

SHADOW - Main Result

Calculation: Kenfig Shadow Detailed

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

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

Height contours used: Height Contours: CONTOURLINE_ONLINEDATA_1.wpo

Obstacles used in calculation

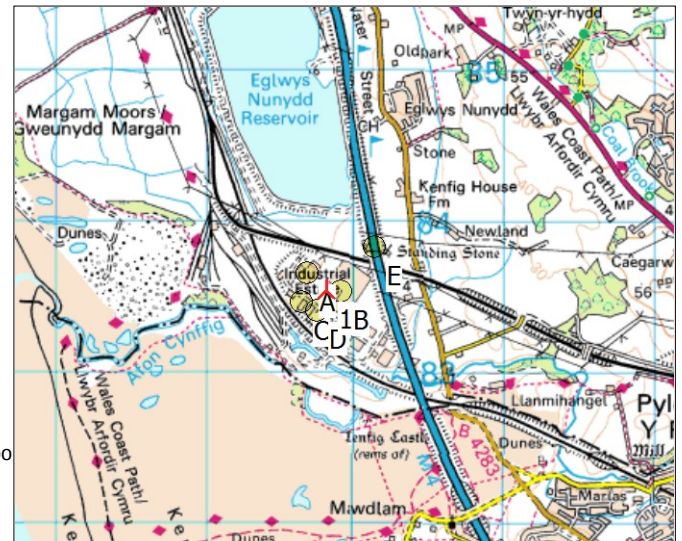
Receptor grid resolution: 10.0 m

All coordinates are in

British TM-OSGB36/Airy (GB/IE)

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Valid	Manuf.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data	
													Calculation distance	RPM
			[m]							[kW]	[m]	[m]	[m]	[RPM]
1	279,818	183,522	12.0	Kenfig WTG	Yes	VENSYS			70-1,500	1,500	70.0	65.0	1,453	19.0



Scale 1:50,000
 New WTG Shadow receptor

Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	279,691	183,641	10.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
B	279,913	183,519	12.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
C	279,655	183,445	11.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
D	279,753	183,389	11.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
E	280,137	183,814	10.3	7.0	7.0	7.0	90.0	"Green house mode"	14.0

Calculation Results

Shadow receptor

Shadow, worst case

No.	Shadow hours per year	Shadow days per year	Max shadow hours per day
	[h/year]	[days/year]	[h/day]
A	130:08	115	1:28
B	297:51	142	2:29
C	41:41	53	1:00
D	0:00	0	0:00
E	55:21	104	0:44

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

No.	Name	Worst case
		[h/year]
1	Kenfig WTG	525:01

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:

South Wales

Licensed user:

Infinite Renewables Limited
 Number One, Waterton Park
 GB-BRIDGEND CF31 3PH, Wales
 +44 1656 644477
 Rob Smith / robsmith484@gmail.com
 Calculated:
 17/03/2022 17:07/3.5.576

SHADOW - Calendar

Calculation: Kenfig Shadow DetailedShadow receptor: A - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (16)
 Assumptions for shadow calculations

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	08:21	07:55	09:20 (1)	07:03	08:45 (1)	06:53	05:49	05:04	05:02	05:38	06:26	07:15
2	16:16	17:03	18	09:38 (1)	17:54	88	10:13 (1)	19:47	20:37	21:22	21:36	18:55
3	16:17	17:05	27	09:43 (1)	17:56	88	10:13 (1)	19:49	20:39	21:24	21:36	18:53
4	16:18	17:07	34	09:47 (1)	17:58	88	10:13 (1)	19:51	20:41	21:25	21:36	18:51
5	16:20	17:09	39	09:49 (1)	18:00	87	10:11 (1)	19:52	20:42	21:26	21:35	18:48
6	16:21	17:11	43	09:51 (1)	18:01	87	10:11 (1)	19:54	20:44	21:27	21:35	18:46
7	16:22	17:13	47	09:54 (1)	18:03	87	10:11 (1)	19:56	20:46	21:28	21:34	18:44
8	16:23	17:14	52	09:56 (1)	18:05	87	10:11 (1)	19:57	20:47	21:28	21:34	18:42
9	16:24	17:16	55	09:58 (1)	18:07	86	10:09 (1)	19:59	20:49	21:29	21:33	18:39
10	16:26	17:18	58	09:59 (1)	18:08	85	10:09 (1)	20:01	20:50	21:30	21:32	18:37
11	16:27	17:20	62	10:01 (1)	18:10	84	10:08 (1)	20:02	20:52	21:31	21:32	18:35
12	16:29	17:22	64	10:02 (1)	18:12	84	10:07 (1)	20:04	20:54	21:32	21:31	18:33
13	16:30	17:24	66	10:03 (1)	18:14	82	10:06 (1)	20:06	20:55	21:32	21:30	18:31
14	16:31	17:25	68	10:04 (1)	18:15	81	10:05 (1)	20:08	20:57	21:33	21:29	18:28
15	16:33	17:27	71	10:05 (1)	18:17	79	10:04 (1)	20:09	20:58	21:34	21:28	18:26
16	16:35	17:29	73	10:06 (1)	18:19	77	10:02 (1)	20:11	21:00	21:34	21:27	18:24
17	16:36	17:31	75	10:07 (1)	18:20	76	10:01 (1)	20:13	21:01	21:35	21:26	18:22
18	16:38	17:33	76	10:08 (1)	18:22	74	10:00 (1)	20:14	21:03	21:35	21:25	18:20
19	16:39	17:35	78	10:09 (1)	18:24	71	09:57 (1)	20:16	21:04	21:36	21:24	18:18
20	16:41	17:36	80	10:10 (1)	18:25	69	09:56 (1)	20:18	21:06	21:36	21:23	18:16
21	16:43	17:38	81	10:10 (1)	18:27	66	09:54 (1)	20:19	21:07	21:36	21:22	18:13
22	16:44	17:40	82	10:11 (1)	18:29	63	09:52 (1)	20:21	21:09	21:36	21:21	18:11
23	16:46	17:42	83	10:11 (1)	18:31	59	09:49 (1)	20:23	21:10	21:37	21:20	18:09
24	16:48	17:44	84	10:12 (1)	18:32	56	09:47 (1)	20:24	21:11	21:37	21:18	18:07
25	16:49	17:45	85	10:12 (1)	18:34	52	09:45 (1)	20:26	21:13	21:37	21:17	18:05
26	16:51	17:47	86	10:13 (1)	18:36	48	09:41 (1)	20:28	21:14	21:37	21:16	18:03
27	16:53	17:49	86	10:12 (1)	18:37	42	09:38 (1)	20:29	21:15	21:37	21:14	18:01
28	16:54	17:51	87	10:12 (1)	18:39	36	09:34 (1)	20:31	21:17	21:37	21:13	17:59
29	16:56	17:53	87	10:12 (1)	18:41	28	09:29 (1)	20:33	21:18	21:37	21:11	17:57
30	16:58			17:00		17	10:23 (1)	20:34	21:19	21:37	21:10	17:55
31	17:00			17:02				20:36	21:20	21:37	21:08	17:53
Potential sun hours	261	278	1847	2027	415	484	497	500	453	381	976	2527
Total, worst case												

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

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

SHADOW - Calendar

Calculation: Kenfig Shadow DetailedShadow receptor: B - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (17)
 Assumptions for shadow calculations

