

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

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Calculated:  
2017-09-08 18:12/3.1.617

SHADOW - Main Result

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m  
Assumptions for shadow calculations

Maximum distance for influence 2 500 m  
Minimum sun height over horizon for influence 3 °  
Day step for calculation 1 days  
Time step for calculation 1 minutes

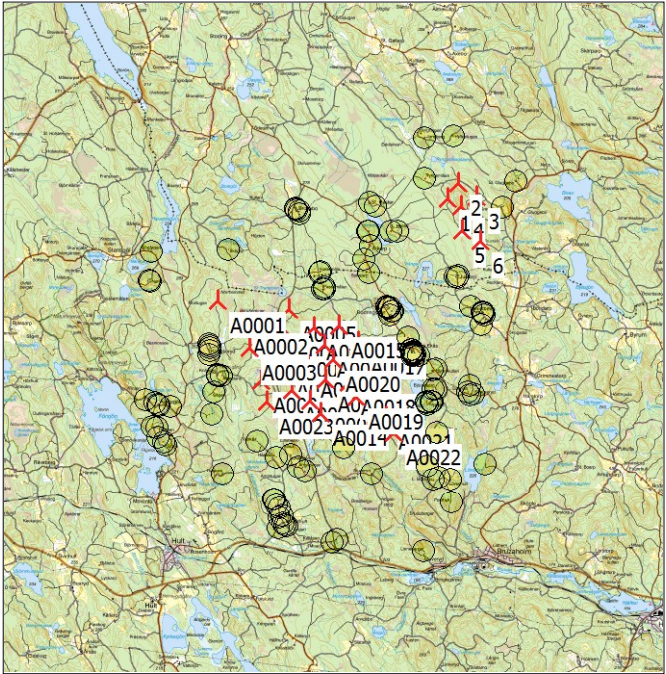
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
1,36 1,52 2,62 6,08 8,82 7,64 6,65 5,42 4,02 2,68 1,38 0,88

Operational hours are calculated from WTGs in calculation and wind distribution:  
MERRA basic windstat

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:  
Height contours used: Height Contours: Hk 2m + 5m uttunnad(1).wpo (2)  
Obstacles used in calculation  
Eye height: 1,5 m  
Grid resolution: 10,0 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]	RPM [RPM]
					Valid	Manufact. Type-generator				
			[m]							
1	514 997	6 398 414	270,0	VESTAS V117-3.3 GridStreame ...	Yes	VESTAS V117-3.3 GridStreame-3 300	3 300	117,0	91,5	13,1
2	515 264	6 398 813	276,9	VESTAS V117-3.3 GridStreame ...	Yes	VESTAS V117-3.3 GridStreame-3 300	3 300	117,0	91,5	13,1
3	515 767	6 398 461	280,0	VESTAS V117-3.3 GridStreame ...	Yes	VESTAS V117-3.3 GridStreame-3 300	3 300	117,0	91,5	13,1
4	515 359	6 398 196	295,0	VESTAS V117-3.3 GridStreame ...	Yes	VESTAS V117-3.3 GridStreame-3 300	3 300	117,0	91,5	13,1
5	515 380	6 397 585	278,8	VESTAS V117-3.3 GridStreame ...	Yes	VESTAS V117-3.3 GridStreame-3 300	3 300	117,0	91,5	13,1
6	515 878	6 397 309	280,0	VESTAS V117-3.3 GridStreame ...	Yes	VESTAS V117-3.3 GridStreame-3 300	3 300	117,0	91,5	13,1
A0001	508 955	6 395 634	304,8	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0002	509 578	6 395 106	297,9	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0003	509 818	6 394 408	288,7	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0004	510 137	6 393 543	283,1	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0005	510 851	6 395 434	296,0	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0006	510 722	6 394 900	317,5	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0007	510 747	6 393 965	289,9	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0008	510 949	6 393 306	285,8	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0009	511 437	6 393 045	296,5	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0010	511 520	6 394 958	313,9	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0011	510 931	6 394 500	308,4	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0012	511 370	6 393 978	300,9	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0013	511 839	6 393 596	292,0	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0014	511 717	6 392 698	286,4	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0015	512 181	6 395 032	308,0	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0016	511 784	6 394 510	306,0	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0017	512 675	6 394 596	291,8	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0018	512 429	6 393 526	307,6	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0019	512 650	6 393 145	298,9	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0020	512 040	6 394 124	299,1	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0021	513 435	6 392 637	293,1	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0022	513 641	6 392 235	305,4	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0
A0023	510 278	6 393 004	272,4	GAMESA G132 -108.2dB 5000 ...	No	GAMESA G132 -108.2dB-5 000	5 000	132,0	174,0	0,0

## SHADOW - Main Result

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

Shadow receptor-Input

No.		Easting	Northing	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
				[m]	[m]	[m]	[m]	[°]	[°]	
	ARKARP 1:3>1	512 931	6 397 530	275,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	ARKARP 1:3>1	512 911	6 397 520	275,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	ARKARP 1:5>1	512 809	6 396 770	296,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	ARKARP 1:5>1	512 817	6 396 790	294,9	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BOGÅRD 6:29>1	509 150	6 391 080	247,4	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BOGÅRD 6:30>1	507 637	6 391 820	224,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BOGÅRD 6:32>1	507 579	6 391 910	228,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BROKABO 1:11>1	512 941	6 398 280	272,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BROKABO 1:12>1	511 104	6 397 950	275,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BROKABO 1:13>1	512 978	6 397 140	280,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BROKABO 1:19>1	509 237	6 396 990	311,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BROKABO 1:3>1	511 011	6 398 050	275,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BROKABO 1:6>1	510 993	6 398 080	275,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BROKABO 1:7>1	510 983	6 398 110	275,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	BROKABO 1:8>1	511 088	6 398 020	275,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÅNHULT 1:2>1	515 592	6 393 320	260,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÖDRINGSHULT 1:4>1	513 460	6 395 490	312,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÖDRINGSHULT 1:4>1	513 507	6 395 520	310,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÖDRINGSHULT 1:4>1	513 481	6 395 500	311,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÖDRINGSHULT 1:5>1	513 501	6 395 330	308,6	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÖDRINGSHULT 1:5>1	513 521	6 395 310	308,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÖDRINGSHULT 1:7>1	513 577	6 395 420	306,4	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÖDRINGSHULT 1:7>1	513 561	6 395 430	307,2	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	DÖDRINGSHULT 1:8>1	513 444	6 395 540	312,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	Grevekulla	516 437	6 398 203	265,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	Grevekulla 1:11	514 393	6 398 932	270,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 1:10>2	514 751	6 393 900	278,1	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 1:13>1	515 990	6 395 350	284,2	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 1:15>1	514 655	6 393 880	277,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 1:16>1	515 635	6 395 560	298,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 1:17>1	515 972	6 395 400	285,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 1:17>1	515 969	6 395 420	285,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 1:6>1	515 940	6 395 430	284,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 3:1>1	515 646	6 393 480	272,4	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HUSTOMTA 3:1>1	515 925	6 395 090	288,6	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	Hyltestugan	515 116	6 400 070	255,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HÄRSTORP 1:13>1	516 070	6 391 410	228,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HÄSSLEÅS 1:11>1	511 319	6 391 170	273,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HÄSSLEÅS 1:12>1	510 050	6 391 950	281,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HÄSSLEÅS 1:13>1	510 932	6 391 600	300,4	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HÄSSLEÅS 1:4>1	510 558	6 391 540	285,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	HÄSSLEÅS 1:6>1	511 142	6 391 270	275,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	INGATORPS-BJÖRKEBERG 1:2>1	515 651	6 393 230	254,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	INGATORPS-BJÖRKEBERG 1:3>1	514 672	6 393 380	284,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	INGATORPS-BJÖRKEBERG 1:4>1	514 754	6 393 390	294,1	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	INGATORPS-GRIMMESTORP 2:4>1	515 744	6 393 260	294,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	Jonsberg	514 366	6 400 000	254,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	JUSTORP 1:2>2	515 281	6 396 330	308,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	JUSTORP 1:5>1	515 234	6 396 350	306,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	JUSTORP 1:5>1	515 287	6 396 380	307,6	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:11>1	509 099	6 393 670	270,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:17>1	508 743	6 394 510	293,2	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:18>1	508 775	6 394 330	282,1	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:19>1	508 979	6 393 660	267,9	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:20>1	508 779	6 394 410	288,9	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:22>1	508 768	6 394 440	290,2	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:23>1	508 891	6 393 230	255,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:24>1	508 751	6 394 490	292,2	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:25>1	508 984	6 393 700	268,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	KONGSERYD 1:26>1	508 742	6 394 230	280,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	LILLA HESTER 2:1>1	513 506	6 397 520	280,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	LILLA HESTER 2:2>1	513 693	6 397 530	279,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	LÖVSEHULT 1:20>1	514 704	6 390 990	263,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
	LÖVSEHULT 1:21>1	514 863	6 391 040	263,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"

