08-06:28/20 21:09	06:11 20:46	06:47 19:56	07:21 19:01	07:00 17:10	07:39 16:45
4	07:57 16:57	07:37 17:35	06:55 18:13	06:59 19:52	06:10 06:31-06:41/10 20:27	05:41 06:04-06:21/17 20:59	05:44 06:08-06:28/20 21:09	06:12 06:42-06:48/6 20:45	06:48 19:54	07:22 18:59	07:02 17:09	07:40 16:44
5	07:57 16:58	07:36 17:37	06:54 18:15	06:58 19:53	06:09 06:30-06:41/11 20:28	05:40 06:04-06:22/18 21:00	05:45 06:09-06:28/19 21:09	06:13 06:40-06:49/9 20:43	06:49 19:52	07:24 18:57	07:03 17:08	07:41 16:44
6	07:57 16:59	07:35 17:38	06:52 18:16	06:56 19:54	06:08 06:29-06:41/12 20:29	05:40 06:03-06:21/18 21:01	05:45 06:09-06:28/19 21:08	06:15 06:38-06:50/12 20:42	06:50 19:50	07:25 18:55	07:04 17:06	07:42 16:44
7	07:57 17:00	07:33 17:40	06:50 18:17	06:54 19:56	06:06 06:28-06:39/11 20:31	05:40 06:03-06:22/19 21:02	05:46 06:10-06:28/18 21:08	06:16 06:39-06:51/12 20:41	06:51 19:49	07:26 18:53	07:06 17:05	07:43 16:44
8	07:57 17:01	07:32 17:41	06:48 19:19	06:52 19:57	06:05 06:30-06:38/8 20:32	05:39 06:03-06:23/20 21:02	05:47 06:11-06:28/17 21:08	06:17 06:40-06:51/11 20:39	06:52 19:47	07:27 18:52	07:07 17:04	07:44 16:44
9	07:57 17:02	07:31 17:42	06:47 19:20	06:50 19:58	06:04 06:32-06:36/4 20:33	05:39 06:03-06:23/20 21:03	05:47 06:11-06:28/17 21:07	06:18 06:41-06:51/10 20:38	06:53 19:45	07:28 18:50	07:08 17:03	07:45 16:44
10	07:56 17:03	07:30 17:44	06:45 19:21	06:49 19:59	06:02 20:34	05:39 06:02-06:22/20 21:04	05:48 06:12-06:28/16 21:07	06:19 06:42-06:51/9 20:37	06:55 19:43	07:30 18:48	07:10 17:02	07:46 16:44
11	07:56 17:04	07:28 17:45	06:43 19:22	06:47 20:01	06:01 20:35	05:39 06:02-06:23/21 21:04	05:49 06:13-06:28/15 21:06	06:20 06:43-06:51/8 20:35	06:56 19:41	07:31 18:46	07:11 17:01	07:46 16:44
12	07:56 17:05	07:27 17:47	06:41 19:24	06:45 20:01	06:00 20:36	05:38 06:02-06:23/21 21:05	05:50 06:14-06:28/14 21:06	06:21 06:44-06:50/6 20:34	06:57 19:39	07:32 18:45	07:12 16:59	07:47 16:44
13	07:55 17:06	07:25 17:48	06:39 19:25	06:43 20:02	05:59 20:38	05:38 06:02-06:23/21 21:05	05:50 06:14-06:27/13 21:05	06:23 06:45-06:49/4 20:32	06:58 19:38	07:33 18:43	07:14 16:58	07:48 16:44
14	07:55 17:08	07:24 17:49	06:38 19:26	06:42 20:03	05:58 20:39	05:38 06:02-06:24/22 21:06	05:51 06:15-06:27/12 21:05	06:24 06:46-06:48/2 20:31	06:59 19:36	07:35 18:41	07:15 16:57	07:49 16:44
15	07:54 17:09	07:23 17:51	06:36 19:27	06:40 20:04	05:57 20:40	05:38 06:02-06:24/22 21:06	05:52 06:16-06:27/11 21:04	06:25 06:47-06:51/10 20:29	07:00 19:34	07:36 18:39	07:16 16:56	07:50 16:44
16	07:54 17:10	07:21 17:52	06:34 19:29	06:38 20:05	05:55 20:41	05:38 06:02-06:24/22 21:07	05:53 06:17-06:26/9 21:03	06:26 06:48-06:51/10 20:26	07:01 19:32	07:37 18:38	07:18 16:55	07:50 16:44
17	07:53 17:11	07:20 17:53	06:32 19:30	06:37 20:07	05:54 20:42	05:38 06:02-06:24/22 21:07	05:54 06:18-06:26/8 21:03	06:27 06:49-06:51/10 20:26	07:03 19:30	07:38 18:36	07:19 16:54	07:51 16:45
