

SHADOW - Main Result

Calculation: Vimmelstorp_9xV126 @ 137 m hh
 Assumptions for shadow calculations

Maximum distance for influence
 Calculate only when more than 20 % of sun is covered by the blade
 Please look in WTG table

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

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBERG G]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,36 1,52 2,62 6,08 8,82 7,64 6,65 5,42 4,02 2,68 1,38 0,88

Operational hours are calculated from WTGs in calculation and wind distribution:
 Vimmelstorp

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 365 405 535 650 678 641 674 975 1357 1271 554 397 8501
 Idle start wind speed: Cut in wind speed from power curve

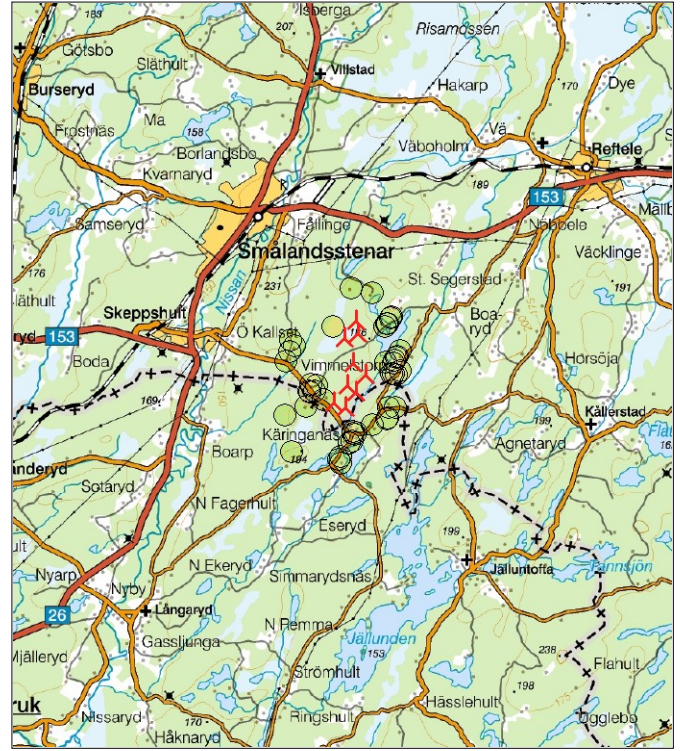
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Vimmelstorp height data
 Obstacles used in calculation
 Eye height for map: 1,5 m
 Grid resolution: 1,0 m

All coordinates are in Swedish UTM 33-SWREF99 (SE)

WTGs

Easting	Northing	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
				Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	407341	6332902	184,8 1	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1
2	407000	6330064	170,0 2	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1
3	407350	6330568	170,6 3	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1
4	406980	6332332	180,0 4	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1
5	407669	6331149	180,0 5	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1
6	407242	6331510	180,0 6	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1
7	406627	6330223	174,8 7	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1
8	407420	6332499	185,0 8	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1
9	407055	6330793	175,9 9	Yes	VESTAS	V126-3.6 HTq-3600	3600	126,0	137,0	1718	12,1



Scale 1:250 000
 ▲ New WTG ● Shadow receptor

Shadow receptor-Input

No.	Name	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	GISLAVED TRONEBO 1:13	405869	6330820	180,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
B	GISLAVED TRONEBO 1:7	406038	6330787	177,8	5,0	5,0	1,0	0,0	"Green house mode"	1,0
C	GISLAVED TRONEBO 1:8	405975	6330607	182,2	5,0	5,0	1,0	0,0	"Green house mode"	1,0
D	GISLAVED TRONEBO 1:8	405991	6330591	181,7	5,0	5,0	1,0	0,0	"Green house mode"	1,0
E	GISLAVED TRONEBO 1:9	405809	6330564	180,6	5,0	5,0	1,0	0,0	"Green house mode"	1,0
F	GISLAVED TRONEBO 1:9	405792	6330584	180,1	5,0	5,0	1,0	0,0	"Green house mode"	1,0
G	GISLAVED SKATEKULL 1:4	406269	6330307	170,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
H	GISLAVED KULLA 1:4	408284	6332714	165,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
I	GISLAVED VIMMELSTORP 1:10	408337	6331554	165,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
J	GISLAVED VIMMELSTORP 1:11	408576	6331499	170,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
K	GISLAVED VIMMELSTORP 1:5	408525	6331175	166,1	5,0	5,0	1,0	0,0	"Green house mode"	1,0
L	GISLAVED VIMMELSTORP 1:5	408571	6331151	167,4	5,0	5,0	1,0	0,0	"Green house mode"	1,0
M	GISLAVED VIMMELSTORP 1:6	408686	6331129	171,3	5,0	5,0	1,0	0,0	"Green house mode"	1,0
N	HYLTE KÄRINGANÄS 1:5	408419	6330047	196,1	5,0	5,0	1,0	0,0	"Green house mode"	1,0
O	HYLTE KÄRINGANÄS 1:8	408352	6329685	205,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0

To be continued on next page...

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Calculation: Vimmelstorp_9xV126 @ 137 m hh

...continued from previous page

No.	Name	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]
P	HYLTE KÄRINGANÄS 1:14	408395	6329691	205,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
Q	HYLTE KÄRINGANÄS 1:9	407884	6329479	192,2	5,0	5,0	1,0	0,0	"Green house mode"	1,0
R	HYLTE KÄRINGANÄS 1:16	407259	6329251	174,1	5,0	5,0	1,0	0,0	"Green house mode"	1,0
S	HYLTE KÄRINGANÄS 1:15	407340	6329235	175,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
T	HYLTE KÄRINGANÄS 1:6	407251	6329204	174,6	5,0	5,0	1,0	0,0	"Green house mode"	1,0
U	HYLTE KÄRINGANÄS 1:17	407305	6329169	175,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
V	HYLTE KÄRINGANÄS 1:12	407205	6328954	175,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
W	HYLTE KÄRINGANÄS 1:18	407123	6328878	174,4	5,0	5,0	1,0	0,0	"Green house mode"	1,0
X	HYLTE HOLMSERYD 1:2	406826	6328447	170,3	5,0	5,0	1,0	0,0	"Green house mode"	1,0
Y	HYLTE HOLMSERYD 1:3	406772	6328345	170,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
Z	HYLTE YTTERSJÖHOLM 1:17	406827	6328217	170,8	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AA	HYLTE KRÅKSÄS 1:11	405230	6328601	175,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AB	Boarp Gråsholmen	404991	6329791	175,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AC	HYLTE KRÅKSÄS 1:5	405700	6330079	172,9	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AD	GISLAVED VIMMELSTORP 3:1	408631	6331620	170,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AE	GISLAVED VIMMELSTORP 3:4	408671	6331719	178,5	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AF	GISLAVED VIMMELSTORP 3:2	408709	6331746	174,2	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AG	GISLAVED TÅNGA 1:1	407180	6333982	181,6	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AH	GISLAVED GÖKABO 1:1	407898	6333841	174,4	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AI	GISLAVED KULLA 1:5	408352	6332803	165,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AJ	GISLAVED KULLA 1:6	408380	6332815	165,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AK	GISLAVED SONNARYD 2:2	408522	6333027	174,2	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AL	GISLAVED SONNARYD 2:3	408489	6333006	172,9	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AM	HYLTE KÄRINGANÄS 1:13	408633	6330054	190,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AN	GISLAVED VIMMELSTORP 1:8	408810	6331267	175,6	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AO	GISLAVED VIMMELSTORP 2:8	408808	6331934	170,4	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AP	Brunnsgård 2	405026	6331563	171,4	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AQ	GISLAVED TRONEBO 1:15	405169	6331887	180,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AR	GISLAVED TRONEBO 1:14	405304	6332088	188,6	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AS	GISLAVED FÄLLINGE 8:4	405189	6332264	195,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0
AT	Orrspelplats_Kronobossen	406594	6332712	180,0	5,0	5,0	1,0	0,0	"Green house mode"	1,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	GISLAVED TRONEBO 1:13	9:33
B	GISLAVED TRONEBO 1:7	16:56
C	GISLAVED TRONEBO 1:8	13:47
D	GISLAVED TRONEBO 1:8	13:48
E	GISLAVED TRONEBO 1:9	11:46
F	GISLAVED TRONEBO 1:9	6:39
G	GISLAVED SKATEKULL 1:4	43:02
H	GISLAVED KULLA 1:4	10:09
I	GISLAVED VIMMELSTORP 1:10	12:07
J	GISLAVED VIMMELSTORP 1:11	7:13
K	GISLAVED VIMMELSTORP 1:5	9:40
L	GISLAVED VIMMELSTORP 1:5	8:57
M	GISLAVED VIMMELSTORP 1:6	7:18
N	HYLTE KÄRINGANÄS 1:5	6:28
O	HYLTE KÄRINGANÄS 1:8	3:22
P	HYLTE KÄRINGANÄS 1:14	4:14
Q	HYLTE KÄRINGANÄS 1:9	9:41
R	HYLTE KÄRINGANÄS 1:16	0:00
S	HYLTE KÄRINGANÄS 1:15	0:00
T	HYLTE KÄRINGANÄS 1:6	0:00
U	HYLTE KÄRINGANÄS 1:17	0:00
V	HYLTE KÄRINGANÄS 1:12	0:00
W	HYLTE KÄRINGANÄS 1:18	0:00
X	HYLTE HOLMSERYD 1:2	0:00
Y	HYLTE HOLMSERYD 1:3	0:00