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## SHADOW - Main Result

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

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No.	Easting	Northing	Z	Width	Height	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
			[m]	[m]	[m]				
LÖVSEHULT 1:23>1	515 181	6 390 380	286,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
LÖVSEHULT 1:24>1	514 485	6 389 080	220,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
LÖVSEHULT 1:26>1	513 081	6 391 120	260,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
LÖVSEHULT 1:27>1	514 556	6 391 350	282,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
LÖVSEHULT 1:5>1	515 149	6 390 990	263,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NAREBO 1:3>1	507 151	6 396 150	300,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NAREBO 1:3>1	507 182	6 396 120	300,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 1:10>1	510 758	6 389 790	245,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 1:7>1	510 722	6 389 990	253,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 1:8>1	510 638	6 389 660	235,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 1:9>1	510 653	6 390 190	261,4	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 2:11>1	512 047	6 389 290	216,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 2:12>1	510 873	6 389 710	243,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 2:12>1	510 815	6 389 720	243,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 2:13>1	510 648	6 389 930	250,1	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 4:5>1	512 174	6 389 360	213,6	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 5:2>1	510 572	6 390 260	263,9	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 5:3>1	510 518	6 390 400	270,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
NÖDJEHULT 5:3>1	510 506	6 390 400	270,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"
PASSAMÅLEN 1:3>1	513 437	6 395 510	312,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
PASSAMÅLEN 1:6>1	511 773	6 395 980	309,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"
PASSAMÅLEN 1:7>1	511 717	6 395 980	306,2	5,0	5,0	2,0	0,0	0,0	"Green house mode"
PASSAMÅLEN 1:8>1	511 785	6 396 040	311,6	5,0	5,0	2,0	0,0	0,0	"Green house mode"
SKÄLJARYD 1:5>1	512 328	6 391 800	305,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
SPINKARP 1:1>1	512 937	6 396 430	302,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
STENSGÖL 1:11>1	507 202	6 396 930	285,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
Stora Gluggebo	516 790	6 398 888	234,9	5,0	5,0	2,0	0,0	0,0	"Green house mode"
STORA HESTER 1:7>1	513 105	6 398 190	275,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
SÄLDEFALL 1:11>1	514 649	6 393 060	272,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
SÄLDEFALL 1:12>1	514 624	6 393 050	272,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
SÄLDEFALL 1:6>1	514 778	6 392 240	282,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
SÄLDEFALL 1:7>1	514 512	6 393 050	276,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
SÄLDEFALL 1:7>1	514 507	6 393 030	276,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
SÄLDEFALL 1:8>1	514 530	6 392 970	273,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VASSEMÅLA 1:1>1	511 636	6 396 420	310,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VASSEMÅLA 1:1>1	511 658	6 396 440	310,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:10>1	514 108	6 394 400	296,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:10>1	514 073	6 394 410	294,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:13>1	514 281	6 394 270	294,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:14>1	514 160	6 394 270	293,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:15>1	514 130	6 394 280	294,9	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:15>1	514 107	6 394 270	293,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:16>1	514 189	6 394 290	295,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:17>1	513 991	6 394 730	293,6	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:18>1	514 126	6 394 330	300,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:19>1	514 121	6 394 350	300,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
VÄSTRA EKÅS 1:7>1	514 137	6 394 300	297,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:11>1	507 762	6 392 850	273,2	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:14>1	507 352	6 392 940	265,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:15>1	508 857	6 392 660	236,5	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:16>1	507 087	6 393 010	265,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:17>1	507 274	6 392 310	245,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:18>1	507 429	6 392 030	228,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:2>2	507 459	6 392 870	265,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:2>2	507 431	6 392 890	265,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"
ÄGERSGÖL 1:6>1	507 415	6 392 290	243,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"

## SHADOW - Main Result

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

### Calculation Results

Shadow receptor

No.	Shadow, worst case			Shadow, expected values	
	Shadow hours	Shadow days	Max shadow	Shadow hours	
	per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]	
ARKARP 1:3>1	0:53	17	0:05	0:12	
ARKARP 1:3>1	0:50	15	0:05	0:11	
ARKARP 1:5>1	17:15	84	0:16	1:55	
ARKARP 1:5>1	17:05	84	0:15	1:54	
BOGÅRD 6:29>1	0:00	0	0:00	0:00	
BOGÅRD 6:30>1	0:00	0	0:00	0:00	
BOGÅRD 6:32>1	0:00	0	0:00	0:00	
BROKABO 1:11>1	2:01	27	0:08	0:25	
BROKABO 1:12>1	0:00	0	0:00	0:00	
BROKABO 1:13>1	1:31	26	0:07	0:13	
BROKABO 1:19>1	15:32	62	0:22	1:28	
BROKABO 1:3>1	0:00	0	0:00	0:00	
BROKABO 1:6>1	0:00	0	0:00	0:00	
BROKABO 1:7>1	0:00	0	0:00	0:00	
BROKABO 1:8>1	0:00	0	0:00	0:00	
DÄNHULT 1:2>1	6:41	36	0:15	1:00	
DÖDRINGSHULT 1:4>1	48:50	147	0:44	6:20	
DÖDRINGSHULT 1:4>1	43:30	128	0:42	5:37	
DÖDRINGSHULT 1:4>1	45:11	131	0:44	5:51	
DÖDRINGSHULT 1:5>1	50:52	166	0:35	6:49	
DÖDRINGSHULT 1:5>1	49:49	165	0:32	6:45	
DÖDRINGSHULT 1:7>1	42:36	137	0:34	5:36	
DÖDRINGSHULT 1:7>1	43:14	135	0:35	5:40	
DÖDRINGSHULT 1:8>1	44:52	127	0:44	5:53	
Grevekulla	108:53	235	1:03	22:56	
Grevekulla 1:11	57:53	177	0:44	7:05	
HUSTOMTA 1:10>2	26:25	129	0:18	3:58	
HUSTOMTA 1:13>1	0:00	0	0:00	0:00	
HUSTOMTA 1:15>1	30:44	148	0:19	4:35	
HUSTOMTA 1:16>1	0:00	0	0:00	0:00	
HUSTOMTA 1:17>1	0:00	0	0:00	0:00	
HUSTOMTA 1:17>1	0:00	0	0:00	0:00	
HUSTOMTA 1:6>1	0:00	0	0:00	0:00	
HUSTOMTA 3:1>1	6:16	36	0:14	0:56	
HUSTOMTA 3:1>1	0:00	0	0:00	0:00	
Hyltestugan	0:00	0	0:00	0:00	
HÄRSTORP 1:13>1	0:00	0	0:00	0:00	
HÄSLEÅS 1:11>1	0:00	0	0:00	0:00	
HÄSLEÅS 1:12>1	14:32	65	0:18	4:16	
HÄSLEÅS 1:13>1	1:24	19	0:06	0:24	
HÄSLEÅS 1:4>1	0:00	0	0:00	0:00	
HÄSLEÅS 1:6>1	0:00	0	0:00	0:00	
INGATORPS-BJÖRKEBERG 1:2>1	6:23	36	0:14	0:59	
INGATORPS-BJÖRKEBERG 1:3>1	30:48	134	0:22	5:26	
INGATORPS-BJÖRKEBERG 1:4>1	27:15	124	0:21	4:43	
INGATORPS-GRIMMESTORP 2:4>1	5:31	34	0:14	0:49	
Jonsberg	18:22	70	0:30	1:43	
JUSTORP 1:2>2	0:00	0	0:00	0:00	
JUSTORP 1:5>1	0:00	0	0:00	0:00	
JUSTORP 1:5>1	0:00	0	0:00	0:00	
KONGSERYD 1:11>1	53:25	195	0:32	11:18	
KONGSERYD 1:17>1	45:29	175	0:44	8:47	
KONGSERYD 1:18>1	48:01	160	0:37	9:41	
KONGSERYD 1:19>1	48:00	185	0:27	10:43	
KONGSERYD 1:20>1	46:58	160	0:39	9:14	
KONGSERYD 1:22>1	45:37	155	0:41	8:45	
KONGSERYD 1:23>1	37:18	127	0:39	9:25	
KONGSERYD 1:24>1	43:41	159	0:43	7:59	
KONGSERYD 1:25>1	48:48	189	0:27	10:44	
KONGSERYD 1:26>1	48:06	162	0:42	10:06	
LILLA HESTER 2:1>1	8:32	77	0:13	2:18	
LILLA HESTER 2:2>1	17:34	118	0:17	4:51	

To be continued on next page...