18	07:53 17:13	07:18 17:55	06:30 19:31	06:35 20:08	05:53 20:43	05:38 06:02-06:24/22 21:08	05:55 06:19-06:24/5 21:02	06:28 06:50-06:51/10 20:25	07:04 19:28	07:40 18:34	07:20 16:54	07:52 16:45
19	07:52 17:14	07:17 17:56	06:29 19:32	06:33 20:09	05:52 20:44	05:38 06:03-06:24/21 21:08	05:56 06:20-06:23/3 21:01	06:29 06:51-06:51/10 20:23	07:05 19:26	07:41 18:33	07:22 16:53	07:52 16:45
20	07:51 17:15	07:15 17:58	06:27 19:34	06:32 20:10	05:51 20:45	05:38 06:04-06:26/22 21:08	05:57 06:21-06:26/22 21:00	06:31 06:52-06:51/10 20:21	07:06 19:25	07:42 18:31	07:23 16:52	07:53 16:46
21	07:51 17:16	07:13 17:59	06:25 19:35	06:30 20:11	05:50 20:46	05:39 06:04-06:26/22 21:09	05:58 06:22-06:26/22 20:59	06:32 06:53-06:51/10 20:20	07:07 19:23	07:43 18:30	07:24 16:51	07:54 16:46
22	07:50 17:18	07:12 18:00	06:23 19:36	06:28 20:13	05:50 20:47	05:39 06:04-06:26/22 21:09	05:59 06:23-06:26/22 20:59	06:33 06:54-06:51/10 20:18	07:08 19:21	07:45 18:28	07:25 16:50	07:54 16:47
23	07:49 17:19	07:10 18:02	06:21 19:37	06:27 20:14	05:49 20:48	05:39 06:04-06:25/21 21:09	06:00 06:24-06:26/22 20:58	06:34 06:55-06:51/10 20:17	07:09 19:19	07:46 18:26	07:27 16:50	07:55 16:47
24	07:48 17:20	07:09 18:03	06:19 19:39	06:25 20:15	05:48 20:49	05:39 06:04-06:26/22 21:09	06:01 06:25-06:26/22 20:57	06:35 06:56-06:51/10 20:15	07:11 19:17	07:47 18:25	07:28 16:49	07:55 16:48
25	07:47 17:22	07:07 18:04	06:18 19:40	06:24 20:16	05:47 06:10-06:14/4 20:50	05:40 06:04-06:26/22 21:09	06:02 06:26-06:26/22 20:56	06:36 06:57-06:51/10 20:13	07:12 19:15	07:49 18:23	07:29 16:48	07:55 16:48
26	07:47 17:23	07:05 18:06	06:16 19:41	06:22 20:17	05:46 06:09-06:16/7 20:51	05:40 06:04-06:26/22 21:09	06:03 06:27-06:26/22 20:55	06:37 06:58-06:51/10 20:12	07:13 19:13	07:50 18:22	07:30 16:48	07:56 16:49
27	07:46 17:24	07:04 18:07	06:14 19:42	06:21 20:19	05:45 06:08-06:16/8 20:52	05:40 06:05-06:27/22 21:09	06:04 06:28-06:27/22 20:54	06:39 06:59-06:51/10 20:10	07:14 19:12	07:51 18:20	07:32 16:47	07:56 16:50
28	07:45 17:26	07:02 18:08	06:12 19:43	06:19 20:20	05:45 06:08-06:18/10 20:53	05:41 06:05-06:27/22 21:09	06:05 06:29-06:27/22 20:53	06:40 06:59-06:51/10 20:08	07:15 19:10	07:53 18:19	07:33 16:47	07:56 16:50
29	07:44 17:27	07:00 18:14	06:10 19:45	06:38 06:40/2 20:21	05:44 06:07-06:18/11 20:54	05:41 06:05-06:27/22 21:09	06:06 06:30-06:27/22 20:52	06:41 06:59-06:51/10 20:06	07:17 19:08	07:54 18:17	07:34 16:46	07:57 16:51
30	07:43 17:29	07:00 18:19	06:08 19:46	06:37 06:42/5 20:22	05:43 06:06-06:19/13 20:55	05:42 06:06-06:27/21 21:09	06:07 06:31-06:27/21 20:51	06:42 06:59-06:51/10 20:05	07:18 19:06	07:55 18:16	07:35 16:46	07:57 16:52
31	07:42 17:30	07:00 18:27	06:07 19:47	06:14 20:23	05:43 06:06-06:20/14 20:56	05:43 06:06-06:20/14 20:56	06:08 06:32-06:27/21 20:49	06:43 06:59-06:51/10 20:03	07:19 19:06	07:56 18:14	07:36 16:46	07:57 16:53
Potential sun hours	289	293	369	403	457	463	469	434	376	342	290	277
Sum of minutes with flicker	0	0	0	89	146	613	278	175	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