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Project:

Vimmelstorp

Licensed user:

Wind Sweden AB

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Calculated:

2019-06-19 22:34/3.3.247

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Calculation: Vimmelstorp_9xV126 @ 137 m hh

...continued from previous page

No.	Name	Shadow, expected values Shadow hours per year [h/year]
	Z HYLTE YTTERSJÖHOLM 1:17	0:00
	AA HYLTE KRÅKSÅS 1:11	0:00
	AB Boarp Gräsholmen	1:29
	AC HYLTE KRÅKSÅS 1:5	11:15
	AD GISLAVED VIMMELSTORP 3:1	8:55
	AE GISLAVED VIMMELSTORP 3:4	7:47
	AF GISLAVED VIMMELSTORP 3:2	6:43
	AG GISLAVED TÅNGA 1:1	1:08
	AH GISLAVED GÖKABO 1:1	3:52
	AI GISLAVED KULLA 1:5	8:07
	AJ GISLAVED KULLA 1:6	6:29
	AK GISLAVED SONNARYD 2:2	3:47
	AL GISLAVED SONNARYD 2:3	4:06
	AM HYLTE KÅRINGANÅS 1:13	3:12
	AN GISLAVED VIMMELSTORP 1:8	4:19
	AO GISLAVED VIMMELSTORP 2:8	4:40
	AP Brunngård 2	0:00
	AQ GISLAVED TRONEBO 1:15	0:00
	AR GISLAVED TRONEBO 1:14	1:15
	AS GISLAVED FÅLLINGE 8:4	0:00
	AT Orrspelplats_Kronobomossen	21:21

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

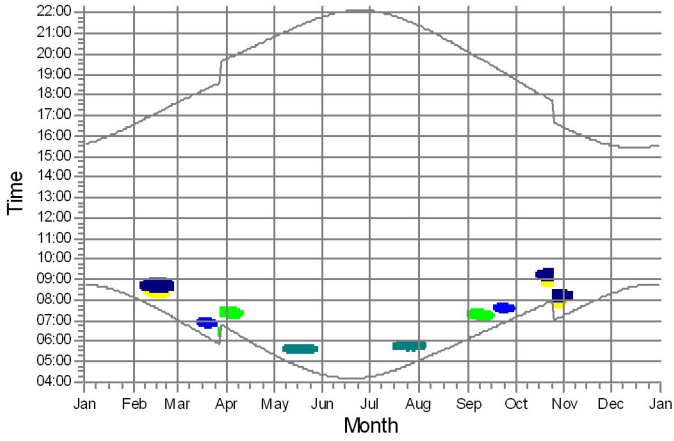
No.	Name	Worst case [h/year]	Expected [h/year]
1	1	130:58	26:39
2	2	116:15	21:35
3	3	107:35	21:33
4	4	85:11	13:11
5	5	116:32	23:39
6	6	133:54	28:56
7	7	232:00	47:05
8	8	117:21	23:40
9	9	110:05	27:03

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.