## SHADOW - Main Result

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

...continued from previous page

No.	Shadow, worst case			Shadow, expected values	
	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]	
LÖVSEHULT 1:20>1	0:00	0	0:00	0:00	
LÖVSEHULT 1:21>1	0:00	0	0:00	0:00	
LÖVSEHULT 1:23>1	0:00	0	0:00	0:00	
LÖVSEHULT 1:24>1	0:00	0	0:00	0:00	
LÖVSEHULT 1:26>1	0:00	0	0:00	0:00	
LÖVSEHULT 1:27>1	0:00	0	0:00	0:00	
LÖVSEHULT 1:5>1	0:00	0	0:00	0:00	
NAREBO 1:3>1	4:35	21	0:17	0:39	
NAREBO 1:3>1	4:44	21	0:17	0:41	
NÖDJEHULT 1:10>1	0:00	0	0:00	0:00	
NÖDJEHULT 1:7>1	0:00	0	0:00	0:00	
NÖDJEHULT 1:8>1	0:00	0	0:00	0:00	
NÖDJEHULT 1:9>1	0:00	0	0:00	0:00	
NÖDJEHULT 2:11>1	0:00	0	0:00	0:00	
NÖDJEHULT 2:12>1	0:00	0	0:00	0:00	
NÖDJEHULT 2:12>1	0:00	0	0:00	0:00	
NÖDJEHULT 2:13>1	0:00	0	0:00	0:00	
NÖDJEHULT 4:5>1	0:00	0	0:00	0:00	
NÖDJEHULT 5:2>1	0:00	0	0:00	0:00	
NÖDJEHULT 5:3>1	0:00	0	0:00	0:00	
NÖDJEHULT 5:3>1	0:00	0	0:00	0:00	
PASSAMÅLEN 1:3>1	48:46	143	0:44	6:21	
PASSAMÅLEN 1:6>1	136:19	144	1:42	14:38	
PASSAMÅLEN 1:7>1	131:27	144	1:38	14:28	
PASSAMÅLEN 1:8>1	124:23	138	1:39	13:07	
SKÅLJARYD 1:5>1	28:11	99	0:24	7:56	
SPINKARP 1:1>1	36:29	107	0:31	4:03	
STENSGÖL 1:11>1	4:12	22	0:15	0:27	
Stora Gluggebo	37:02	133	0:37	5:10	
STORA HESTER 1:7>1	3:20	41	0:09	0:41	
SÄLDEFALL 1:11>1	27:44	103	0:25	4:58	
SÄLDEFALL 1:12>1	36:57	150	0:25	7:10	
SÄLDEFALL 1:6>1	28:13	74	0:36	6:58	
SÄLDEFALL 1:7>1	38:21	145	0:27	7:05	
SÄLDEFALL 1:7>1	37:44	143	0:27	6:56	
SÄLDEFALL 1:8>1	34:53	130	0:27	6:22	
VASSEMÅLA 1:1>1	65:41	114	1:07	6:40	
VASSEMÅLA 1:1>1	60:57	112	1:05	6:13	
VÄSTRA EKÅS 1:10>1	37:00	172	0:22	6:44	
VÄSTRA EKÅS 1:10>1	37:10	169	0:23	6:53	
VÄSTRA EKÅS 1:13>1	36:31	156	0:20	6:00	
VÄSTRA EKÅS 1:14>1	43:16	182	0:23	7:32	
VÄSTRA EKÅS 1:15>1	42:49	180	0:22	7:33	
VÄSTRA EKÅS 1:15>1	44:04	183	0:24	7:50	
VÄSTRA EKÅS 1:16>1	41:11	179	0:21	7:08	
VÄSTRA EKÅS 1:17>1	36:53	163	0:24	6:24	
VÄSTRA EKÅS 1:18>1	39:03	173	0:22	7:01	
VÄSTRA EKÅS 1:19>1	38:09	172	0:22	6:53	
VÄSTRA EKÅS 1:7>1	41:26	181	0:22	7:19	
ÅGERSGÖL 1:11>1	3:00	18	0:13	0:45	
ÅGERSGÖL 1:14>1	0:00	0	0:00	0:00	
ÅGERSGÖL 1:15>1	29:20	89	0:36	8:06	
ÅGERSGÖL 1:16>1	0:00	0	0:00	0:00	
ÅGERSGÖL 1:17>1	0:00	0	0:00	0:00	
ÅGERSGÖL 1:18>1	0:00	0	0:00	0:00	
ÅGERSGÖL 1:2>2	0:00	0	0:00	0:00	
ÅGERSGÖL 1:2>2	0:00	0	0:00	0:00	
ÅGERSGÖL 1:6>1	0:00	0	0:00	0:00	

## SHADOW - Main Result

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	VESTAS V117-3.3 GridStreame 3300 117.0 !O! hub: 91,5 m (TOT: 150,0 m) (283)	41:55	7:08
2	VESTAS V117-3.3 GridStreame 3300 117.0 !O! hub: 91,5 m (TOT: 150,0 m) (284)	50:27	9:38
3	VESTAS V117-3.3 GridStreame 3300 117.0 !O! hub: 91,5 m (TOT: 150,0 m) (285)	63:39	14:33
4	VESTAS V117-3.3 GridStreame 3300 117.0 !O! hub: 91,5 m (TOT: 150,0 m) (286)	36:29	6:02
5	VESTAS V117-3.3 GridStreame 3300 117.0 !O! hub: 91,5 m (TOT: 150,0 m) (287)	23:39	3:02
6	VESTAS V117-3.3 GridStreame 3300 117.0 !O! hub: 91,5 m (TOT: 150,0 m) (288)	34:00	3:45
A0001	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1268)	21:01	2:19
A0002	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1269)	11:10	2:22
A0003	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1270)	54:40	12:37
A0004	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1271)	64:52	13:14
A0005	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1272)	62:13	10:50
A0006	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1273)	64:49	12:40
A0007	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1274)	43:09	9:40
A0008	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1275)	21:41	3:56
A0009	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1276)	9:47	2:24
A0010	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1277)	86:07	10:09
A0011	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1278)	53:07	10:21
A0012	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1279)	4:26	1:04
A0013	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1280)	17:18	2:21
A0014	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1281)	7:28	2:15
A0015	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1282)	127:13	16:49
A0016	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1283)	40:27	5:44
A0017	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1284)	133:52	21:23
A0018	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1285)	56:15	8:19
A0019	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1286)	46:41	7:57
A0020	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1287)	29:18	4:07
A0021	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1288)	103:20	17:02
A0022	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1289)	87:58	14:37
A0023	GAMESA G132 -108.2dB 5000 132.0 !O! hub: 174,0 m (TOT: 240,0 m) (1290)	48:44	7:50

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ARKARP 1:3>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (855)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	05:40 (1) 21:46	04:10 22:03	04:03 21:18	04:52 20:00	05:58 18:36	07:02 16:15	08:16 15:20
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:08 20:47	05:40 (1) 21:47	04:09 22:02	04:04 21:16	04:54 20:00	06:00 19:58	07:04 18:34	08:18 15:19
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	05:40 (1) 21:49	04:08 22:02	04:05 21:14	04:56 20:02	06:02 19:55	07:06 18:31	08:19 15:18
4	08:42 15:27	07:58 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:50	04:06 22:01	04:59 21:12	04:59 20:04	06:04 19:52	07:08 18:28	08:21 15:18
5	08:42 15:28	07:56 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:07 22:00	05:01 21:09	05:01 20:00	06:07 19:49	07:10 18:25	08:23 15:17
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:53	04:08 21:59	05:03 21:07	05:03 20:00	06:09 19:47	07:12 18:23	08:24 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:57 20:58	04:04 21:54	04:09 21:59	05:05 21:05	05:05 20:00	06:11 19:44	07:15 18:20	08:26 15:15
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55	04:11 21:58	05:07 21:02	05:07 20:00	06:13 19:41	07:17 18:17	08:28 15:15
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	05:09 20:00	06:15 19:38	07:19 18:14	08:29 15:14
10	08:38 15:36	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:56	05:11 20:58	05:11 20:00	06:17 19:35	07:21 18:12	08:30 15:14
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	05:13 20:00	06:19 19:33	07:23 18:09	08:32 15:13
12	08:36 15:40	07:40 16:49	06:27 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:53	05:15 20:00	06:21 19:30	07:25 18:06	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00	04:18 21:52	05:18 20:50	05:18 20:00	06:23 19:27	07:28 18:03	08:34 15:13
14	08:34 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:01	04:19 21:51	05:20 20:48	05:20 20:00	06:26 19:24	07:30 18:01	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	05:22 20:00	06:28 19:21	07:32 17:58	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:17	03:59 22:02	04:22 21:48	05:24 20:43	05:24 20:00	06:30 19:19	07:34 17:55	08:37 15:12
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:19	03:58 22:03	04:24 21:46	05:26 20:40	05:26 20:00	06:32 19:16	07:37 17:53	08:38 15:12
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:16	04:33 21:21	03:58 22:03	04:26 21:45	05:28 20:38	05:28 20:00	06:34 19:13	07:39 17:50	08:39 15:12
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:23	03:58 22:04	04:27 21:43	05:30 20:35	05:30 20:00	06:36 19:10	07:41 17:48	08:40 15:13
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	05:32 20:00	06:38 19:07	07:43 17:45	08:41 15:13
21	08:24 15:58	07:17 17:11	06:02 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:40	05:35 20:30	05:35 20:00	06:40 19:04	07:45 17:42	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:25	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	05:37 20:00	06:42 19:02	07:48 17:40	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	05:39 20:00	06:45 18:59	07:50 17:37	08:42 15:14
24	08:19 16:05	07:10 17:18	05:53 18:21	05:28 20:29	04:22 21:32	03:59 22:05	04:37 21:34	05:41 20:22	05:41 20:00	06:47 18:56	07:52 17:35	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:05	04:38 21:32	05:43 20:19	05:43 20:00	06:49 18:53	06:55 17:32	08:43 15:16
26	08:16 16:09	07:04 17:22	05:48 18:25	05:23 20:33	04:19 21:36	04:00 22:05	04:40 21:31	05:45 20:17	05:45 20:00	06:51 18:50	06:57 17:30	08:43 15:16
27	08:14 16:12	07:02 17:24	05:45 18:27	05:21 20:36	04:17 21:37	04:00 22:04	04:42 21:29	05:47 20:14	05:47 20:00	06:53 18:48	06:59 17:27	08:44 15:17
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:27	05:50 20:11	05:50 20:00	06:55 18:45	07:01 17:25	08:44 15:18
29	08:10 16:16	06:39 19:32	05:16 20:40	05:16 20:40	04:14 21:41	04:02 22:04	04:46 21:25	05:52 20:08	05:52 20:00	06:57 18:42	07:04 17:22	08:44 15:19
30	08:08 16:19	06:36 19:34	05:13 20:42	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	05:54 20:00	06:59 18:39	07:06 17:20	08:44 15:20
31	08:06 16:21	06:34 19:36	05:11 20:44	05:11 20:44	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	05:56 20:00	06:59 16:17	07:08 17:17	08:44 15:21
Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction			0,22	0,42	0,53			0,35	0,31			
Oper. time red.			0,99	0,99	0,99			0,99	0,99			
Wind dir. red.			0,65	0,68	0,68			0,68	0,65			
Total reduction			0,14	0,28	0,36			0,24	0,20			
Total, real			1	2	2			4	2			