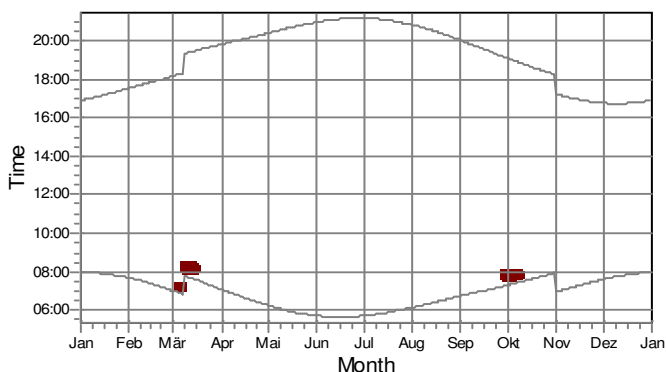
Project:  
2009-06-25 Sky 8

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**SeeBA Energiesysteme**  
Tielger Allee 60  
DE-32351 Stemwede  
+49 (0) 5773 912 222  
wla  
Calculated:  
12.08.2009 13:08/2.6.1.252

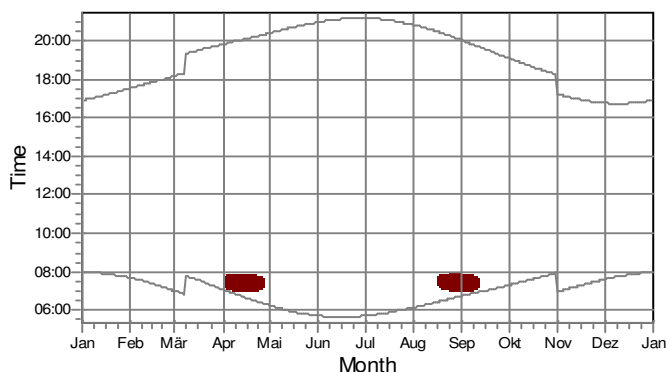
**SHADOW - Calendar per WTG, graphical**