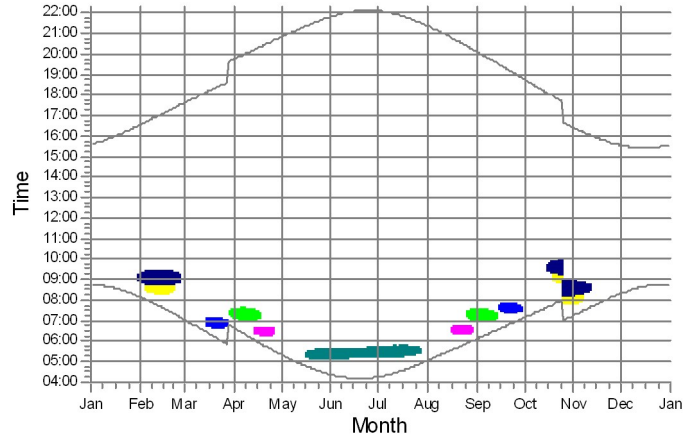
SHADOW - Calendar, graphical

Calculation: Vimmelstorp_9xV126 @ 137 m hh

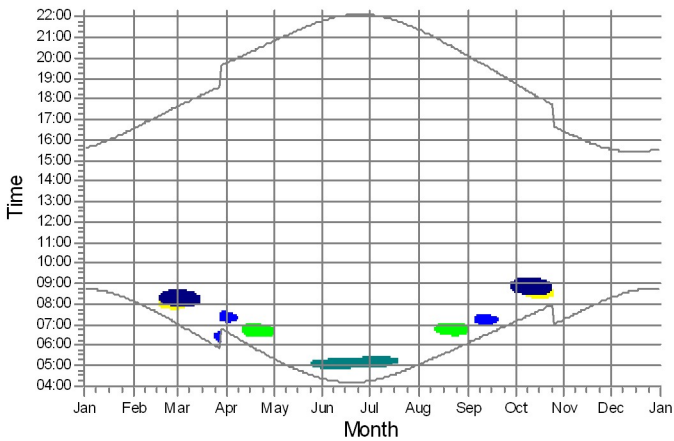
A: GISLAVED TRONEBO 1:13



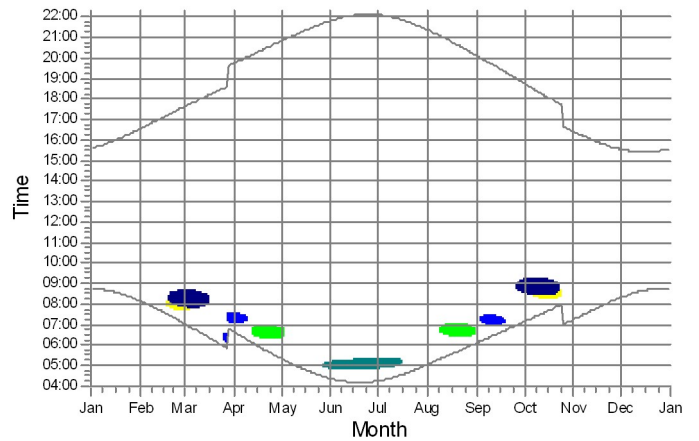
B: GISLAVED TRONEBO 1:7



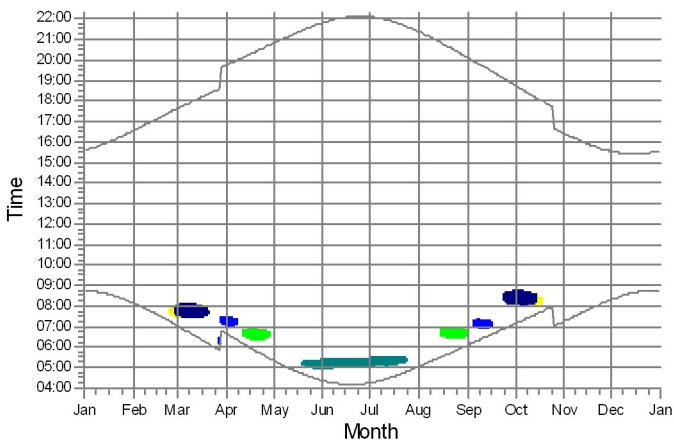
C: GISLAVED TRONEBO 1:8



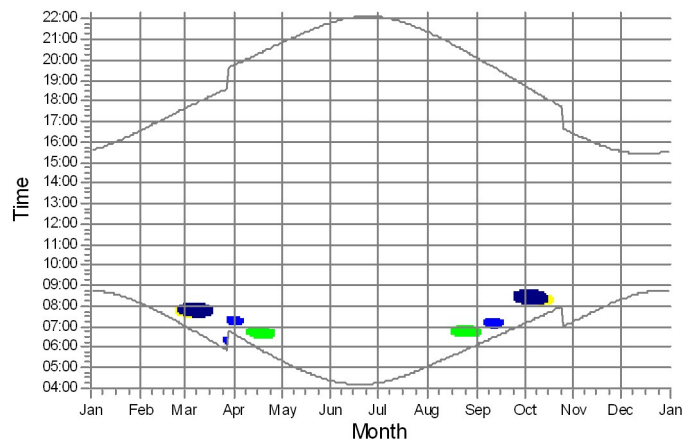
D: GISLAVED TRONEBO 1:8



E: GISLAVED TRONEBO 1:9



F: GISLAVED TRONEBO 1:9



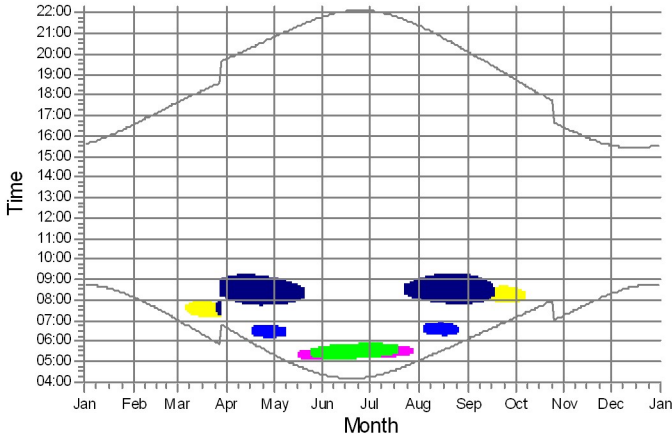
WTGs



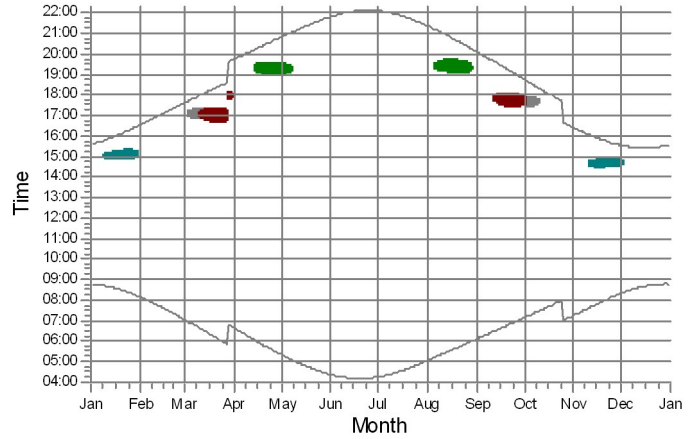
SHADOW - Calendar, graphical

Calculation: Vimmelstorp_9xV126 @ 137 m hh

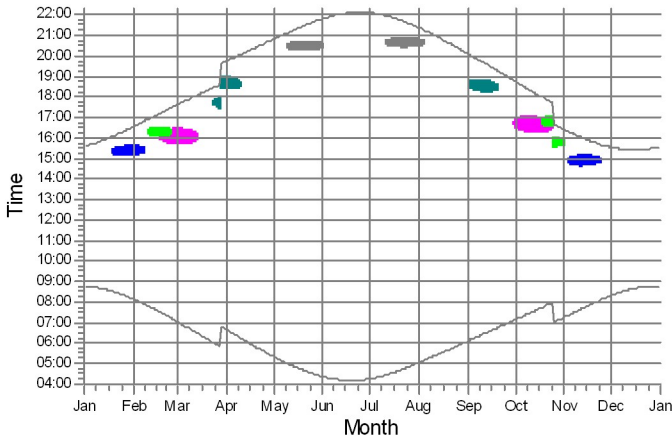
G: GISLAVED SKATEKULL 1:4