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	08:21	07:55	07:03	06:53		05:49		16:41 (1)	05:04	16:30 (1)
	16:16	17:03	17:54	19:47		20:37	119	18:40 (1)	21:22	18:57 (1)
2	08:21	07:54	07:00	06:51		05:47		16:39 (1)	05:04	16:30 (1)
	16:17	17:05	17:56	19:49		20:39	122	18:41 (1)	21:24	18:57 (1)
3	08:21	07:52	06:58	06:48		05:45		16:39 (1)	05:03	16:30 (1)
	16:18	17:07	17:58	19:51		20:41	123	18:42 (1)	21:25	18:57 (1)
4	08:21	07:51	06:56	06:46		05:43		16:38 (1)	05:02	16:30 (1)
	16:20	17:09	18:00	19:52		20:42	125	18:43 (1)	21:26	18:58 (1)
5	08:21	07:49	06:54	06:44		05:42		16:36 (1)	05:02	16:30 (1)
	16:21	17:11	18:01	19:54		20:44	127	18:43 (1)	21:27	18:58 (1)
6	08:20	07:47	06:52	06:42		05:40		16:35 (1)	05:01	16:31 (1)
	16:22	17:13	18:03	19:56		20:46	129	18:44 (1)	21:28	18:59 (1)
7	08:20	07:46	06:50	06:39		05:38		16:35 (1)	05:00	16:31 (1)
	16:23	17:14	18:05	19:57		20:47	130	18:45 (1)	21:28	18:59 (1)
8	08:20	07:44	06:47	06:37		05:36		16:34 (1)	05:00	16:31 (1)
	16:24	17:16	18:07	19:59		20:49	132	18:46 (1)	21:29	18:59 (1)
9	08:19	07:42	06:45	06:35		05:35		16:34 (1)	04:59	16:31 (1)
	16:26	17:18	18:08	20:01		20:50	133	18:47 (1)	21:30	18:59 (1)
10	08:19	07:40	06:43	06:33		05:33		16:33 (1)	04:59	16:31 (1)
	16:27	17:20	18:10	20:02		20:52	134	18:47 (1)	21:31	19:00 (1)
11	08:18	07:39	06:41	06:30		05:31		16:33 (1)	04:59	16:32 (1)
	16:29	17:22	18:12	20:04		20:54	135	18:48 (1)	21:32	19:00 (1)
12	08:18	07:37	06:38	06:28		17:38 (1)	05:30	16:32 (1)	04:58	16:32 (1)
	16:30	17:24	18:14	20:06	15	17:53 (1)	20:55	18:48 (1)	21:32	19:01 (1)
13	08:17	07:35	06:36	06:26		17:28 (1)	05:28	16:32 (1)	04:58	16:32 (1)
	16:31	17:25	18:15	20:08	34	18:02 (1)	20:57	18:49 (1)	21:33	19:00 (1)
14	08:16	07:33	06:34	06:24		17:22 (1)	05:26	16:31 (1)	04:58	16:32 (1)
	16:33	17:27	18:17	20:09	46	18:08 (1)	20:58	18:49 (1)	21:34	19:01 (1)
15	08:15	07:31	06:32	06:22		17:17 (1)	05:25	16:31 (1)	04:58	16:33 (1)
	16:35	17:29	18:19	20:11	55	18:12 (1)	21:00	18:50 (1)	21:34	19:01 (1)
16	08:15	07:29	06:29	06:20		17:12 (1)	05:23	16:30 (1)	04:57	16:33 (1)
	16:36	17:31	18:20	20:13	62	18:14 (1)	21:01	18:50 (1)	21:35	19:01 (1)
17	08:14	07:27	06:27	06:17		17:09 (1)	05:22	16:30 (1)	04:57	16:33 (1)
	16:38	17:33	18:22	20:14	68	18:17 (1)	21:03	18:51 (1)	21:35	19:01 (1)
18	08:13	07:25	06:25	06:15		17:06 (1)	05:20	16:30 (1)	04:57	16:33 (1)
	16:39	17:35	18:24	20:16	74	18:20 (1)	21:04	18:52 (1)	21:36	19:02 (1)
19	08:12	07:23	06:23	06:13		17:03 (1)	05:19	16:29 (1)	04:57	16:33 (1)
	16:41	17:36	18:25	20:18	79	18:22 (1)	21:06	18:52 (1)	21:36	19:02 (1)
20	08:11	07:21	06:20	06:11		17:00 (1)	05:18	16:29 (1)	04:57	16:35 (1)
	16:42	17:38	18:27	20:19	84	18:24 (1)	21:07	18:52 (1)	21:36	19:03 (1)
21	08:10	07:19	06:18	06:09		16:58 (1)	05:16	16:29 (1)	04:58	16:35 (1)
	16:44	17:40	18:29	20:21	88	18:26 (1)	21:09	18:53 (1)	21:36	19:03 (1)
22	08:09	07:17	06:16	06:07		16:55 (1)	05:15	16:29 (1)	04:58	16:35 (1)
	16:46	17:42	18:31	20:23	93	18:28 (1)	21:10	18:53 (1)	21:37	19:03 (1)
23	08:07	07:15	06:13	06:05		16:53 (1)	05:14	16:29 (1)	04:58	16:34 (1)
	16:48	17:44	18:32	20:24	97	18:30 (1)	21:11	18:54 (1)	21:37	19:03 (1)
24	08:06	07:13	06:11	06:03		16:51 (1)	05:13	16:29 (1)	04:58	16:35 (1)
	16:49	17:45	18:34	20:26	100	18:31 (1)	21:13	18:54 (1)	21:37	19:04 (1)
25	08:05	07:11	06:09	06:01		16:49 (1)	05:11	16:29 (1)	04:59	16:35 (1)
	16:51	17:47	18:36	20:28	104	18:33 (1)	21:14	18:55 (1)	21:37	19:04 (1)
26	08:04	07:09	06:07	05:59		16:47 (1)	05:10	16:29 (1)	04:59	16:35 (1)
	16:53	17:49	18:37	20:29	107	18:34 (1)	21:15	18:55 (1)	21:37	19:03 (1)
27	08:02	07:07	06:04	05:57		16:46 (1)	05:09	16:29 (1)	04:59	16:36 (1)
	16:54	17:51	18:39	20:31	109	18:35 (1)	21:17	18:56 (1)	21:37	19:04 (1)
28	08:01	07:05	06:02	05:55		16:45 (1)	05:08	16:29 (1)	05:00	16:35 (1)
	16:56	17:52	18:41	20:33	112	18:37 (1)	21:18	18:56 (1)	21:37	19:04 (1)
29	08:00		07:00	05:53		16:44 (1)	05:07	16:29 (1)	05:01	16:36 (1)
	16:58		19:42	20:34	114	18:38 (1)	21:19	18:56 (1)	21:37	19:04 (1)
30	07:58		06:57	05:51		16:42 (1)	05:06	16:29 (1)	05:01	16:36 (1)
	17:00		19:44	20:36	117	18:39 (1)	21:20	18:56 (1)	21:36	19:04 (1)
31	07:57		06:55				05:05	16:29 (1)		
	17:02		19:46				21:21	18:56 (1)		
Potential sun hours	261	278	367	415		484		497		
Total, worst case				1558		4273		4446		

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

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

Calculation: Kenfig Shadow DetailedShadow receptor: B - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (17)
 Assumptions for shadow calculations