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ARKARP 1:3>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (916)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	05:40 (1) 21:46	04:10 22:03	04:03 21:18	04:52 20:00	05:58 18:36	07:02 16:15	08:16 15:20
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:08 20:47	05:40 (1) 21:47	04:04 22:02	04:54 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:19
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	05:43 (1) 21:49	04:08 22:02	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	08:42 15:27	07:58 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:50	04:06 22:01	04:59 21:12	06:04 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	08:42 15:28	07:56 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:53	04:08 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:57 20:58	04:04 21:54	04:09 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:01	08:26 15:15
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:36	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	08:36 15:40	07:40 16:49	06:27 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 15:49	08:34 15:13
14	08:34 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:01	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 18:01	07:43 15:45	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:17	03:59 22:02	04:22 21:48	05:24 20:43	06:30 19:19	07:34 18:00	07:45 15:43	08:37 15:12
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:19	03:58 22:03	04:24 21:46	05:26 20:40	06:32 19:16	07:37 18:00	07:47 15:41	08:38 15:12
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:16	04:33 21:21	03:58 22:03	04:26 21:45	05:28 20:38	06:34 19:13	07:39 18:00	07:49 15:39	08:39 15:12
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:23	03:58 22:04	04:27 21:43	05:30 20:35	06:36 19:10	07:41 18:00	07:52 15:38	08:40 15:13
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 18:00	07:54 15:36	08:41 15:13
21	08:24 15:58	07:17 17:11	06:02 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:40	05:35 20:30	06:40 19:04	07:45 18:00	07:56 15:34	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:25	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:42 19:02	07:48 18:00	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	06:45 18:59	07:50 18:00	08:00 15:31	08:42 15:14
24	08:19 16:05	07:10 17:18	05:53 18:21	05:28 20:29	04:22 21:32	03:59 22:05	04:37 21:34	05:41 20:22	06:47 18:56	07:52 18:00	08:02 15:30	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:05	04:38 21:32	05:43 20:19	06:49 18:53	07:55 18:00	08:04 15:28	08:43 15:16
26	08:16 16:09	07:04 17:22	05:48 18:25	05:23 20:33	04:19 21:36	04:00 22:05	04:40 21:31	05:45 20:17	06:51 18:50	07:57 18:00	08:06 15:27	08:43 15:16
27	08:14 16:12	07:02 17:24	05:45 18:27	05:21 20:36	04:17 21:37	04:00 22:04	04:42 21:29	05:47 20:14	06:53 18:48	07:59 18:00	08:08 15:25	08:44 15:17
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:27	05:50 20:11	06:55 18:45	07:01 18:00	08:10 15:24	08:44 15:18
29	08:10 16:16	06:39 19:32	05:16 19:09	05:16 20:40	04:14 21:41	04:02 22:04	04:46 21:25	05:52 20:08	06:57 18:42	07:04 18:00	08:12 15:23	08:44 15:19
30	08:08 16:19	06:36 19:34	05:13 19:06	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 18:00	08:14 15:22	08:44 15:20
31	08:06 16:21	06:34 19:36	05:11 19:36	04:11 21:44	04:11 21:44	04:00 21:20	04:50 20:03	05:56 20:03	06:59 18:39	07:08 16:17	08:14 15:21	08:44 15:21
Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction			10		8			17		10		
Oper. time red.			0,22		0,42			0,35		0,31		
Wind dir. red.			0,99		0,99			0,99		0,99		
Total reduction			0,65		0,68			0,68		0,65		
Total, real			0,14		0,28			0,24		0,20		

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ARKARP 1:5>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (816)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	12 13:24 (A0015) 16:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44
2	08:43 15:24	10 13:25 (A0015) 16:26	08:02 16:26	06:54 17:31	06:28 19:40	05:08 20:47
3	08:43 15:25	14 13:26 (A0015) 16:28	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49
4	08:42 15:27	13 14:38 (A0010) 16:30	07:58 16:30	06:48 17:36	06:22 19:45	05:04 20:51
5	08:42 15:28	13 14:39 (A0010) 16:33	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53
6	08:41 15:30	10 14:41 (A0010) 16:35	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55
7	08:40 15:31	11 14:42 (A0010) 16:37	07:51 16:37	06:40 17:43	06:14 19:51	04:57 20:57
8	08:40 15:33	12 14:43 (A0010) 16:39	2 16:01 (A0005) 16:39	06:38 17:45	06:11 19:54	04:54 21:00
9	08:39 15:35	13 14:44 (A0010) 16:40	6 16:05 (A0005) 16:40	06:35 17:47	06:09 19:56	04:52 21:02
10	08:38 15:36	14 14:45 (A0010) 16:42	9 16:08 (A0005) 16:42	06:32 17:50	06:06 19:58	04:50 21:04
11	08:37 15:38	14 14:46 (A0010) 16:44	12 16:10 (A0005) 16:44	06:29 17:52	06:03 20:00	04:48 21:06
12	08:36 15:40	15 14:47 (A0010) 16:47	13 16:11 (A0005) 16:47	06:27 17:54	06:00 20:02	04:45 21:08
13	08:35 15:42	15 14:48 (A0010) 16:49	13 16:11 (A0005) 16:49	06:24 17:56	05:58 20:05	04:43 21:10
14	08:34 15:44	15 14:49 (A0010) 16:52	12 16:11 (A0005) 16:52	06:21 17:58	05:55 20:07	04:41 21:12
15	08:32 15:46	15 14:33 (A0010) 16:54	11 16:10 (A0005) 16:54	06:18 18:01	05:52 20:09	04:39 21:14
16	08:31 15:48	15 14:48 (A0010) 16:56	9 16:03 (A0005) 16:56	06:15 18:03	05:50 20:11	04:37 21:16
17	08:30 15:50	15 14:49 (A0010) 16:59	4 16:07 (A0005) 16:59	06:15 18:05	05:50 20:13	04:37 21:19
18	08:28 15:52	14 14:48 (A0010) 17:01	07:01 17:01	06:13 18:05	05:47 20:13	04:35 21:19
19	08:27 15:54	13 14:48 (A0010) 17:03	07:03 17:03	06:10 18:07	05:44 20:16	04:33 21:21
20	08:26 15:56	13 14:48 (A0010) 17:03	07:03 17:03	06:07 18:07	05:42 20:16	04:31 21:21
21	08:24 15:58	10 14:49 (A0010) 17:06	07:06 17:06	06:04 18:10	05:39 20:18	04:29 21:22
22	08:22 16:00	6 14:37 (A0010) 17:08	07:08 17:08	06:04 18:12	05:39 20:20	04:29 21:24
23	08:21 16:03	07:11 17:11	07:11 17:11	06:02 18:14	05:36 20:22	04:27 21:26
24	08:19 16:05	07:13 17:13	07:13 17:13	06:02 18:14	05:36 20:22	04:27 21:26
25	08:17 16:07	07:15 17:15	07:15 17:15	06:02 18:14	05:36 20:22	04:27 21:26
26	08:16 16:09	07:17 17:17	07:17 17:17	06:02 18:14	05:36 20:22	04:27 21:26
27	08:14 16:12	07:19 17:19	07:19 17:19	06:02 18:14	05:36 20:22	04:27 21:26
28	08:12 16:14	07:21 17:21	07:21 17:21	06:02 18:14	05:36 20:22	04:27 21:26
29	08:10 16:16	07:23 17:23	07:23 17:23	06:02 18:14	05:36 20:22	04:27 21:26
30	08:08 16:19	07:25 17:25	07:25 17:25	06:02 18:14	05:36 20:22	04:27 21:26
31	08:06 16:21	07:27 17:27	07:27 17:27	06:02 18:14	05:36 20:22	04:27 21:26
Potential sun hours	228	262	366	429	515	539
Total, worst case	278	91				
Sun reduction	0,19	0,16				
Oper. time red.	0,99	0,99				
Wind dir. red.	0,69	0,69				
Total reduction	0,13	0,11				
Total, real	35	10				