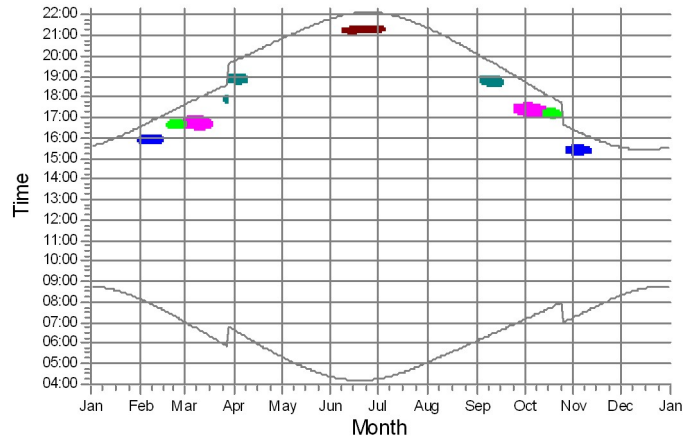
H: GISLAVED KULLA 1:4



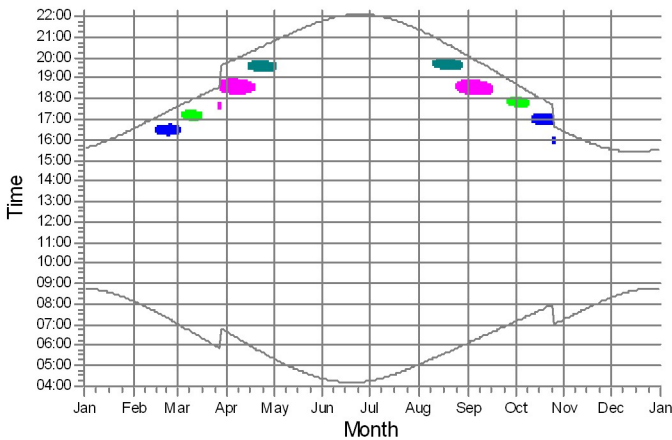
I: GISLAVED VIMMELSTORP 1:10



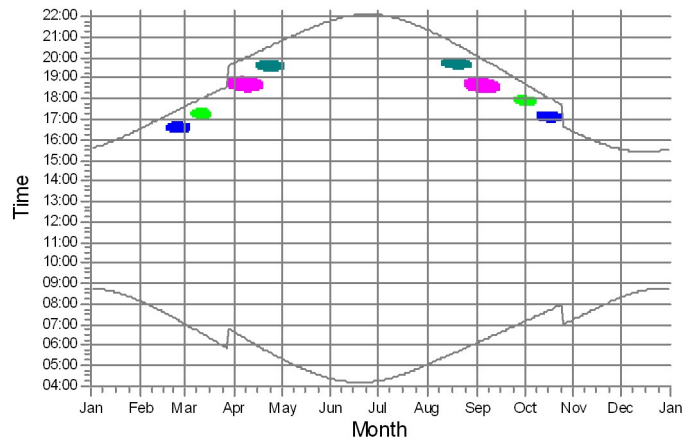
J: GISLAVED VIMMELSTORP 1:11



K: GISLAVED VIMMELSTORP 1:5



L: GISLAVED VIMMELSTORP 1:5

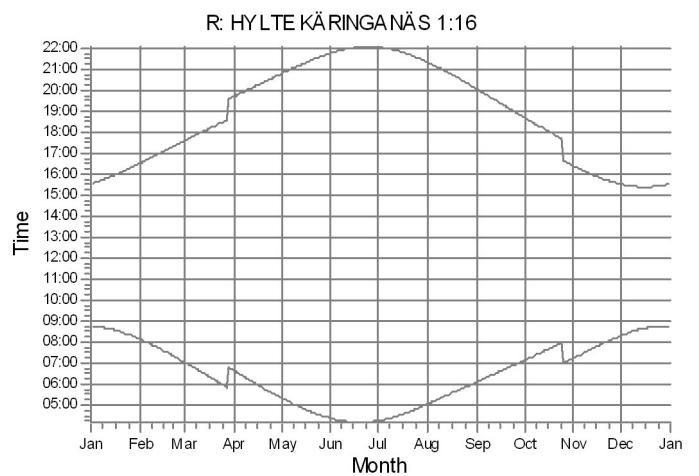
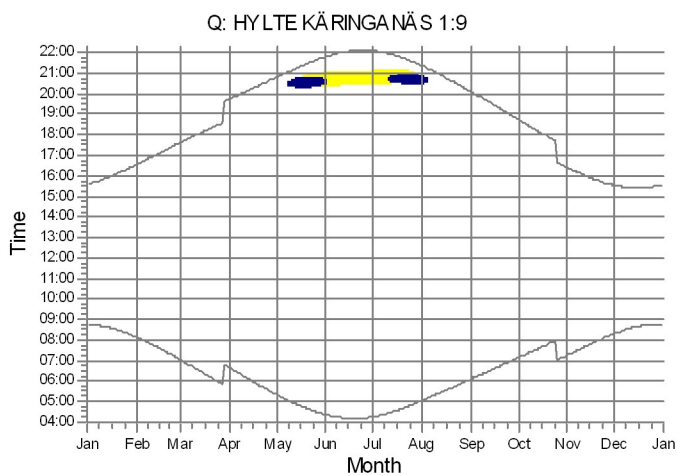
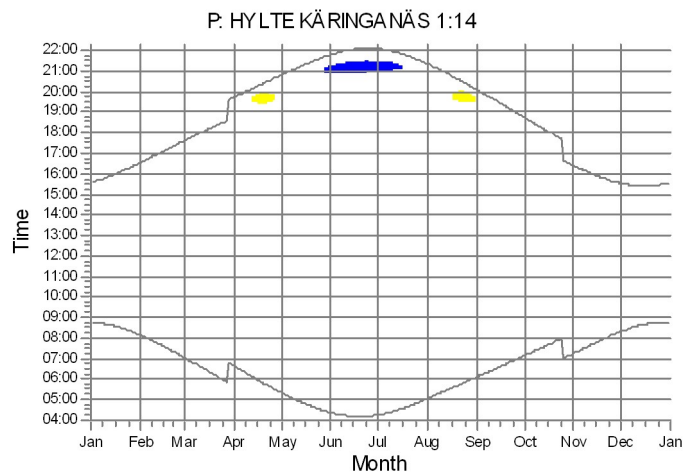
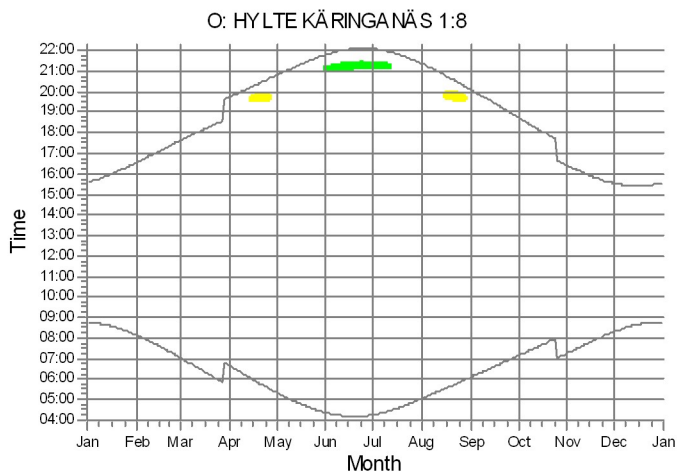
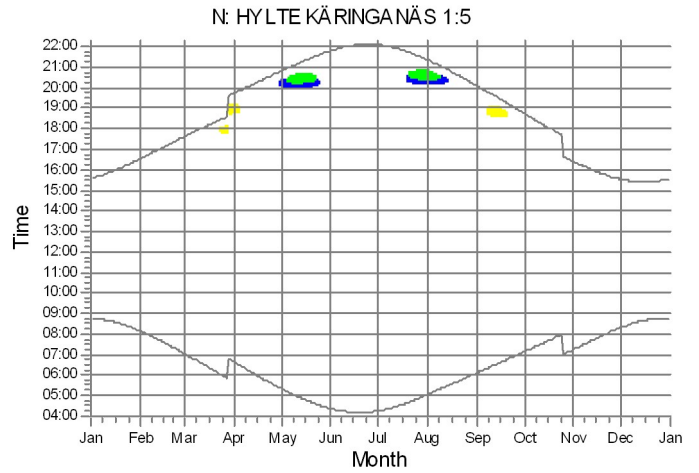
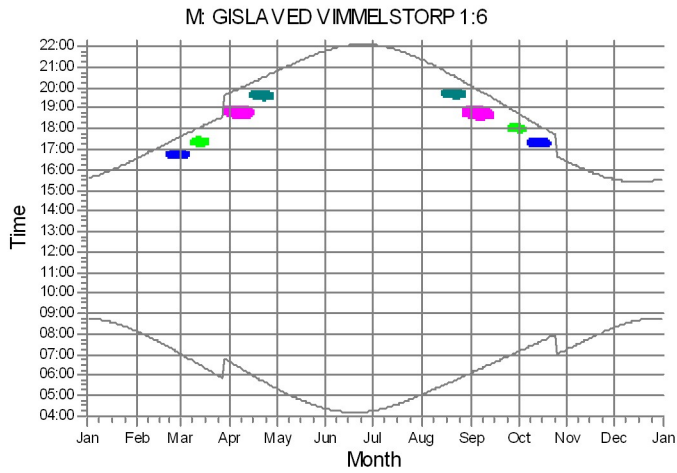


WTGs



SHADOW - Calendar, graphical

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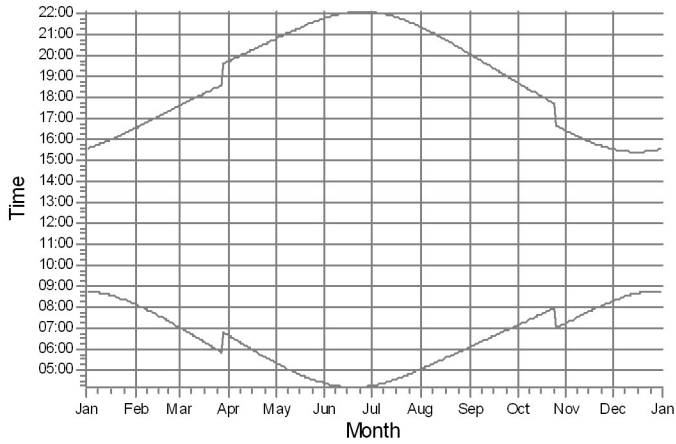
WTGs