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	05:02	16:36 (1)	05:38	16:42 (1)	06:26	07:15
	21:36	19:04 (1)	21:05	18:59 (1)	20:04	18:55
2	05:02	16:37 (1)	05:39	16:42 (1)	06:28	07:16
	21:36	19:05 (1)	21:03	18:57 (1)	20:02	18:53
3	05:03	16:36 (1)	05:41	16:43 (1)	06:30	07:18
	21:36	19:04 (1)	21:02	18:57 (1)	19:59	18:51
4	05:04	16:37 (1)	05:42	16:43 (1)	06:31	07:20
	21:35	19:05 (1)	21:00	18:56 (1)	19:57	18:48
5	05:05	16:37 (1)	05:44	16:45 (1)	06:33	07:21
	21:35	19:05 (1)	20:58	18:56 (1)	19:55	18:46
6	05:05	16:37 (1)	05:45	16:45 (1)	06:34	07:23
	21:34	19:05 (1)	20:57	18:55 (1)	19:53	18:44
7	05:06	16:37 (1)	05:47	16:46 (1)	06:36	07:25
	21:34	19:04 (1)	20:55	18:54 (1)	19:50	18:42
8	05:07	16:37 (1)	05:48	16:46 (1)	06:38	07:26
	21:33	19:05 (1)	20:53	18:53 (1)	19:48	18:39
9	05:08	16:37 (1)	05:50	16:47 (1)	06:39	07:28
	21:32	19:05 (1)	20:51	18:52 (1)	19:46	18:37
10	05:09	16:37 (1)	05:51	16:48 (1)	06:41	07:30
	21:32	19:05 (1)	20:49	18:51 (1)	19:44	18:35
11	05:10	16:37 (1)	05:53	16:49 (1)	06:42	07:31
	21:31	19:05 (1)	20:47	18:50 (1)	19:41	18:33
12	05:11	16:37 (1)	05:55	16:49 (1)	06:44	07:33
	21:30	19:05 (1)	20:46	18:48 (1)	19:39	18:31
13	05:12	16:38 (1)	05:56	16:50 (1)	06:46	07:35
	21:29	19:05 (1)	20:44	18:46 (1)	19:37	18:28
14	05:13	16:38 (1)	05:58	16:51 (1)	06:47	07:36
	21:28	19:05 (1)	20:42	18:45 (1)	19:34	18:26
15	05:15	16:38 (1)	05:59	16:52 (1)	06:49	07:38
	21:27	19:04 (1)	20:40	18:43 (1)	19:32	18:24
16	05:16	16:38 (1)	06:01	16:54 (1)	06:50	07:40
	21:26	19:04 (1)	20:38	18:42 (1)	19:30	18:22
17	05:17	16:39 (1)	06:03	16:54 (1)	06:52	07:41
	21:25	19:05 (1)	20:36	18:40 (1)	19:27	18:20
18	05:18	16:39 (1)	06:04	16:56 (1)	06:54	07:43
	21:24	19:05 (1)	20:34	18:39 (1)	19:25	18:18
19	05:19	16:39 (1)	06:06	16:57 (1)	06:55	07:45
	21:23	19:04 (1)	20:32	18:37 (1)	19:23	18:16
20	05:21	16:39 (1)	06:07	16:59 (1)	06:57	07:47
	21:22	19:04 (1)	20:30	18:35 (1)	19:20	18:13
21	05:22	16:39 (1)	06:09	17:01 (1)	06:58	07:48
	21:21	19:03 (1)	20:28	18:34 (1)	19:18	18:11
22	05:23	16:40 (1)	06:10	17:03 (1)	07:00	07:50
	21:19	19:04 (1)	20:25	18:31 (1)	19:16	18:09
23	05:25	16:39 (1)	06:12	17:05 (1)	07:02	07:52
	21:18	19:03 (1)	20:23	18:29 (1)	19:14	18:07
24	05:26	16:39 (1)	06:14	17:07 (1)	07:03	07:53
	21:17	19:02 (1)	20:21	18:26 (1)	19:11	18:05
25	05:27	16:39 (1)	06:15	17:10 (1)	07:05	06:55
	21:16	19:02 (1)	20:19	18:24 (1)	19:09	17:03
26	05:29	16:40 (1)	06:17	17:12 (1)	07:06	06:57
	21:14	19:02 (1)	20:17	18:20 (1)	19:07	17:01
27	05:30	16:40 (1)	06:18	17:15 (1)	07:08	06:59
	21:13	19:01 (1)	20:15	18:17 (1)	19:04	16:59
28	05:32	16:40 (1)	06:20	17:18 (1)	07:10	07:00
	21:11	19:00 (1)	20:13	18:13 (1)	19:02	16:57
29	05:33	16:41 (1)	06:22	17:23 (1)	07:11	07:02
	21:10	19:01 (1)	20:10	18:08 (1)	19:00	16:56
30	05:35	16:41 (1)	06:23	17:28 (1)	07:13	07:04
	21:08	19:00 (1)	20:08	18:02 (1)	18:57	16:54
31	05:36	16:42 (1)	06:25	17:38 (1)		07:06
	21:07	19:00 (1)	20:06	17:52 (1)		16:52
Potential sun hours	500	453	381	332	268	246
Total, worst case	4501	3093				

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

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

Project:

South Wales

Licensed user:

Infinite Renewables Limited
 Number One, Waterton Park
 GB-BRIDGEND CF31 3PH, Wales
 +44 1656 644477
 Rob Smith / robsmith484@gmail.com
 Calculated:
 17/03/2022 17:07/3.5.576

SHADOW - Calendar

Calculation: Kenfig Shadow DetailedShadow receptor: C - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (18)
 Assumptions for shadow calculations