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ARKARP 1:5>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (816)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	07:11 16:15	08:16 14:28 (A0010)
2	04:04 22:02	04:54 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 14:28 (A0010)
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 14:28 (A0010)
4	04:06 22:01	04:59 21:12	06:04 19:52	07:08 18:28	07:18 16:08	08:21 14:28 (A0010)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 14:28 (A0010)
6	04:08 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 14:28 (A0010)
7	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:01	08:26 14:28 (A0010)
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 14:28 (A0010)
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 14:26 (A0010)
10	04:13 21:55	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:30 13:25 (A0015)
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 13:26 (A0015)
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:33 13:27 (A0015)
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:04	07:38 15:49	08:34 13:28 (A0015)
14	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 13:28 (A0015)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:36 13:29 (A0015)
16	04:22 21:48	05:24 20:43	06:30 19:19	07:34 17:55	07:45 15:43	08:37 13:29 (A0015)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:38 13:30 (A0015)
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39	08:39 13:31 (A0015)
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 13:31 (A0015)
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 13:32 (A0015)
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 13:32 (A0015)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:33	08:42 13:33 (A0015)
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:42 13:33 (A0015)
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 13:33 (A0015)
25	04:39 21:32	05:43 20:19	06:49 18:53	07:55 16:32	08:04 15:28	08:43 13:34 (A0015)
26	04:40 21:30	05:45 20:17	06:51 18:50	06:57 16:30	08:06 15:27	08:43 13:35 (A0015)
27	04:42 21:29	05:47 20:14	06:53 18:48	06:59 16:27	08:08 15:25	08:44 13:35 (A0015)
28	04:44 21:27	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:44 13:35 (A0015)
29	04:46 21:24	05:52 20:08	06:57 18:42	07:04 16:22	08:12 15:23	08:44 13:35 (A0015)
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:44 13:35 (A0015)
31	04:50 21:20	05:56 20:03		07:08 16:17	08:16 15:21	08:44 13:36 (A0015)
Potential sun hours	538	474	386	321	241	207
Total, worst case				66	170	420
Sun reduction				0,26	0,17	0,13
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,69	0,70	0,68
Total reduction				0,18	0,12	0,09
Total, real				12	20	37

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ARKARP 1:5>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (915)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	12 13:24 (A0015) 16:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44
2	08:43 15:24	11 13:24 (A0015) 16:26	08:02 16:26	06:54 17:31	06:28 19:40	05:08 20:47
3	08:43 15:25	13 13:35 (A0015) 16:28	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49
4	08:42 15:27	13 14:38 (A0010) 16:30	07:58 16:30	06:48 17:36	06:22 19:45	05:04 20:51
5	08:42 15:28	14 14:40 (A0010) 16:33	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53
6	08:41 15:30	13 14:41 (A0010) 16:35	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55
7	08:40 15:31	9 14:42 (A0010) 16:37	07:51 16:37	06:40 17:43	06:14 19:51	04:57 20:57
8	08:40 15:33	11 14:43 (A0010) 16:39	07:49 16:39	06:38 17:45	06:11 19:54	04:54 21:00
9	08:39 15:35	12 14:44 (A0010) 16:40	4 16:01 (A0005) 16:40	06:38 17:45	06:11 19:54	04:54 21:00
10	08:38 15:36	12 14:45 (A0010) 16:42	8 16:08 (A0005) 16:42	06:35 17:47	06:09 19:56	04:52 21:02
11	08:37 15:38	13 14:46 (A0010) 16:45	11 16:10 (A0005) 16:45	06:32 17:50	06:06 19:58	04:50 21:04
12	08:36 15:40	13 14:47 (A0010) 16:47	13 16:12 (A0005) 16:47	06:29 17:52	06:03 20:00	04:48 21:06
13	08:35 15:42	14 14:48 (A0010) 16:49	13 16:12 (A0005) 16:49	06:27 17:54	06:00 20:02	04:45 21:08
14	08:34 15:44	14 14:49 (A0010) 16:51	14 16:13 (A0005) 16:51	06:24 17:56	05:58 20:05	04:43 21:10
15	08:32 15:46	15 14:50 (A0010) 16:54	12 16:12 (A0005) 16:54	06:21 17:58	05:55 20:07	04:41 21:12
16	08:31 15:48	15 14:51 (A0010) 16:56	10 16:11 (A0005) 16:56	06:18 18:01	05:52 20:09	04:39 21:14
17	08:30 15:50	16 14:52 (A0010) 16:59	6 16:09 (A0005) 16:59	06:15 18:03	05:50 20:11	04:37 21:16
18	08:28 15:52	15 14:53 (A0010) 17:01	6 16:09 (A0005) 17:01	06:13 18:05	05:47 20:13	04:35 21:19
19	08:27 15:54	15 14:54 (A0010) 17:03	6 16:09 (A0005) 17:03	06:10 18:07	05:44 20:16	04:33 21:21
20	08:26 15:56	14 14:55 (A0010) 17:05	6 16:09 (A0005) 17:05	06:07 18:09	05:42 20:18	04:31 21:23
21	08:24 15:58	14 14:56 (A0010) 17:07	6 16:09 (A0005) 17:07	06:04 18:10	05:39 20:20	04:29 21:25
22	08:22 16:00	12 14:57 (A0010) 17:09	6 16:09 (A0005) 17:09	06:02 18:12	05:36 20:22	04:27 21:27
23	08:21 16:03	11 14:58 (A0010) 17:11	6 16:09 (A0005) 17:11	06:00 18:14	05:34 20:24	04:25 21:29
24	08:19 16:05	8 14:59 (A0010) 17:13	6 16:09 (A0005) 17:13	05:59 18:16	05:33 20:25	04:24 21:30
25	08:17 16:07	1 14:59 (A0010) 17:15	6 16:09 (A0005) 17:15	05:56 18:18	05:31 20:27	04:22 21:32
26	08:16 16:09	16:05 17:18	6 16:09 (A0005) 17:18	05:53 18:21	05:29 20:29	04:22 21:34
27	08:14 16:12	17:20 17:22	6 16:09 (A0005) 17:22	05:50 18:23	05:26 20:31	04:20 21:36
28	08:12 16:14	17:24 17:24	6 16:09 (A0005) 17:24	05:48 18:25	05:23 20:33	04:19 21:38
29	08:10 16:16	17:26 17:26	6 16:09 (A0005) 17:26	05:45 18:27	05:21 20:35	04:17 21:40
30	08:08 16:19	17:28 17:28	6 16:09 (A0005) 17:28	05:42 18:29	05:18 20:37	04:16 21:42
31	08:06 16:21	17:30 17:30	6 16:09 (A0005) 17:30	05:40 18:31	05:16 20:39	04:14 21:44
Potential sun hours	228	262	366	429	515	539
Total, worst case	282	91				
Sun reduction	0,19	0,16				
Oper. time red.	0,99	0,99				
Wind dir. red.	0,69	0,69				
Total reduction	0,13	0,11				
Total, real	36	10				