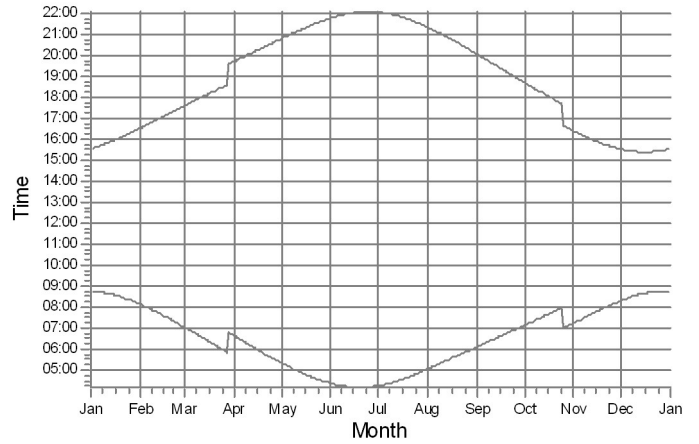
SHADOW - Calendar, graphical

Calculation: Vimmelstorp_9xV126 @ 137 m hh

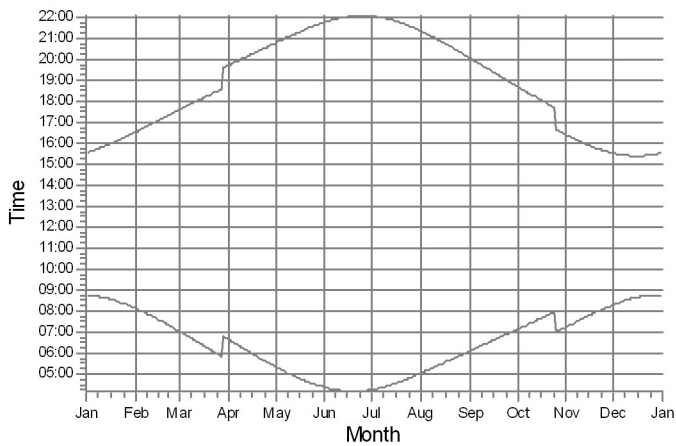
S: HYLTE KÄRINGANÄS 1:15



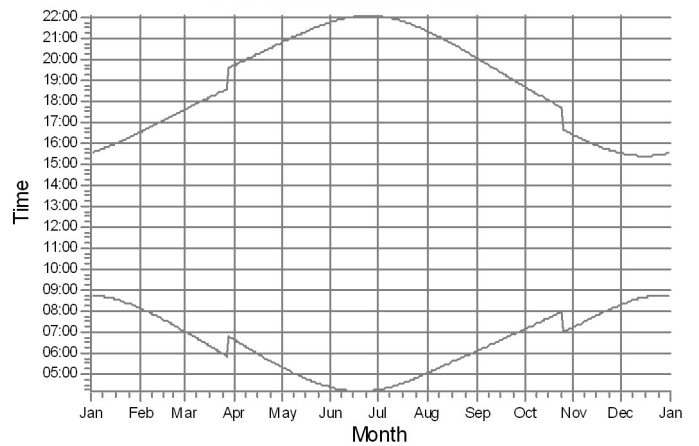
T: HYLTE KÄRINGANÄS 1:6



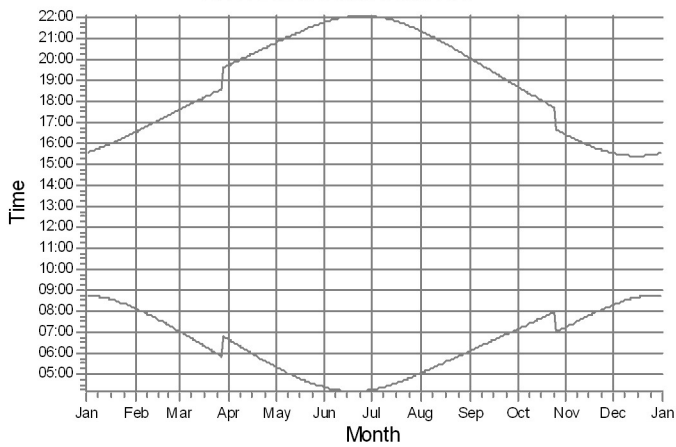
U: HYLTE KÄRINGANÄS 1:17



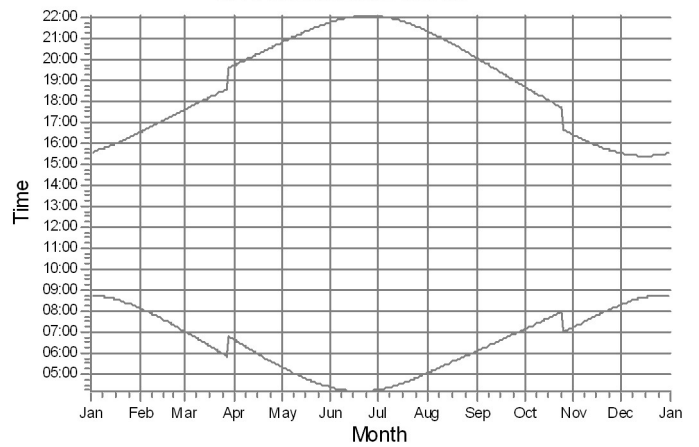
V: HYLTE KÄRINGANÄS 1:12



W: HYLTE KÄRINGANÄS 1:18



X: HYLTE HOLMSERYD 1:2

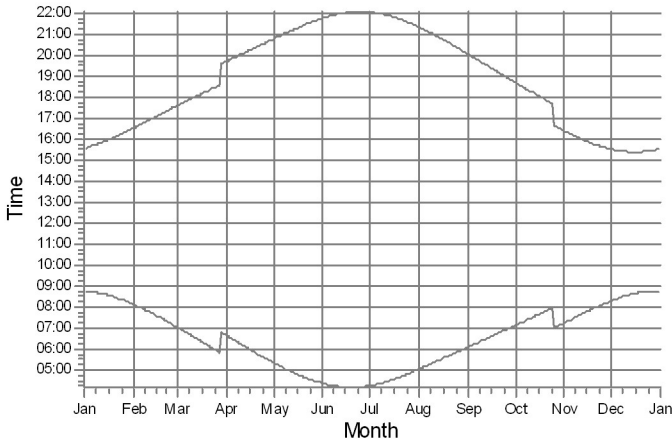


WTGs

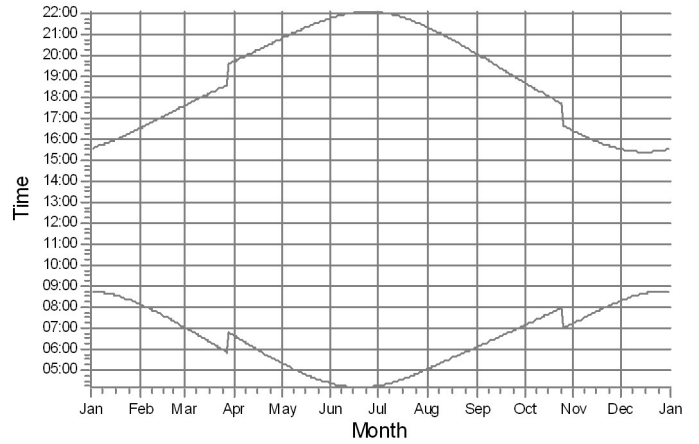
SHADOW - Calendar, graphical

Calculation: Vimmelstorp_9xV126 @ 137 m hh