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	08:21 16:16	07:55 17:03	07:03 17:54	06:53 19:47	05:49 20:37	05:05 21:22	06:20 (1) 21:36	05:02 21:36	06:18 (1) 21:05	05:38 20:04	07:15 18:55	07:08 16:50
2	08:21 16:17	07:54 17:05	07:00 17:56	06:51 19:49	05:47 20:39	05:04 21:24	06:19 (1) 21:36	05:02 21:36	06:19 (1) 21:03	05:39 20:02	07:16 18:53	07:09 16:48
3	08:21 16:18	07:52 17:07	06:58 17:58	06:48 19:51	05:45 20:41	05:03 21:25	06:17 (1) 21:36	05:03 21:36	06:19 (1) 21:02	05:41 20:59	07:18 18:51	07:11 16:46
4	08:21 16:20	07:51 17:09	06:56 18:00	06:46 19:52	05:43 20:42	05:02 21:26	06:17 (1) 21:35	05:04 21:35	06:20 (1) 21:00	05:42 20:57	07:20 18:48	07:13 16:45
5	08:21 16:21	07:49 17:11	06:54 18:01	06:44 19:54	05:42 20:44	05:02 21:27	06:16 (1) 21:35	05:05 21:35	06:21 (1) 20:58	05:44 20:55	07:21 18:46	07:15 16:43
6	08:21 16:22	07:47 17:13	06:52 18:03	06:42 19:56	05:40 20:46	05:01 21:28	06:16 (1) 21:34	05:05 21:34	06:22 (1) 20:57	05:45 20:57	07:23 18:44	07:16 16:41
7	08:20 16:23	07:46 17:14	06:50 18:05	06:39 19:57	05:38 20:47	05:00 21:28	06:15 (1) 21:34	05:06 21:34	06:22 (1) 20:55	05:47 20:55	07:25 18:42	07:18 16:39
8	08:20 16:25	07:44 17:16	06:47 18:07	06:37 19:59	05:36 20:49	05:00 21:29	06:15 (1) 21:33	05:07 21:33	06:23 (1) 20:53	05:48 20:53	07:26 18:39	07:20 16:38
9	08:19 16:26	07:42 17:18	06:45 18:08	06:35 20:01	05:35 20:50	04:59 21:30	06:15 (1) 21:32	05:08 21:32	06:24 (1) 20:51	05:50 20:51	07:28 18:37	07:22 16:36
10	08:19 16:27	07:40 17:20	06:43 18:10	06:33 20:02	05:33 20:52	04:59 21:31	06:14 (1) 21:32	05:09 21:32	06:25 (1) 20:49	05:51 20:49	07:30 18:35	07:23 16:35
11	08:18 16:29	07:39 17:22	06:41 18:12	06:30 20:04	05:31 20:54	04:59 21:32	06:14 (1) 21:31	05:10 21:31	06:27 (1) 20:47	05:53 20:47	07:31 18:33	07:25 16:33
12	08:18 16:30	07:37 17:24	06:38 18:14	06:28 20:06	05:30 20:55	04:58 21:32	06:14 (1) 21:30	05:11 21:30	06:28 (1) 20:46	05:55 20:46	07:33 18:31	07:27 16:32
13	08:17 16:32	07:35 17:25	06:36 18:15	06:26 20:08	05:28 20:57	04:58 21:33	06:13 (1) 21:29	05:12 21:29	06:30 (1) 20:44	05:56 20:44	07:35 18:28	07:29 16:30
14	08:16 16:33	07:33 17:27	06:34 18:17	06:24 20:09	05:26 20:58	04:58 21:34	06:13 (1) 21:28	05:13 21:28	06:32 (1) 20:42	05:58 20:42	07:36 18:26	07:30 16:29
15	08:15 16:35	07:31 17:29	06:32 18:19	06:22 20:11	05:25 21:00	04:58 21:34	06:13 (1) 21:27	05:15 21:27	06:34 (1) 20:40	05:59 20:40	07:38 18:24	07:32 16:27
16	08:15 16:36	07:29 17:31	06:29 18:20	06:20 20:13	05:23 21:01	04:57 21:35	06:13 (1) 21:26	05:16 21:26	06:37 (1) 20:38	06:01 20:38	07:40 18:22	07:34 16:26
17	08:14 16:38	07:27 17:33	06:27 18:22	06:17 20:14	05:22 21:03	04:57 21:35	06:13 (1) 21:25	05:17 21:25	06:42 (1) 20:36	06:03 20:36	07:41 18:20	07:36 16:24
18	08:13 16:39	07:25 17:35	06:25 18:24	06:15 20:16	05:20 21:04	04:57 21:36	06:13 (1) 21:24	05:18 21:24	06:44 (1) 20:34	06:04 20:34	07:43 18:18	07:37 16:23
19	08:12 16:41	07:23 17:36	06:23 18:25	06:13 20:18	05:19 21:06	04:57 21:36	06:13 (1) 21:23	05:19 21:23	06:46 (1) 20:32	06:06 20:32	07:45 18:16	07:39 16:22
20	08:11 16:43	07:21 17:38	06:20 18:27	06:11 20:19	05:18 21:07	04:57 21:36	06:14 (1) 21:22	05:21 21:22	06:47 (1) 20:30	06:07 20:30	07:47 18:13	07:41 16:21
21	08:10 16:44	07:19 17:40	06:18 18:29	06:09 20:21	05:16 21:09	04:58 21:36	06:14 (1) 21:21	05:22 21:21	06:49 (1) 20:28	06:09 20:28	07:48 18:11	07:42 16:20
22	08:09 16:46	07:17 17:42	06:16 18:31	06:07 20:23	05:15 21:10	04:58 21:37	06:14 (1) 21:19	05:23 21:19	06:10 (1) 20:25	07:00 20:25	07:50 18:09	07:44 16:18
23	08:07 16:48	07:15 17:44	06:13 18:32	06:05 20:24	05:14 21:11	04:58 21:37	06:14 (1) 21:18	05:25 21:18	06:12 (1) 20:23	07:02 20:23	07:52 18:07	07:46 16:17
24	08:06 16:49	07:13 17:45	06:11 18:34	06:03 20:26	05:13 21:13	04:58 21:37	06:15 (1) 21:17	05:26 21:17	06:14 (1) 20:21	07:03 20:21	07:53 18:05	07:47 16:16
25	08:05 16:51	07:11 17:47	06:09 18:36	06:01 20:28	05:11 21:14	04:59 21:37	06:15 (1) 21:16	05:27 21:16	06:15 (1) 20:19	07:05 20:19	06:55 18:03	07:49 16:15
26	08:04 16:53	07:09 17:49	06:07 18:37	05:59 20:29	05:10 21:15	04:59 21:37	06:15 (1) 21:14	05:29 21:14	06:17 (1) 20:17	07:06 20:17	06:57 18:01	07:50 16:14
27	08:02 16:55	07:07 17:51	06:04 18:39	05:57 20:31	05:09 21:17	04:59 21:38	06:16 (1) 21:13	05:30 21:13	06:18 (1) 20:15	07:08 20:15	06:59 18:04	07:52 16:13
28	08:01 16:56	07:05 17:53	06:02 18:41	05:55 20:33	05:08 21:18	04:58 21:38	06:16 (1) 21:11	05:32 21:11	06:20 (1) 20:13	07:10 20:13	07:53 18:07	07:53 16:13
29	08:00 16:58		07:00 19:42	05:53 20:34	05:07 21:19	04:59 21:38	06:17 (1) 21:10	05:33 21:10	06:22 (1) 20:10	07:11 20:10	07:55 18:04	07:55 16:12
30	07:58 17:00		06:57 19:44	05:51 20:36	05:06 21:20	04:59 21:38	06:17 (1) 21:08	05:01 21:08	06:23 (1) 20:08	07:13 20:08	07:56 18:11	07:56 16:11
31	07:57 17:02		06:55 19:46		05:05 21:21	04:59 21:38	06:17 (1) 21:07	05:36 21:07	06:25 (1) 20:06	07:14 20:06	07:57 18:12	07:57 16:11
Potential sun hours	261	278	367	415	484	497	500	453	381	332	268	246
Total, worst case					146	1646	709					

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:

South Wales

Licensed user:

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 +44 1656 644477
 Rob Smith / robsmith484@gmail.com
 Calculated:
 17/03/2022 17:07/3.5.576

SHADOW - Calendar

Calculation: Kenfig Shadow DetailedShadow receptor: D - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (19)
 Assumptions for shadow calculations