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ARKARP 1:5>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (915)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	07:11 16:15	08:16 15:21
2	04:04 22:02	04:54 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:19
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:19
4	04:06 22:01	04:59 21:12	06:04 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	04:08 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:16
7	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:01	08:26 15:15
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	04:13 21:55	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:36 15:12
16	04:22 21:48	05:24 20:43	06:30 19:19	07:34 17:55	07:45 15:43	08:37 15:12
17	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:38 15:12
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	04:39 21:32	05:43 20:19	06:49 18:53	07:55 16:32	08:04 15:28	08:43 15:16
26	04:40 21:30	05:45 20:17	06:51 18:50	07:57 16:30	08:06 15:27	08:43 15:16
27	04:42 21:29	05:47 20:14	06:53 18:48	07:59 16:27	08:08 15:25	08:44 15:17
28	04:44 21:27	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:44 15:18
29	04:46 21:24	05:52 20:08	06:57 18:42	07:04 16:22	08:12 15:23	08:44 15:19
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:44 15:20
31	04:50 21:20	05:56 20:03		07:08 16:18	08:16 15:22	08:44 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case				70	169	423
Sun reduction				0,26	0,17	0,13
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,69	0,70	0,68
Total reduction				0,18	0,12	0,09
Total, real				12	20	38

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)



## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BOGÅRD 6:29>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (812)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:16	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:42 15:26	08:00 16:28	06:51 17:34	06:26 19:43	05:06 20:49	04:08 21:48	04:06 22:02	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:09	08:21 15:18
5	08:41 15:29	07:56 16:33	06:46 17:39	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:49	07:10 18:26	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:54	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04	08:24 15:17
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:52	04:57 20:57	04:04 21:54	04:10 21:58	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:16
8	08:39 15:34	07:49 16:45	06:38 17:45	06:12 19:54	04:55 21:00	04:04 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 16:00	08:27 15:15
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 19:56	04:52 21:02	04:03 21:56	04:13 21:56	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:12 20:58	06:17 19:36	07:21 18:12	07:31 15:55	08:30 15:14
11	08:37 15:39	07:42 16:47	06:30 17:52	06:04 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:20 19:33	07:23 18:09	07:34 15:53	08:32 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:03	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:07	07:36 15:51	08:33 15:13
13	08:35 15:43	07:37 16:52	06:24 17:57	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:00	04:20 21:50	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	08:32 15:46	07:32 16:57	06:18 18:01	05:53 20:09	04:40 21:14	04:00 22:01	04:21 21:49	05:22 20:45	06:28 19:22	07:32 17:58	07:43 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:38 21:16	03:59 22:02	04:23 21:48	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:44	08:37 15:13
17	08:30 15:50	07:28 17:02	06:13 18:05	05:47 20:14	04:36 21:18	03:59 22:02	04:25 21:46	05:27 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:28 15:53	07:25 17:04	06:10 18:08	05:45 20:16	04:34 21:20	03:59 22:03	04:26 21:45	05:29 20:38	06:34 19:13	07:39 17:51	07:49 15:40	08:39 15:13
19	08:27 15:55	07:23 17:06	06:07 18:10	05:42 20:18	04:32 21:22	03:59 22:03	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
20	08:25 15:57	07:20 17:09	06:05 18:12	05:39 20:20	04:30 21:24	03:59 22:04	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:14
21	08:24 15:59	07:17 17:11	06:02 18:14	05:37 20:22	04:28 21:26	03:59 22:04	04:32 21:40	05:35 20:30	06:41 19:05	07:46 17:43	07:56 15:35	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:25	04:26 21:28	03:59 22:04	04:34 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:16	05:56 18:19	05:32 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:23 21:32	04:00 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:04	04:39 21:32	05:44 20:19	06:49 18:53	06:55 16:33	08:04 15:29	08:43 15:16
26	08:15 16:10	07:05 17:23	05:48 18:25	05:24 20:33	04:19 21:36	04:01 22:04	04:41 21:30	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:36	04:18 21:37	04:01 22:04	04:43 21:28	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:43 15:18
28	08:12 16:14	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:25	08:44 15:19
29	08:10 16:17	06:59 19:32	05:42 20:40	05:16 21:41	04:15 22:04	04:02 21:24	04:47 20:09	05:52 18:42	06:58 16:23	07:04 15:23	08:12 15:20	08:44 15:20
30	08:08 16:19	06:57 19:34	05:40 20:42	05:14 21:42	04:13 22:03	04:03 21:22	04:49 21:22	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:44 15:21
31	08:06 16:21	06:54 19:36	05:38 20:42	05:12 21:44	04:12 22:04	04:01 21:20	04:51 20:03	05:56 16:18	07:08 15:22	07:08 15:22	08:14 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BOGÅRD 6:30>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (810)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:24	08:04 16:24	06:57 17:30	06:31 19:38	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:26	08:00 16:29	06:51 17:34	06:26 19:43	05:07 20:49	04:08 21:48	04:06 22:02	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:28	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:09	08:21 15:18
5	08:42 15:29	07:56 16:33	06:46 17:39	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:50	07:10 18:26	07:20 16:06	08:23 15:17
6	08:41 15:31	07:53 16:36	06:43 17:41	06:17 19:49	04:59 20:55	04:05 21:53	04:09 21:59	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04	08:24 15:17
7	08:40 15:32	07:51 16:38	06:41 17:43	06:15 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:16
8	08:40 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:04 21:55	04:11 21:58	05:08 21:02	06:13 19:41	07:17 18:17	07:27 16:00	08:28 15:15
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 19:56	04:53 21:02	04:03 21:56	04:13 21:57	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:12 20:58	06:18 19:36	07:21 18:12	07:31 15:56	08:30 15:14
11	08:37 15:39	07:42 16:47	06:30 17:52	06:04 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:20 19:33	07:24 18:09	07:34 15:53	08:32 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:03	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:07	07:36 15:51	08:33 15:14
13	08:35 15:43	07:37 16:52	06:24 17:57	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:45	07:35 16:55	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:01	04:20 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:35 15:13
15	08:33 15:47	07:33 16:57	06:19 18:01	05:53 20:09	04:40 21:15	04:00 22:01	04:22 21:49	05:22 20:45	06:28 19:22	07:32 17:59	07:43 15:46	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:38 21:17	03:59 22:02	04:23 21:48	05:25 20:43	06:30 19:19	07:35 17:56	07:45 15:44	08:37 15:13
17	08:30 15:51	07:28 17:02	06:13 18:06	05:47 20:14	04:36 21:19	03:59 22:03	04:25 21:46	05:27 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:29 15:53	07:25 17:04	06:10 18:08	05:45 20:16	04:34 21:21	03:59 22:03	04:26 21:45	05:29 20:38	06:34 19:13	07:39 17:51	07:49 15:40	08:39 15:13
19	08:27 15:55	07:23 17:06	06:07 18:10	05:42 20:18	04:32 21:23	03:59 22:03	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	08:26 15:57	07:20 17:09	06:05 18:12	05:39 20:20	04:30 21:25	03:59 22:04	04:30 21:41	05:33 20:33	06:39 19:08	07:43 17:45	07:54 15:37	08:41 15:14
21	08:24 15:59	07:18 17:11	06:02 18:14	05:37 20:22	04:28 21:26	03:59 22:04	04:32 21:40	05:35 20:30	06:41 19:05	07:46 17:43	07:56 15:35	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:17	05:34 20:25	04:26 21:28	03:59 22:04	04:34 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:16	05:56 18:19	05:32 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:06	07:10 17:18	05:54 18:21	05:29 20:29	04:23 21:32	04:00 22:05	04:37 21:34	05:42 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:05	04:39 21:32	05:44 20:19	06:49 18:54	06:55 16:33	08:04 15:29	08:43 15:16
26	08:16 16:10	07:05 17:23	05:48 18:25	05:24 20:34	04:19 21:36	04:01 22:04	04:41 21:31	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:14 16:12	07:02 17:25	05:45 18:28	05:21 20:36	04:18 21:37	04:01 22:04	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:44 15:18
28	08:12 16:15	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:27	05:50 20:11	06:55 18:45	07:02 16:25	08:10 15:25	08:44 15:19
29	08:10 16:17	06:40 19:32	05:16 20:40	04:15 21:41	04:02 22:04	04:02 21:25	04:47 20:09	05:52 18:42	06:58 16:23	07:04 15:23	08:12 15:20	08:44 15:20
30	08:08 16:19	06:37 19:34	05:14 20:42	04:13 21:42	04:03 22:03	04:03 21:22	04:49 21:22	05:54 20:06	07:00 18:40	07:06 16:20	08:14 15:22	08:44 15:21
31	08:06 16:21	06:34 19:36	05:12 20:44	04:11 21:44	04:01 22:04	04:01 21:20	04:51 20:03	05:56 16:18	07:08 15:22	07:08 15:22	08:14 15:22	08:44 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BOGÅRD 6:32>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (839)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:24	08:04 16:24	06:57 17:30	06:31 19:38	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:26	08:00 16:29	06:51 17:34	06:26 19:43	05:07 20:49	04:08 21:49	04:06 22:02	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:28	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:09	08:21 15:18
5	08:42 15:29	07:56 16:33	06:46 17:39	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:50	07:11 18:26	07:20 16:06	08:23 15:17
6	08:41 15:31	07:53 16:36	06:43 17:41	06:17 19:49	04:59 20:55	04:05 21:53	04:09 21:59	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04	08:24 15:17
7	08:40 15:32	07:51 16:38	06:41 17:43	06:15 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:16
8	08:40 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:04 21:55	04:11 21:58	05:08 21:02	06:13 19:41	07:17 18:17	07:27 16:00	08:28 15:15
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 19:56	04:53 21:02	04:03 21:56	04:13 21:57	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:12 20:58	06:18 19:36	07:21 18:12	07:31 15:56	08:30 15:14
11	08:37 15:39	07:42 16:47	06:30 17:52	06:04 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:20 19:33	07:24 18:09	07:34 15:53	08:32 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:03	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:07	07:36 15:51	08:33 15:14
13	08:35 15:43	07:37 16:52	06:24 17:57	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:45	07:35 16:55	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:01	04:20 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:35 15:13
15	08:33 15:47	07:33 16:57	06:19 18:01	05:53 20:09	04:40 21:15	04:00 22:01	04:22 21:49	05:22 20:45	06:28 19:22	07:32 17:59	07:43 15:46	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:38 21:17	03:59 22:02	04:23 21:48	05:25 20:43	06:30 19:19	07:35 17:56	07:45 15:44	08:37 15:13
17	08:30 15:51	07:28 17:02	06:13 18:06	05:47 20:14	04:36 21:19	03:59 22:03	04:25 21:46	05:27 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:29 15:53	07:25 17:04	06:10 18:08	05:45 20:16	04:34 21:21	03:59 22:03	04:26 21:45	05:29 20:38	06:34 19:13	07:39 17:51	07:49 15:40	08:39 15:13
19	08:27 15:55	07:23 17:06	06:07 18:10	05:42 20:18	04:32 21:23	03:59 22:04	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	08:26 15:57	07:20 17:09	06:05 18:12	05:39 20:20	04:30 21:25	03:59 22:04	04:30 21:41	05:33 20:33	06:39 19:08	07:43 17:45	07:54 15:37	08:41 15:14
21	08:24 15:59	07:18 17:11	06:02 18:14	05:37 20:23	04:28 21:26	03:59 22:04	04:32 21:40	05:35 20:30	06:41 19:05	07:46 17:43	07:56 15:35	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:17	05:34 20:25	04:26 21:28	03:59 22:04	04:34 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:16	05:56 18:19	05:32 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:06	07:10 17:18	05:54 18:21	05:29 20:29	04:23 21:32	04:00 22:05	04:37 21:34	05:42 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:05	04:39 21:32	05:44 20:19	06:49 18:54	06:55 16:33	08:04 15:29	08:43 15:16
26	08:16 16:10	07:05 17:23	05:48 18:25	05:24 20:34	04:19 21:36	04:01 22:04	04:41 21:31	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:14 16:12	07:02 17:25	05:45 18:28	05:21 20:36	04:18 21:37	04:01 22:04	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:44 15:18
28	08:12 16:15	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:27	05:50 20:11	06:56 18:45	07:02 16:25	08:10 15:25	08:44 15:19
29	08:10 16:17	06:40 19:32	05:16 20:40	04:15 21:41	04:02 22:04	04:02 21:25	04:47 20:09	05:52 18:42	06:58 16:23	07:04 15:23	08:12 15:20	08:44 15:20
30	08:08 16:19	06:37 19:34	05:14 20:42	04:13 21:42	04:03 22:03	04:03 21:23	04:49 21:23	05:54 20:06	07:00 18:40	07:06 16:20	08:14 15:22	08:44 15:21
31	08:06 16:21	06:34 19:36	05:12 20:44	04:12 21:44	04:02 22:04	04:02 21:20	04:51 20:03	05:56 20:03	07:08 16:18	07:08 15:22	08:16 15:22	08:44 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:11>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (902)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March		April		May	June	July	August		September		October	November	December	
1	08:43	08:04	06:56		06:31	6	06:57 (1)	05:11	04:10	04:03	04:52	05:58		07:02	07:11	08:16	
	15:23	16:23	17:29		19:38		07:03 (1)	20:44	21:46	22:03	21:18	20:00		18:36	16:15	15:20	
2	08:43	08:02	06:54		06:28		06:54 (1)	05:08	04:09	04:04	04:54	06:00		07:04	07:13	08:18	
	15:24	16:26	17:31		19:40	7	07:01 (1)	20:47	21:47	22:02	21:16	19:58		18:34	16:13	15:19	
3	08:43	08:00	06:51		06:25		06:51 (1)	05:06	04:08	04:05	04:56	06:02		07:06	07:15	08:20	
	15:25	16:28	17:34		19:43	8	06:59 (1)	20:49	21:49	22:02	21:14	19:55		18:31	16:10	15:18	
4	08:42	07:58	06:48		06:22			05:04	04:07	04:06	04:59	06:04		07:08	07:18	08:21	
	15:27	16:30	17:36		19:45			20:51	21:50	22:01	21:12	19:52		18:28	16:08	15:17	
5	08:42	07:56	06:46		06:20			05:01	04:05	04:07	05:01	06:07		07:10	07:20	08:23	
	15:28	16:33	17:38		19:47			20:53	21:51	22:00	21:09	19:49		18:25	16:06	15:17	
6	08:41	07:53	06:43		06:17			04:59	04:04	04:08	05:03	06:09		07:12	07:22	08:25	
	15:30	16:35	17:40		19:49			20:55	21:53	22:00	21:07	19:47		18:23	16:04	15:16	
7	08:40	07:51	06:40		06:14			04:56	04:04	04:09	05:05	06:11		07:15	07:24	08:26	
	15:31	16:37	17:43		19:51			20:58	21:54	21:59	21:05	19:44		18:20	16:01	15:15	
8	08:40	07:49	06:38		06:11			04:54	04:03	04:11	05:07	06:13		07:17	07:27	08:28	
	15:33	16:40	17:45		19:54			21:00	21:55	21:58	21:02	19:41		18:17	15:59	15:15	
9	08:39	07:47	06:35		06:09			04:52	04:02	04:12	05:09	06:15	06:46 (1)	07:19	07:29	08:29	
	15:35	16:42	17:47		19:56			21:02	21:56	21:57	21:00	19:38	7	06:53 (1)	18:14	15:57	15:14
10	08:38	07:44	06:32		06:06			04:50	04:01	04:13	05:11	06:17		06:47 (1)	07:21	07:31	08:30
	15:36	16:45	17:50		19:58			21:04	21:57	21:56	20:58	19:35	7	06:54 (1)	18:12	15:55	15:13
11	08:37	07:42	06:29		06:03			04:47	04:01	04:15	05:13	06:19		06:49 (1)	07:23	07:34	08:32
	15:38	16:47	17:52		20:00			21:06	21:58	21:54	20:55	19:33	6	06:55 (1)	18:09	15:53	15:13
12	08:36	07:40	06:27		06:00			04:45	04:00	04:16	05:15	06:21		06:51 (1)	07:25	07:36	08:33
	15:40	16:49	17:54		20:02			21:08	21:59	21:53	20:53	19:30	4	06:55 (1)	18:06	15:51	15:13
13	08:35	07:37	06:24		05:58			04:43	04:00	04:18	05:18	06:23		06:53 (1)	07:28	07:38	08:34
	15:42	16:52	17:56		20:05	2	06:26 (2)	21:10	22:00	21:52	20:50	19:27	2	06:55 (1)	18:03	15:49	15:12
14	08:34	07:35	06:21		05:55		06:22 (2)	04:41	03:59	04:19	05:20	06:26		07:30	07:40	08:35	
	15:44	16:54	17:58		20:07	4	06:26 (2)	21:12	22:01	21:51	20:48	19:24		18:01	15:47	15:12	
15	08:33	07:32	06:18		05:52		06:19 (2)	04:39	03:59	04:21	05:22	06:28		07:32	07:43	08:37	
	15:46	16:56	18:01		20:09	5	06:24 (2)	21:15	22:01	21:49	20:45	19:21		17:58	15:45	15:12	
16	08:31	07:30	06:15		05:50		06:19 (2)	04:37	03:58	04:22	05:24	06:30		07:34	07:45	08:38	
	15:48	16:59	18:03		20:11	1	06:20 (2)	21:17	22:02	21:48	20:43	19:19		17:55	15:43	15:12	
17	08:30	07:27	06:13		05:47			04:35	03:58	04:24	05:26	06:32		07:03 (4)	07:37	07:47	08:38
	15:50	17:01	18:05		20:13			21:19	22:03	21:46	20:40	19:16	6	07:09 (4)	17:53	15:41	15:12
18	08:29	07:25	06:10		05:44			04:33	03:58	04:26	05:28	06:34		07:03 (4)	07:39	07:49	08:39
	15:52	17:03	18:07		20:16			21:21	22:03	21:45	20:38	19:13	7	07:10 (4)	17:50	15:39	15:12
19	08:27	07:22	06:07		05:42			04:31	03:58	04:27	05:30	06:36		07:06 (4)	07:41	07:52	08:40
	15:54	17:06	18:10		20:18			21:23	22:04	21:43	20:35	19:10	5	07:11 (4)	17:48	15:38	15:13
20	08:26	07:20	06:04		05:39			04:29	03:58	04:29	05:32	06:38		07:08 (4)	07:43	07:54	08:41
	15:56	17:08	18:12		20:20			21:25	22:04	21:41	20:32	19:07	3	07:11 (4)	17:45	15:36	15:13
21	08:24	07:17	06:02		05:36			04:27	03:58	04:31	05:35	06:40		07:10 (4)	07:46	07:56	08:41
	15:58	17:10	18:14		20:22			21:26	22:04	21:40	20:30	19:04	1	07:11 (4)	17:42	15:34	15:13
22	08:22	07:15	05:59		05:34			04:25	03:58	04:33	05:37	06:42		07:48	07:58	08:42	
	16:00	17:13	18:16		20:25			21:28	22:04	21:38	20:27	19:02		15:33	15:33	15:14	
23	08:21	07:12	05:56		05:31			04:24	03:59	04:35	05:39	06:45		07:50	08:00	08:43	
	16:03	17:15	18:18	3	06:25 (4)	20:27		21:30	22:05	21:36	20:25	18:59		17:37	15:31	15:14	
24	08:19	07:10	05:53		06:19 (4)	05:28		04:22	03:59	04:37	05:41	06:47		07:52	08:02	08:43	
	16:05	17:17	18:21	5	06:24 (4)	20:29		21:32	22:05	21:34	20:22	18:56		17:35	15:29	15:15	
25	08:17	07:07	05:50		06:16 (4)	05:26		04:20	03:59	04:38	05:43	06:49		06:55	08:04	08:43	
	16:07	17:20	18:23	7	06:23 (4)	20:31		21:34	22:05	21:32	20:19	18:53		16:32	15:28	15:15	
26	08:16	07:04	05:48		06:15 (4)	05:23		04:19	04:00	04:40	05:45	06:51		06:57	08:06	08:44	
	16:09	17:22	18:25	7	06:22 (4)	20:33		21:36	22:05	21:31	20:17	18:50		16:30	15:27	15:16	
27	08:14	07:02	05:45		05:21			04:17	04:00	04:42	05:47		06:21 (2)	06:53	06:59	08:08	08:44
	16:12	17:24	18:27		20:36			21:37	22:04	21:29	20:14	2	06:23 (2)	18:48	16:27	15:25	15:17
28	08:12	06:59	05:42		05:18			04:16	04:01	04:44	05:50		06:21 (2)	18:45	07:01	08:10	08:44
	16:14	17:27	18:29		20:38			21:39	22:04	21:27	20:11	5	06:26 (2)	18:45	16:25	15:24	15:18
29	08:10		06:39		05:16			04:14	04:02	04:46	05:52		06:23 (2)	18:42	07:04	08:12	08:44
	16:16		19:32		20:40			21:41	22:04	21:25	20:09	4	06:27 (2)	18:42	16:22	15:23	15:19
30	08:08		06:36		05:13	07:02 (1)		04:13	04:02	04:48	05:54		06:25 (2)	18:42	07:06	08:14	08:44
	16:19		19:34	1	07:03 (1)	20:42		21:43	22:03	21:22	20:06	2	06:27 (2)	18:39	16:20	15:22	15:20
31	08:06		06:34		07:00 (1)			04:11		04:50	05:56			07:08	08:14	08:44	
	16:21		19:36	4	07:04 (1)			21:44		21:20	20:03			16:17	15:21	15:21	
Potential sun hours	227	262	366		429			515	539	538	474	386		321	241	207	
Total, worst case			27		33						13			48			
Sun reduction			0,22		0,42						0,35			0,31			
Oper. time red.			0,99		0,99						0,99			0,99			
Wind dir. red.			0,64		0,65						0,66			0,65			
Total reduction			0,14		0,27						0,23			0,20			
Total, real			4		9						3			10			