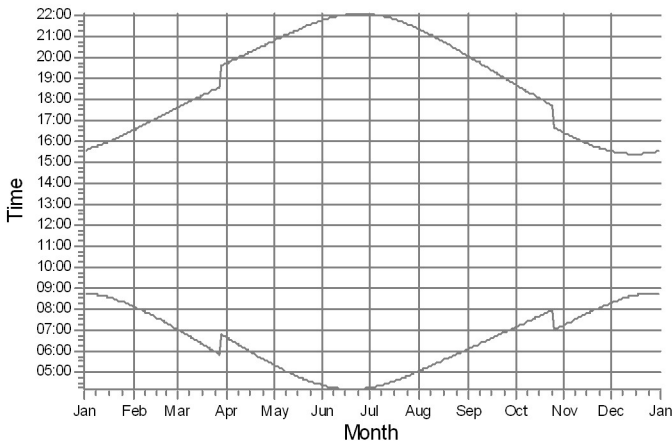
Y: HYLTE HOLMSERYD 1:3



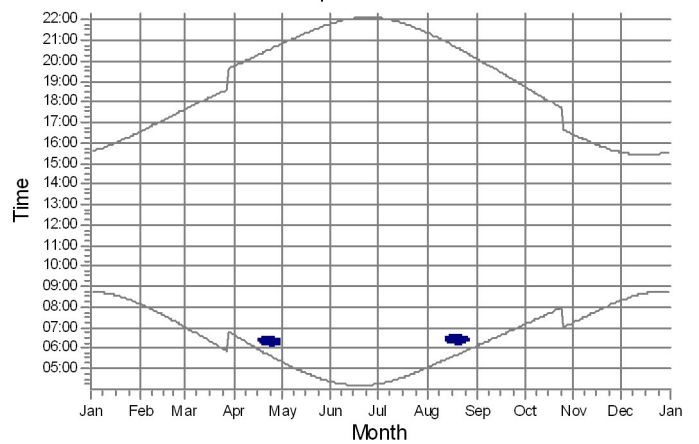
Z: HYLTE YTTERSJÖHOLM 1:17



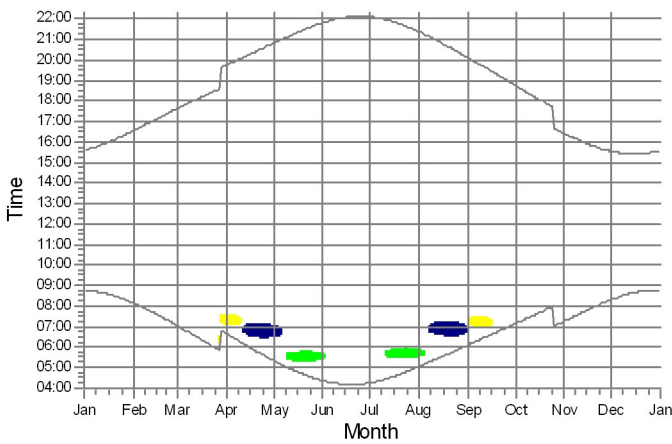
AA: HYLTE KRÅKSÅS 1:11



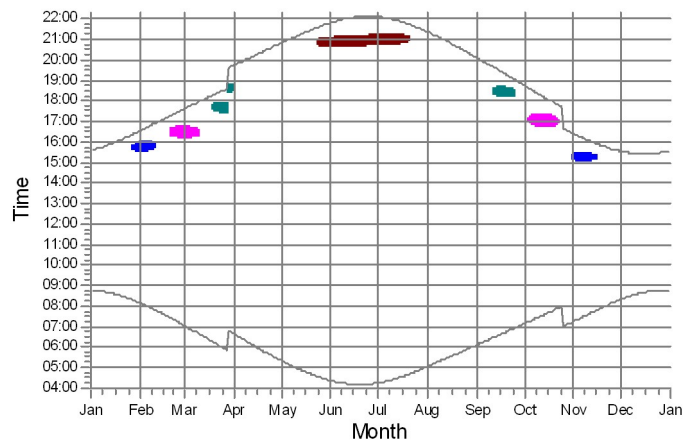
AB: Boarp Gräsholmen



AC: HYLTE KRÅKSÅS 1:5



AD: GISLAVED VIMMELSTORP 3:1

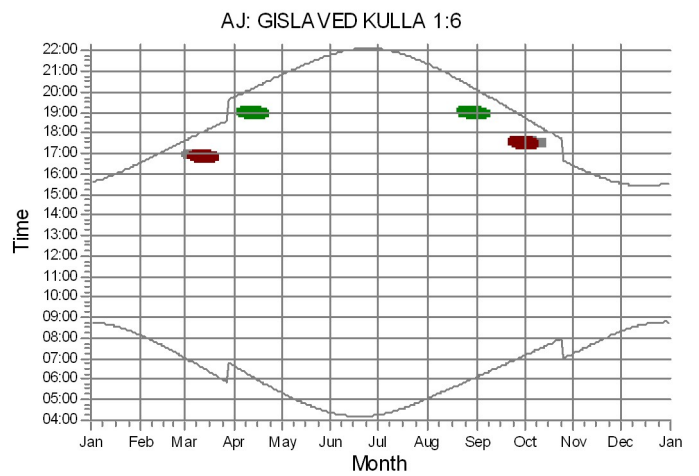
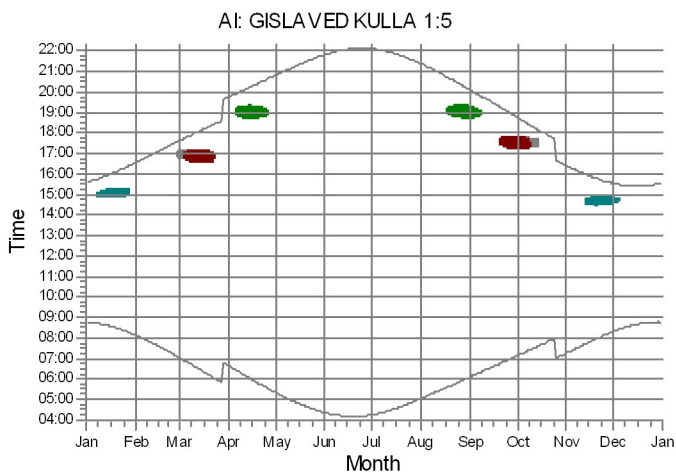
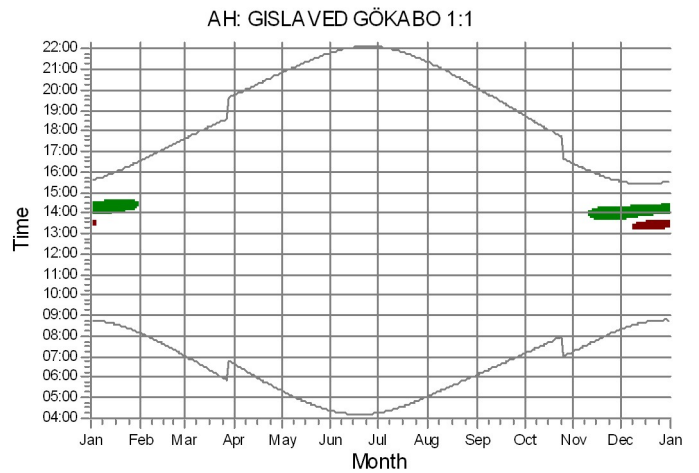
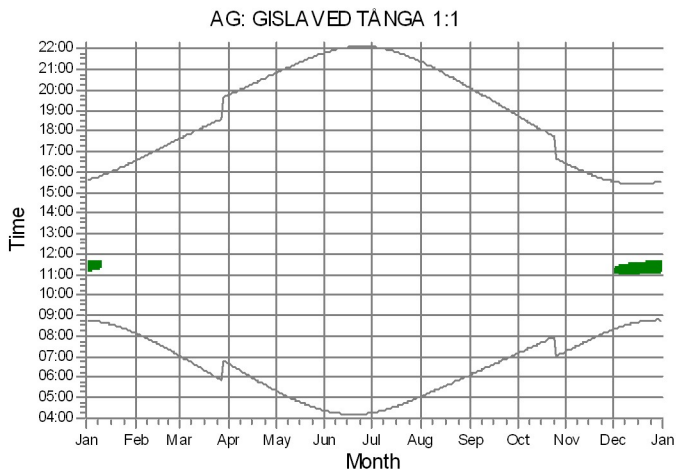
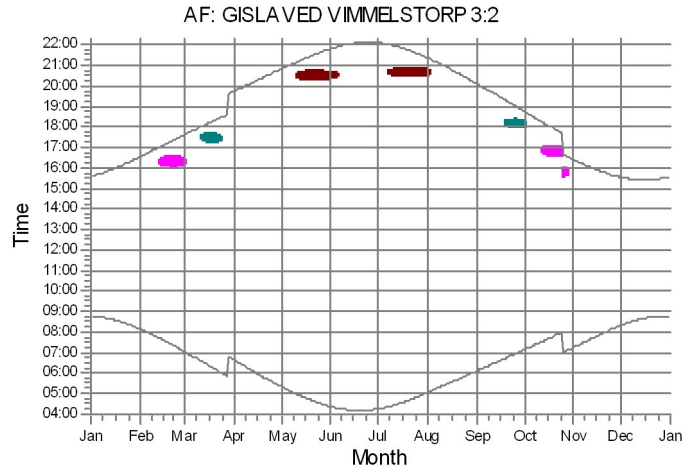
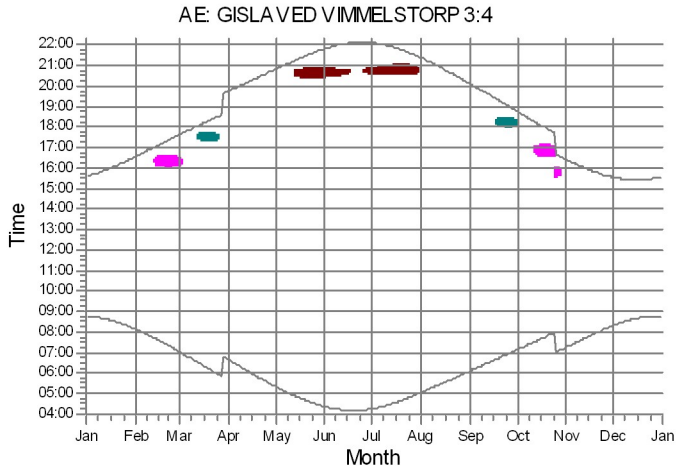