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	08:21	07:55	07:03	06:53	05:49	05:05	05:02	05:38	06:26	07:15	07:08	07:58
	16:16	17:03	17:54	19:47	20:37	21:22	21:36	21:05	20:04	18:55	16:50	16:10
2	08:21	07:54	07:00	06:51	05:47	05:04	05:02	05:39	06:28	07:16	07:09	07:59
	16:17	17:05	17:56	19:49	20:39	21:24	21:36	21:03	20:02	18:53	16:48	16:10
3	08:21	07:52	06:58	06:48	05:45	05:03	05:03	05:41	06:30	07:18	07:11	08:01
	16:18	17:07	17:58	19:51	20:41	21:25	21:36	21:02	19:59	18:51	16:46	16:09
4	08:21	07:51	06:56	06:46	05:43	05:02	05:04	05:42	06:31	07:20	07:13	08:02
	16:20	17:09	18:00	19:52	20:42	21:26	21:35	21:00	19:57	18:48	16:45	16:09
5	08:21	07:49	06:54	06:44	05:42	05:02	05:05	05:44	06:33	07:21	07:15	08:03
	16:21	17:11	18:01	19:54	20:44	21:27	21:35	20:58	19:55	18:46	16:43	16:08
6	08:21	07:47	06:52	06:42	05:40	05:01	05:05	05:45	06:34	07:23	07:16	08:04
	16:22	17:13	18:03	19:56	20:46	21:28	21:34	20:57	19:53	18:44	16:41	16:08
7	08:20	07:46	06:50	06:39	05:38	05:00	05:06	05:47	06:36	07:25	07:18	08:06
	16:23	17:14	18:05	19:57	20:47	21:28	21:34	20:55	19:50	18:42	16:39	16:07
8	08:20	07:44	06:47	06:37	05:36	05:00	05:07	05:48	06:38	07:26	07:20	08:07
	16:24	17:16	18:07	19:59	20:49	21:29	21:33	20:53	19:48	18:39	16:38	16:07
9	08:19	07:42	06:45	06:35	05:35	04:59	05:08	05:50	06:39	07:28	07:22	08:08
	16:26	17:18	18:08	20:01	20:50	21:30	21:32	20:51	19:46	18:37	16:36	16:07
10	08:19	07:40	06:43	06:33	05:33	04:59	05:09	05:51	06:41	07:30	07:23	08:09
	16:27	17:20	18:10	20:02	20:52	21:31	21:32	20:49	19:44	18:35	16:35	16:06
11	08:18	07:39	06:41	06:30	05:31	04:59	05:10	05:53	06:42	07:31	07:25	08:10
	16:29	17:22	18:12	20:04	20:54	21:32	21:31	20:47	19:41	18:33	16:33	16:06
12	08:18	07:37	06:38	06:28	05:30	04:58	05:11	05:55	06:44	07:33	07:27	08:11
	16:30	17:24	18:14	20:06	20:55	21:32	21:30	20:46	19:39	18:31	16:32	16:06
13	08:17	07:35	06:36	06:26	05:28	04:58	05:12	05:56	06:46	07:35	07:29	08:12
	16:32	17:25	18:15	20:08	20:57	21:33	21:29	20:44	19:37	18:28	16:30	16:06
14	08:16	07:33	06:34	06:24	05:26	04:58	05:13	05:58	06:47	07:36	07:30	08:13
	16:33	17:27	18:17	20:09	20:58	21:34	21:28	20:42	19:34	18:26	16:29	16:06
15	08:15	07:31	06:32	06:22	05:25	04:58	05:15	05:59	06:49	07:38	07:32	08:14
	16:35	17:29	18:19	20:11	21:00	21:34	21:27	20:40	19:32	18:24	16:27	16:06
16	08:15	07:29	06:29	06:20	05:23	04:57	05:16	06:01	06:50	07:40	07:34	08:15
	16:36	17:31	18:20	20:13	21:01	21:35	21:26	20:38	19:30	18:22	16:26	16:06
17	08:14	07:27	06:27	06:17	05:22	04:57	05:17	06:03	06:52	07:41	07:36	08:16
	16:38	17:33	18:22	20:14	21:03	21:35	21:25	20:36	19:27	18:20	16:24	16:07
18	08:13	07:25	06:25	06:15	05:20	04:57	05:18	06:04	06:54	07:43	07:37	08:17
	16:39	17:35	18:24	20:16	21:04	21:36	21:24	20:34	19:25	18:18	16:23	16:07
19	08:12	07:23	06:23	06:13	05:19	04:57	05:19	06:06	06:55	07:45	07:39	08:17
	16:41	17:36	18:25	20:18	21:06	21:36	21:23	20:32	19:23	18:16	16:22	16:07
20	08:11	07:21	06:20	06:11	05:18	04:57	05:21	06:07	06:57	07:47	07:41	08:18
	16:43	17:38	18:27	20:19	21:07	21:36	21:22	20:30	19:20	18:13	16:21	16:07
21	08:10	07:19	06:18	06:09	05:16	04:58	05:22	06:09	06:58	07:48	07:42	08:18
	16:44	17:40	18:29	20:21	21:09	21:36	21:21	20:28	19:18	18:11	16:20	16:08
22	08:09	07:17	06:16	06:07	05:15	04:58	05:23	06:10	07:00	07:50	07:44	08:19
	16:46	17:42	18:31	20:23	21:10	21:37	21:19	20:25	19:16	18:09	16:18	16:08
23	08:07	07:15	06:13	06:05	05:14	04:58	05:25	06:12	07:02	07:52	07:46	08:20
	16:48	17:44	18:32	20:24	21:11	21:37	21:18	20:23	19:14	18:07	16:17	16:09
24	08:06	07:13	06:11	06:03	05:13	04:58	05:26	06:14	07:03	07:53	07:47	08:20
	16:49	17:45	18:34	20:26	21:13	21:37	21:17	20:21	19:11	18:05	16:16	16:09
25	08:05	07:11	06:09	06:01	05:11	04:59	05:27	06:15	07:05	07:55	07:49	08:20
	16:51	17:47	18:36	20:28	21:14	21:37	21:16	20:19	19:09	17:03	16:15	16:10
26	08:04	07:09	06:07	05:59	05:10	04:59	05:29	06:17	07:06	07:57	07:50	08:21
	16:53	17:49	18:37	20:29	21:15	21:37	21:14	20:17	19:07	17:01	16:14	16:11
27	08:02	07:07	06:04	05:57	05:09	05:00	05:30	06:18	07:08	07:59	07:52	08:21
	16:54	17:51	18:39	20:31	21:17	21:37	21:13	20:15	19:04	16:59	16:13	16:12
28	08:01	07:05	06:02	05:55	05:08	05:00	05:32	06:20	07:10	07:00	07:53	08:21
	16:56	17:53	18:41	20:33	21:18	21:37	21:11	20:13	19:02	16:57	16:13	16:12
29	08:00		07:00	05:53	05:07	05:01	05:33	06:22	07:11	07:02	07:55	08:21
	16:58		19:42	20:34	21:19	21:37	21:10	20:10	19:00	16:56	16:12	16:13
30	07:58		06:57	05:51	05:06	05:01	05:35	06:23	07:13	07:04	07:56	08:21
	17:00		19:44	20:36	21:20	21:37	21:08	20:08	18:57	16:54	16:11	16:14
31	07:57		06:55		05:05		05:36	06:25		07:06		08:21
	17:02		19:46		21:21		21:07	20:06		16:52		16:15
Potential sun hours	261	278	367	415	484	497	500	453	381	332	268	246
Total, worst case												

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

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

Project:

South Wales

Licensed user:

Infinite Renewables Limited
 Number One, Waterton Park
 GB-BRIDGEND CF31 3PH, Wales
 +44 1656 644477
 Rob Smith / robsmith484@gmail.com
 Calculated:
 17/03/2022 17:07/3.5.576

SHADOW - Calendar

Calculation: Kenfig Shadow DetailedShadow receptor: E - Shadow Receptor: 7.0 × 7.0 Azimuth: 0.0° Slope: 90.0° (20)
 Assumptions for shadow calculations

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

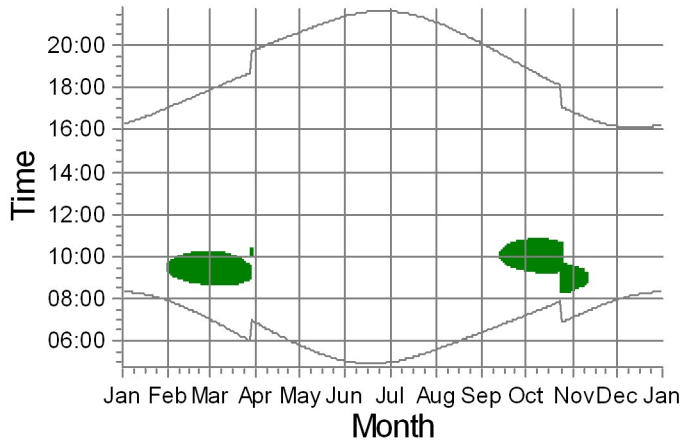
Table layout: For each day in each month the following matrix apply

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

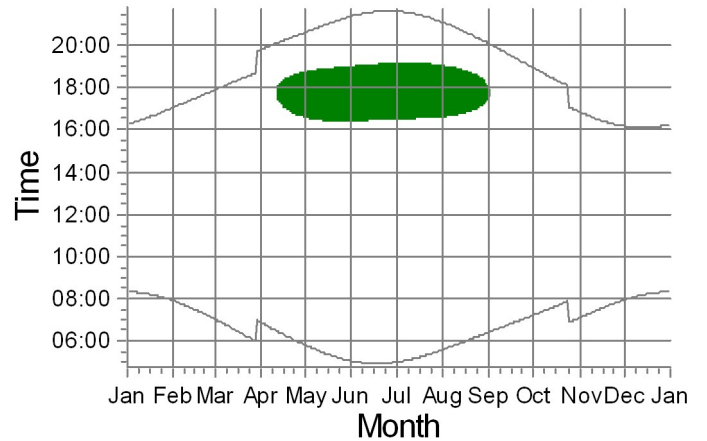
SHADOW - Calendar, graphical

Calculation: Kenfig Shadow Detailed

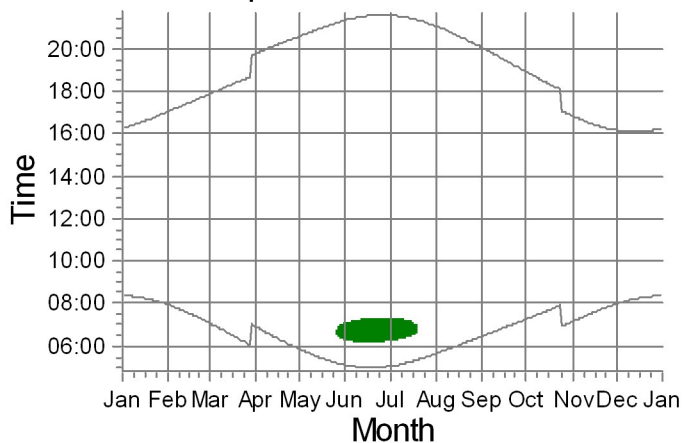
A: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° S