Calculation: 2009-08-12 5x E82, 78,3m

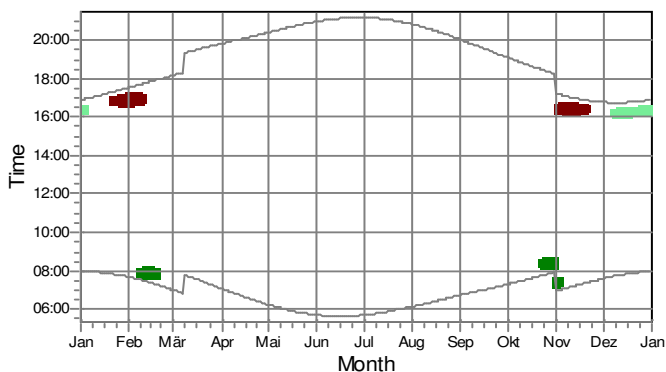
1: Turbine 1



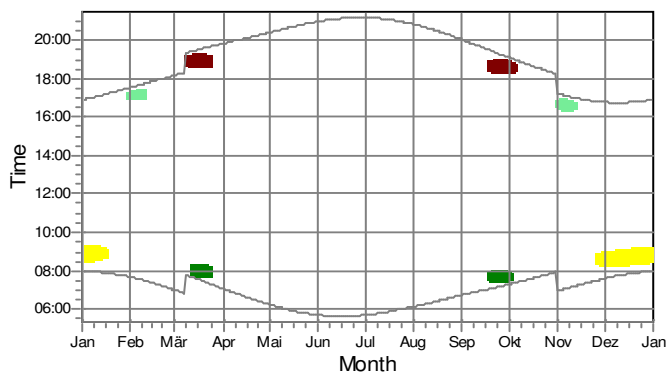
2: Turbine 2



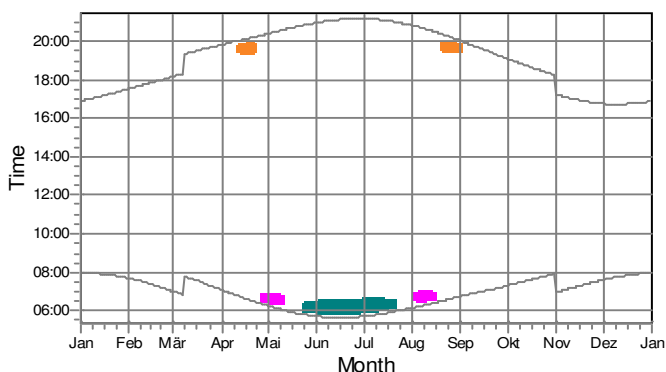
3: Turbine 3



4: Turbine 4



5: Turbine 5



Shadow receptor

- |   |   |   |  |
|---|---|---|--|
|  B: Receptor 302 |  F: Receptor 306 |  I: Receptor 309 |  AC: Receptor 330 |
|  C: Receptor 303 |  G: Receptor 307 |  Z: Receptor 327 |  |