WTGs



SHADOW - Calendar, graphical

Calculation: Vimmelstorp_9xV126 @ 137 m hh

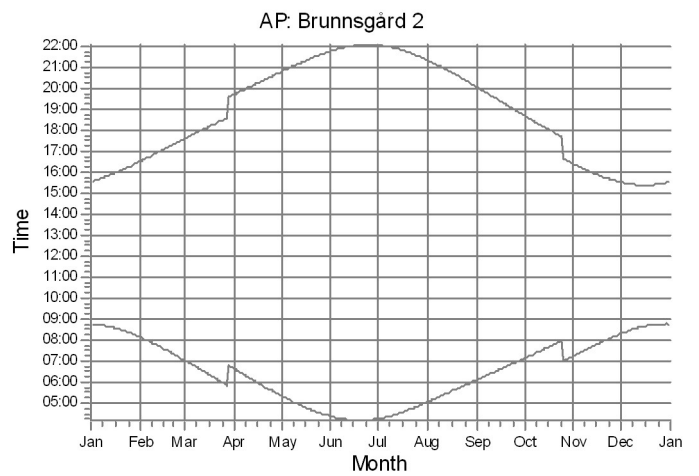
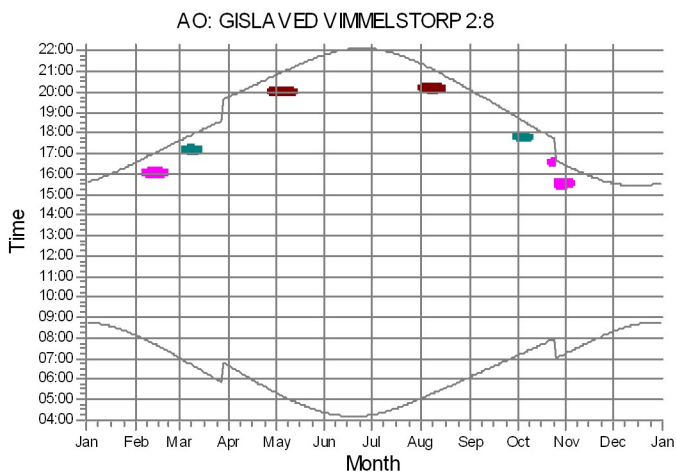
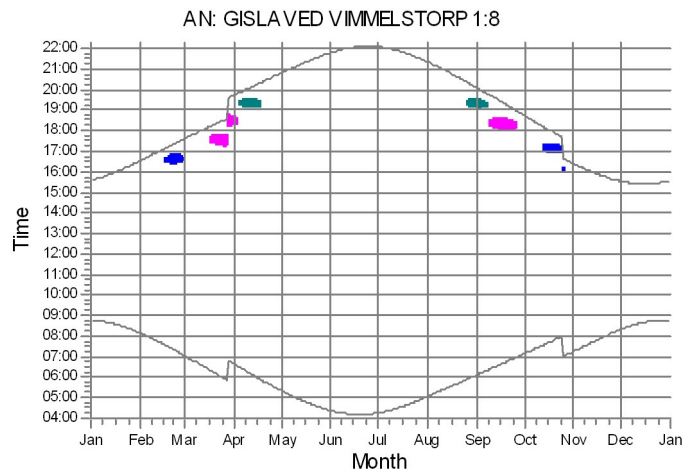
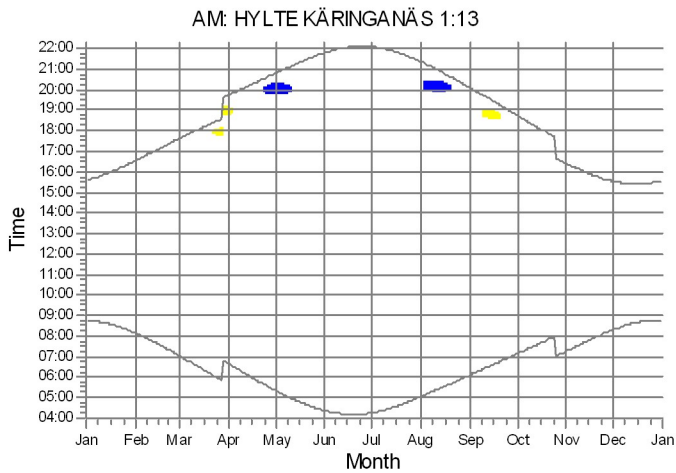
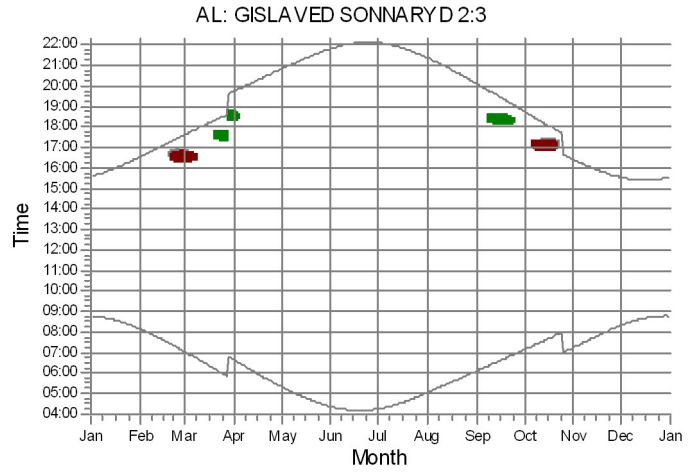
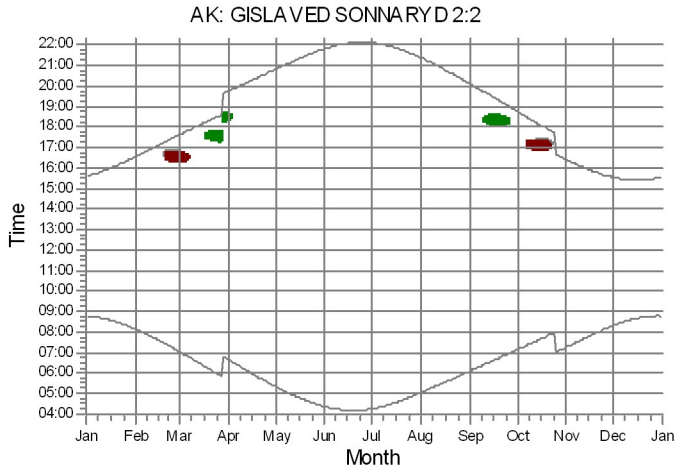