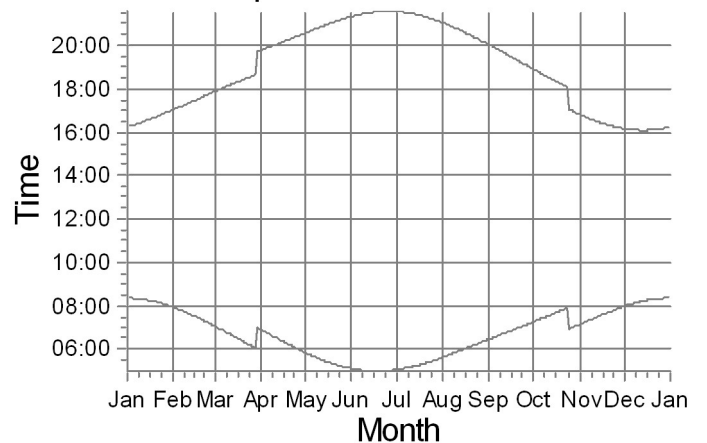
B: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° S



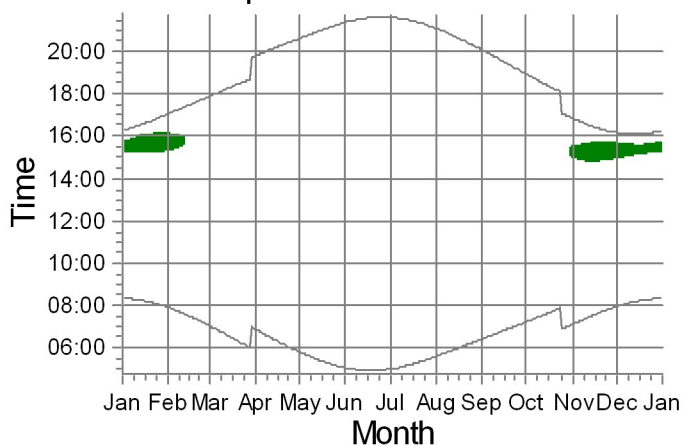
C: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° S



D: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° S



E: Shadow Receptor: 7.0 × 7.0 Azimuth: 0.0° S



WTGs



1: Kenfig WTG

Project:

South Wales

Licensed user:

Infinite Renewables Limited
 Number One, Waterton Park
 GB-BRIDGEND CF31 3PH, Wales
 +44 1656 644477
 Rob Smith / robsmith484@gmail.com
 Calculated:
 17/03/2022 17:07/3.5.576

SHADOW - Calendar per WTG

Calculation: Kenfig Shadow Detailed WTG: 1 - Kenfig WTG

Assumptions for shadow calculations

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	08:21	15:19-15:41/22		07:55	15:24-16:04/40		07:03	08:45-10:13/88		06:53		05:49	16:41-18:40/119		05:04	06:20-06:59/39		
	16:16			17:03	09:20-09:38/18		17:54			19:47		20:37			21:22	16:30-18:57/147		
2	08:21	15:20-15:43/23		07:54	15:25-16:04/39		07:00	08:45-10:13/88		06:51		05:47	16:39-18:41/122		05:04	06:19-07:01/42		
	16:17			17:05	09:16-09:43/27		17:56			19:49		20:39			21:24	16:30-18:57/147		
3	08:21	15:20-15:44/24		07:52	15:26-16:03/37		06:58	08:45-10:13/88		06:48		05:45	16:39-18:42/123		05:03	06:17-07:02/45		
	16:18			17:07	09:13-09:47/34		17:58			19:51		20:41			21:25	16:30-18:57/147		
4	08:21	15:19-15:45/26		07:51	15:27-16:02/35		06:56	08:44-10:11/87		06:46		05:43	16:38-18:43/125		05:02	06:17-07:03/46		
	16:20			17:09	09:10-09:49/39		18:00			19:52		20:42			21:26	16:30-18:58/148		
5	08:21	15:20-15:47/27		07:49	15:28-16:02/34		06:54	08:44-10:11/87		06:44		05:42	16:36-18:43/127		05:02	06:16-07:04/48		
	16:21			17:11	09:08-09:51/43		18:01			19:54		20:44			21:27	16:30-18:58/148		
6	08:21	15:20-15:48/28		07:47	15:30-16:02/32		06:52	08:44-10:11/87		06:42		05:40	16:35-18:44/129		05:01	06:16-07:05/49		
	16:22			17:13	09:07-09:54/47		18:03			19:56		20:46			21:28	16:31-18:59/148		
7	08:20	15:20-15:49/29		07:46	15:31-16:00/29		06:50	08:44-10:11/87		06:39		05:38	16:35-18:45/130		05:00	06:15-07:06/51		
	16:23			17:14	09:04-09:56/52		18:05			19:57		20:47			21:28	16:31-18:59/148		
8	08:20	15:20-15:51/31		07:44	15:33-15:59/26		06:47	08:43-10:09/86		06:37		05:36	16:34-18:46/132		05:00	06:15-07:07/52		
	16:24			17:16	09:03-09:58/55		18:07			19:59		20:49			21:29	16:31-18:59/148		
9	08:19	15:20-15:52/32		07:42	15:35-15:57/22		06:45	08:44-10:09/85		06:35		05:35	16:34-18:47/133		04:59	06:15-07:08/53		
	16:26			17:18	09:01-09:59/58		18:08			20:01		20:50			21:30	16:31-18:59/148		
10	08:19	15:20-15:53/33		07:40	15:38-15:55/17		06:43	08:44-10:08/84		06:33		05:33	16:33-18:47/134		04:59	06:14-07:08/54		
	16:27			17:20	08:59-10:01/62		18:10			20:02		20:52			21:31	16:31-19:00/149		
11	08:18	15:20-15:55/35		07:39	15:42-15:51/9		06:41	08:43-10:07/84		06:30		05:31	16:33-18:48/135		04:59	06:14-07:09/55		
	16:29			17:22	08:58-10:02/64		18:12			20:04		20:54			21:32	16:32-19:00/148		
12	08:18	15:21-15:57/36		07:37	08:57-10:03/66		06:38	08:44-10:06/82		06:28	17:38-17:53/15	05:30	16:32-18:48/136		04:58	06:14-07:10/56		
	16:30			17:24			18:14			20:06		20:55			21:32	16:32-19:01/149		
13	08:17	15:20-15:59/39		07:35	08:56-10:04/68		06:36	08:44-10:05/81		06:26	17:28-18:02/34	05:28	16:32-18:49/137		04:58	06:13-07:10/57		
	16:31			17:25			18:15			20:08		20:57			21:33	16:32-19:00/148		
14	08:16	15:20-16:00/40		07:33	08:54-10:05/71		06:34	08:45-10:04/79		06:24	17:22-18:08/46	05:26	16:31-18:49/138		04:58	06:13-07:11/58		