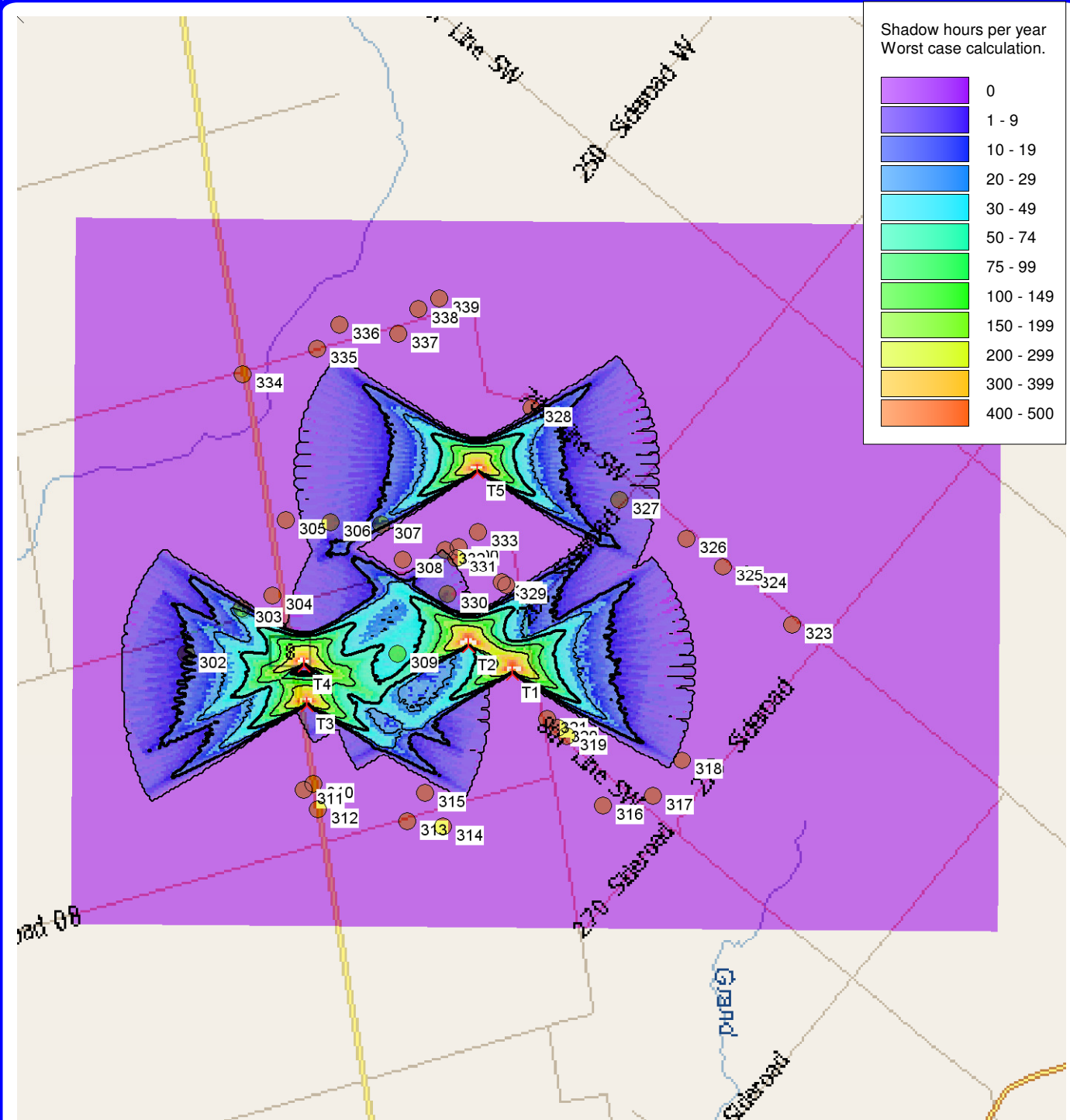
Project:  
2009-06-25 Sky 8

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wla  
Calculated:  
12.08.2009 13:08/2.6.1.252

**SHADOW - DynMap3832-275**

Calculation: 2009-08-12 5x E82, 78,3m File: DynMap3832-275.bmi



Shadow hours per year  
Worst case calculation.

0
1 - 9
10 - 19
20 - 29
30 - 49
50 - 74
75 - 99
100 - 149
150 - 199
200 - 299
300 - 399
400 - 500

0 500 1000 1500 2000 m

Map: WindPRO map , Print scale 1:50.000, Map center UTM NAD 83 Zone: 17 East: 549.272 North: 4.882.114

New WTG Shadow receptor

Isolines showing shadow in Shadow hours per year. Worst case calculation.

0 10 25 50 100 200