WTGs



SHADOW - Calendar, graphical

Calculation: Vimmelstorp_9xV126 @ 137 m hh

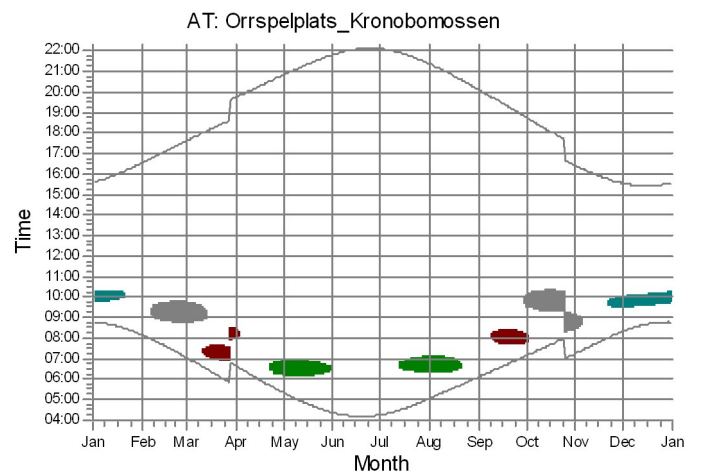
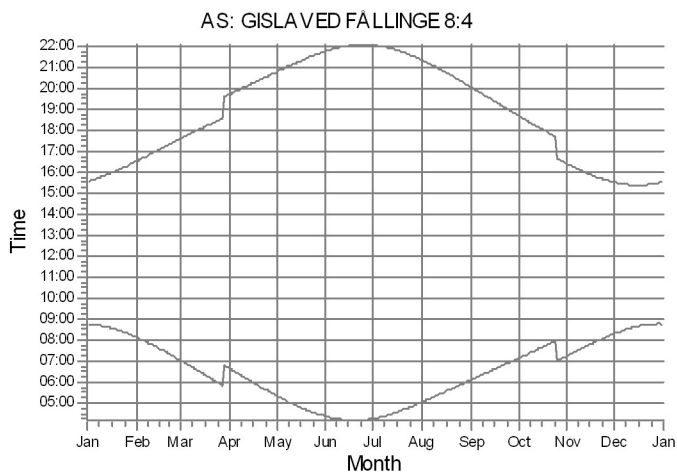
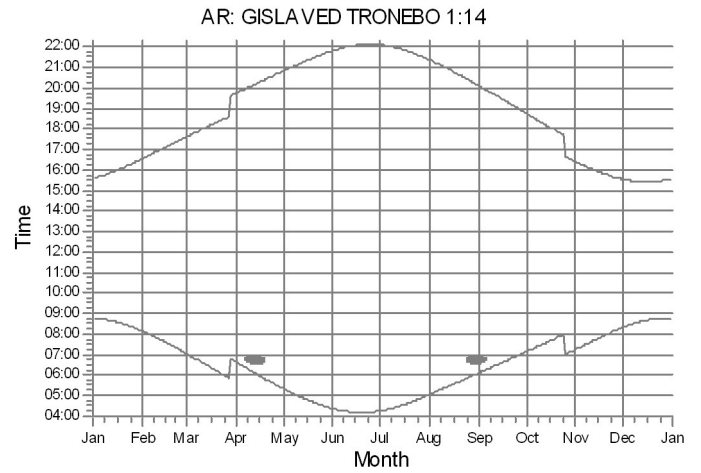
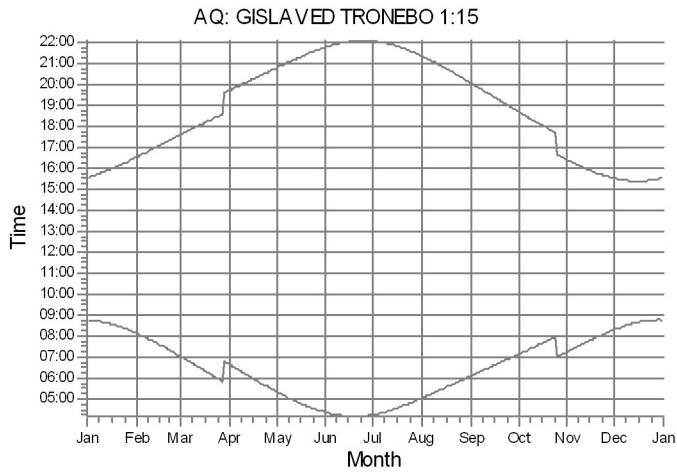


WTGs



SHADOW - Calendar, graphical

Calculation: Vimmelstorp_9xV126 @ 137 m hh



WTGs



1: 1



4: 4



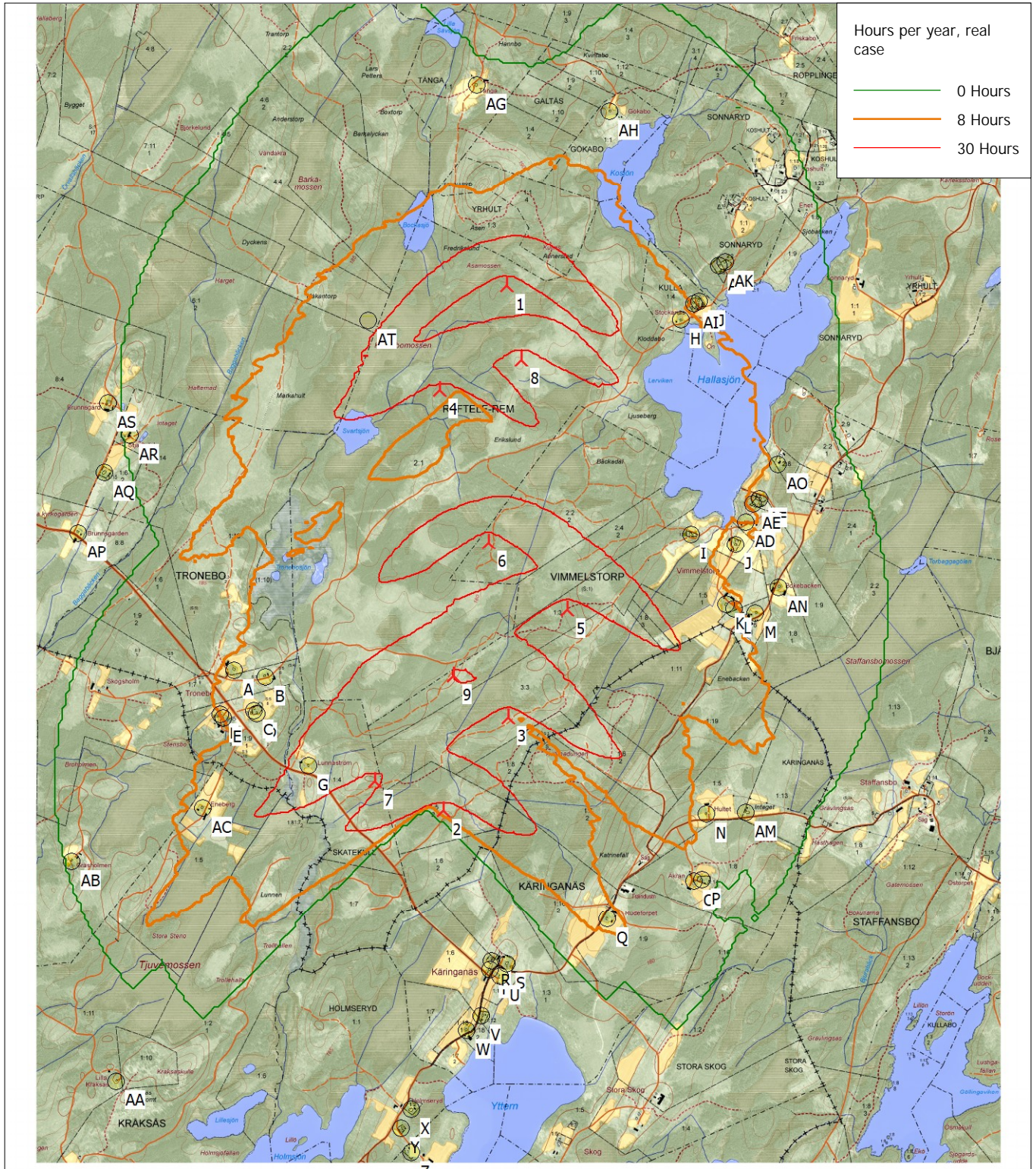
6: 6



8: 8

SHADOW - Map

Calculation: Vimmelstorp_9xV126 @ 137 m hh



Map: Fastighetskartan , Print scale 1:31 000, Map center Swedish UTM 33-SWREF99 (SE) East: 407 400 North: 6 331 260

New WTG Shadow receptor

Flicker map level: Vimmelstorp height data