	16:33			17:27			18:17			20:09		20:58			21:34	16:32-19:01/149		
15	08:15	15:20-16:00/40		07:31	08:53-10:06/73		06:32	08:45-10:02/77		06:22	17:17-18:12/55	05:25	16:31-18:50/139		04:58	06:13-07:11/58		
	16:35			17:29			18:19			20:11		21:00			21:34	16:33-19:01/148		
16	08:15	15:20-16:01/41		07:29	08:52-10:07/75		06:29	08:45-10:01/76		06:20	17:12-18:14/62	05:23	16:30-18:50/140		04:57	06:13-07:12/59		
	16:36			17:31			18:20			20:13		21:01			21:35	16:33-19:01/148		
17	08:14	15:20-16:02/42		07:27	08:52-10:08/76		06:27	08:46-10:00/74		06:17	17:09-18:17/68	05:22	16:30-18:51/141		04:57	06:13-07:12/59		
	16:38			17:33			18:22			20:14		21:03			21:35	16:33-19:01/148		
18	08:13	15:20-16:02/42		07:25	08:51-10:09/78		06:25	08:46-09:57/71		06:15	17:06-18:20/74	05:20	16:30-18:52/142		04:57	06:13-07:12/59		
	16:39			17:35			18:24			20:16		21:04			21:36	16:33-19:02/149		
19	08:12	15:20-16:03/43		07:23	08:50-10:10/80		06:23	08:47-09:56/69		06:13	17:03-18:22/79	05:19	16:29-18:52/143		04:57	06:13-07:13/60		
	16:41			17:36			18:25			20:18		21:06			21:36	16:33-19:02/149		
20	08:11	15:20-16:03/43		07:21	08:49-10:10/81		06:20	08:48-09:54/66		06:11	17:00-18:24/84	05:18	16:29-18:52/143		04:57	06:14-07:14/60		
	16:43			17:38			18:27			20:19		21:07			21:36	16:35-19:03/148		
21	08:10	15:20-16:04/44		07:19	08:49-10:11/82		06:18	08:49-09:52/63		06:09	16:58-18:26/88	05:16	16:29-18:53/144		04:58	06:14-07:14/60		
	16:44			17:40			18:29			20:21		21:09			21:36	16:35-19:03/148		
22	08:09	15:20-16:04/44		07:17	08:48-10:11/83		06:16	08:50-09:49/59		06:07	16:55-18:28/93	05:15	16:29-18:53/144		04:58	06:14-07:14/60		
	16:46			17:42			18:31			20:23		21:10			21:37	16:35-19:03/148		
23	08:07	15:21-16:05/44		07:15	08:48-10:12/84		06:13	08:51-09:47/56		06:05	16:53-18:30/97	05:14	16:29-18:54/145		04:58	06:14-07:14/60		
	16:48			17:44			18:32			20:24		21:11			21:37	16:34-19:03/149		
24	08:06	15:20-16:04/44		07:13	08:47-10:12/85		06:11	08:53-09:45/52		06:03	16:51-18:31/100	05:13	16:29-18:54/145		04:58	06:15-07:14/59		
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	16:51			17:47			18:36			20:28		21:14			21:37	16:35-19:04/149		
26	08:04	15:21-16:05/44		07:09	08:46-10:12/86		06:07	08:56-09:38/42		05:59	16:47-18:34/107	05:10	06:37-06:41/4		04:59	06:15-07:14/59		
	16:53			17:49			18:37			20:29		21:15	16:29-18:55/146		21:37	16:35-19:03/148		
27	08:02	15:21-16:05/44		07:07	08:45-10:12/87		06:04	08:58-09:34/36		05:57	16:46-18:35/109	05:09	06:30-06:48/18		04:59	06:16-07:14/58		
	16:54			17:51			18:39			20:31		21:17	16:29-18:56/147		21:37	16:36-19:04/148		
28	08:01	15:22-16:06/44		07:05	08:45-10:12/87		06:02	09:01-09:29/28		05:55	16:45-18:37/112	05:08	06:27-06:51/24		05:00	06:16-07:14/58		
	16:56			17:53			18:41			20:33		21:18	16:29-18:56/147		21:37	16:35-19:04/149		
29	08:00	15:22-16:05/43					07:00	10:06-10:23/17		05:53	16:44-18:38/114	05:07	06:24-06:54/30		05:01	06:17-07:14/57		
	16:58						19:42			20:34		21:19	16:29-18:56/147		21:37	16:36-19:04/148		
30	07:58	15:22-16:05/43					06:57			05:51	16:42-18:39/117	05:06	06:22-06:56/34		05:01	06:17-07:13/56		
	17:00						19:44			20:36		21:20	16:29-18:56/147		21:37	16:36-19:04/148		
31	07:57	15:24-16:05/41					06:55					05:05	06:21-06:57/36					
	17:02						19:46					21:21	16:29-18:56/147					
Potential sun hours	261		278			367			415			484		497				
Sum of minutes with flicker	1155		2167		2027		1558		4419		6092							

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:

South Wales

Licensed user:

Infinite Renewables Limited
 Number One, Waterton Park
 GB-BRIDGEND CF31 3PH, Wales
 +44 1656 644477
 Rob Smith / robsmith484@gmail.com
 Calculated:
 17/03/2022 17:07/3.5.576

SHADOW - Calendar per WTG

Calculation: Kenfig Shadow Detailed WTG: 1 - Kenfig WTG

Assumptions for shadow calculations

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

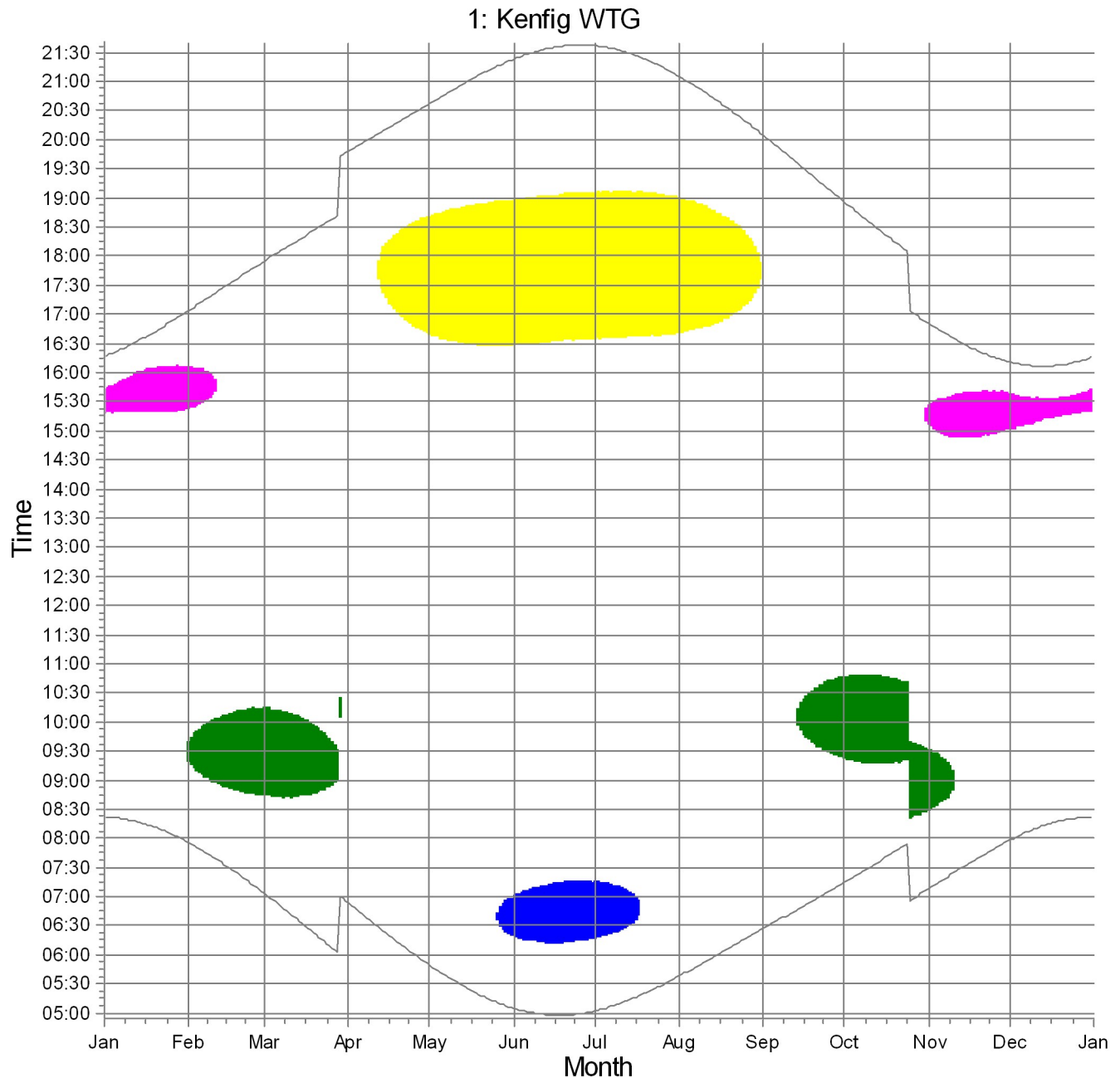
	July	August	September	October	November	December
1	05:02 06:18-07:14/56 21:36 16:36-19:04/148	05:38 16:42-18:59/137 21:05 16:42-18:57/135	06:26 20:04 21:03 20:02	07:15 09:23-10:44/81 18:55 09:22-10:45/83	07:08 15:07-15:25/18 16:50 08:29-09:30/61	07:58 15:02-15:37/35 16:10 15:03-15:37/34
2	05:02 06:19-07:14/55 21:36 16:37-19:05/148	05:39 16:42-18:57/135 21:03 20:02	06:28 20:02 21:03 20:02	07:16 09:22-10:45/83 18:53 09:22-10:46/84	07:09 15:05-15:27/22 16:48 08:31-09:29/58	07:59 15:03-15:37/34 16:10 15:03-15:35/32
3	05:03 06:19-07:13/54 21:36 16:36-19:04/148	05:41 16:43-18:57/134 21:02 19:59	06:30 19:59 06:31 19:57	07:18 09:22-10:46/84 18:51 09:21-10:46/85	07:11 15:02-15:29/27 16:46 08:33-09:27/54	08:01 15:03-15:35/32 16:09 15:05-15:35/30
4	05:04 06:20-07:13/53 21:35 16:37-19:05/148	05:42 16:43-18:56/133 21:00 19:57	06:31 19:57 06:33 19:55	07:20 09:21-10:46/85 18:48 09:20-10:46/86	07:13 15:01-15:30/29 16:45 08:34-09:26/52	08:02 15:05-15:35/30 16:09 15:05-15:34/29
5	05:05 06:21-07:12/51 21:35 16:37-19:05/148	05:44 16:45-18:56/131 20:58 19:55	06:33 19:55 06:34 19:53	07:21 09:20-10:46/86 18:46 09:20-10:47/87	07:15 14:59-15:31/32 16:43 08:37-09:24/47	08:03 15:05-15:34/29 16:08 15:06-15:34/28
6	05:05 06:22-07:12/50 21:34 16:37-19:05/148	05:45 16:45-18:55/130 20:57 19:53	06:34 19:53 06:36 19:50	07:23 09:20-10:47/87 18:44 09:20-10:47/87	07:16 14:58-15:32/34 16:41 08:39-09:22/43	08:04 15:06-15:34/28 16:08 15:07-15:34/27
7	05:06 06:22-07:11/49 21:34 16:37-19:04/147	05:47 16:46-18:54/128 20:55 19:50	06:36 19:50 06:38 19:48	07:25 09:20-10:47/87 18:42 09:19-10:46/87	07:18 14:56-15:32/36 16:39 08:41-09:20/39	08:06 15:07-15:34/27 16:07 15:07-15:33/26
8	05:07 06:23-07:10/47 21:33 16:37-19:05/148	05:48 16:46-18:53/127 20:53 19:48	06:38 19:48 06:39 19:46	07:26 09:19-10:46/87 18:39 09:19-10:46/87	07:20 14:56-15:33/37 16:38 08:43-09:16/33	08:07 15:07-15:33/26 16:07 15:08-15:32/24
9	05:08 06:24-07:09/45 21:32 16:37-19:05/148	05:50 16:47-18:52/125 20:51 19:46	06:39 19:46 06:41 19:44	07:28 09:19-10:46/87 18:37 09:19-10:47/88	07:22 14:55-15:34/39 16:36 08:47-09:13/26	08:08 15:08-15:32/24 16:07 15:09-15:32/23
10	05:09 06:25-07:09/44 21:32 16:37-19:05/148	05:51 16:48-18:51/123 20:49 19:44	06:41 19:44 06:42 19:41	07:30 09:19-10:47/88 18:35 09:18-10:46/88	07:23 14:55-15:35/40 16:35 08:51-09:09/18	08:09 15:09-15:32/23 16:06 15:10-15:33/23
11	05:10 06:27-07:07/40 21:31 16:37-19:05/148	05:53 16:49-18:50/121 20:47 19:41	06:42 19:41 06:44 19:39	07:31 09:18-10:46/88 18:33 09:18-10:46/88	07:25 14:54-15:36/42 16:33 14:54-15:36/42	08:10 15:10-15:33/23 16:06 15:11-15:32/21
12	05:11 06:28-07:06/38 21:30 16:37-19:05/148	05:55 16:49-18:48/119 20:46 19:39	06:44 19:39 06:46 19:37	07:33 09:18-10:46/88 18:31 09:18-10:46/88	07:27 14:54-15:36/42 16:32 14:54-15:37/43	08:11 15:11-15:32/21 16:06 15:12-15:32/20
13	05:12 06:30-07:05/35 21:29 16:38-19:05/147	05:56 16:50-18:46/116 20:44 19:37	06:46 19:37 06:47 19:34	07:35 09:18-10:46/88 18:28 09:18-10:46/88	07:29 14:54-15:37/43 16:30 14:54-15:38/44	08:12 15:12-15:32/20 16:06 15:13-15:32/19
14	05:13 06:32-07:03/31 21:28 16:38-19:05/147	05:58 16:51-18:45/114 20:42 19:34	06:47 19:34 06:49 19:32	07:36 09:18-10:46/88 18:26 09:19-10:45/86	07:30 14:54-15:38/44 16:29 14:54-15:38/44	08:13 15:13-15:32/19 16:06 15:13-15:31/18
15	05:15 06:34-07:01/27 21:27 16:38-19:04/146	05:59 16:52-18:43/111 20:40 19:32	06:49 19:32 06:50 19:30	07:38 09:19-10:45/86 18:24 09:18-10:44/86	07:32 14:54-15:38/44 16:27 14:55-15:39/44	08:14 15:13-15:31/18 16:06 15:14-15:32/18
16	05:16 06:37-06:58/21 21:26 16:38-19:04/146	06:01 16:54-18:42/108 20:38 19:30	06:50 19:30 06:52 19:27	07:40 09:18-10:44/86 18:22 09:18-10:44/86	07:34 14:55-15:39/44 16:26 14:54-15:38/44	08:15 15:14-15:32/18 16:06 15:14-15:32/18
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31	05:36 16:42-19:00/138 21:07 16:42-19:00/138	06:25 17:38-17:52/14 20:06 17:38-17:52/14	06:25 17:38-17:52/14 381	07:06 15:10-15:22/12 16:52 08:28-09:31/63	07:56 15:02-15:38/36 16:11 15:02-15:38/36	08:21 15:20-15:41/21 16:15 15:20-15:41/21
Potential sun hours	500	453	381	332	268	246
Sum of minutes with flicker	5210	3093	976	2539	1590	675

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

SHADOW - Calendar per WTG, graphical

Calculation: Kenfig Shadow Detailed WTG: 1 - Kenfig WTG



Shadow receptors

	A: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (16)
	B: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (17)
	C: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (18)
	E: Shadow Receptor: 7.0 × 7.0 Azimuth: 0.0° Slope: 90.0° (20)

SHADOW - Map

Calculation: Kenfig Shadow Detailed