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:12>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (866)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:57 17:29	06:31 19:38	05:11 20:45	04:10 21:46	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:41	05:08 20:47	04:09 21:47	04:04 22:03	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:49	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	08:42 15:27	07:58 16:30	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	08:42 15:28	07:56 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	04:59 20:55	04:05 21:53	04:08 22:00	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:25 15:16
7	08:41 15:31	07:51 16:38	06:40 17:43	06:14 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:15
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:31 15:14
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:55	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	08:36 15:40	07:40 16:49	06:27 17:54	06:01 20:03	04:45 21:08	04:00 21:59	04:16 21:53	05:16 20:53	06:21 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:41 21:13	03:59 22:01	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:36 15:12
15	08:33 15:46	07:32 16:57	06:18 18:01	05:52 20:09	04:39 21:15	03:59 22:02	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:37 15:12
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:17	03:59 22:02	04:22 21:48	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:43	08:38 15:12
17	08:30 15:50	07:28 17:01	06:13 18:05	05:47 20:14	04:35 21:19	03:58 22:03	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:39 15:12
18	08:29 15:52	07:25 17:04	06:10 18:07	05:44 20:16	04:33 21:21	03:58 22:03	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:23 17:06	06:07 18:10	05:42 20:18	04:31 21:23	03:58 22:04	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:25	03:58 22:04	04:29 21:42	05:33 20:33	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	08:24 15:58	07:17 17:11	06:02 18:14	05:36 20:22	04:27 21:27	03:58 22:04	04:31 21:40	05:35 20:30	06:40 19:05	07:46 17:42	07:56 15:34	08:42 15:13
22	08:23 16:01	07:15 17:13	05:59 18:16	05:34 20:25	04:26 21:28	03:59 22:05	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:43 15:14
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:22 21:32	03:59 22:05	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:05	04:39 21:33	05:43 20:19	06:49 18:53	06:55 16:32	08:04 15:28	08:43 15:16
26	08:16 16:09	07:05 17:22	05:48 18:25	05:23 20:34	04:19 21:36	04:00 22:05	04:41 21:31	05:45 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:44 15:16
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:36	04:17 21:38	04:00 22:04	04:42 21:29	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:25	08:44 15:17
28	08:12 16:14	06:59 17:27	05:42 18:30	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:27	05:50 20:11	06:55 18:45	07:02 16:25	08:10 15:24	08:44 15:18
29	08:10 16:16	06:59 19:32	05:42 20:40	05:16 21:41	04:14 22:04	04:02 21:25	04:46 20:09	05:52 18:42	06:57 16:22	07:04 15:23	08:12 15:19	08:44 15:19
30	08:08 16:19	06:56 19:34	05:40 20:42	05:13 21:43	04:13 22:04	04:03 21:23	04:48 21:23	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:44 15:20
31	08:06 16:21	06:54 19:36	05:38 20:44	05:11 21:44	04:11 22:04	04:00 21:20	04:50 20:03	05:56 16:18	07:08 15:21	07:08 15:21	08:16 15:21	08:44 15:21
Potential sun hours	227	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:13>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (829)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:46
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:08 20:47	04:09 21:47
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:49
4	08:42 15:27	07:58 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:50
5	08:42 15:28	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:53
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:54
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	06:35 (5) 21:02	04:52 21:56
10	08:38 15:36	07:44 16:45	06:32 17:50	06:06 19:58	06:32 (5) 21:04	04:50 21:57
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	06:30 (5) 21:06	04:47 21:58
12	08:36 15:40	07:40 16:49	06:27 17:54	06:00 20:02	04:45 21:08	04:00 21:59
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00
14	08:34 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:01
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	05:11 (1) 05:12 (1)
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	05:09 (1) 05:11 (1)
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:19	05:07 (1) 05:10 (1)
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:16	04:33 21:21	05:06 (1) 05:08 (1)
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:23	05:08 (1) 22:03
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04
21	08:24 15:58	07:17 17:11	06:02 18:14	05:36 20:22	04:27 21:26	03:58 22:04
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:25	04:25 21:28	03:58 22:04
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	03:59 22:05
24	08:19 16:05	07:10 17:18	05:53 18:21	05:28 20:29	04:22 21:32	03:59 22:05
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:05
26	08:16 16:09	07:04 17:22	05:48 18:25	05:23 20:33	04:19 21:36	04:00 22:04
27	08:14 16:12	07:02 17:24	05:45 18:27	05:21 20:36	04:17 21:37	04:00 22:04
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:01 22:04
29	08:10 16:16		06:39 19:32	05:16 20:40	04:14 21:41	04:02 22:04
30	08:08 16:19		06:36 19:34	05:13 20:42	04:13 21:42	04:02 22:03
31	08:06 16:21		06:34 19:36		04:11 21:44	
Potential sun hours	228	262	366	429	515	539
Total, worst case				6		8
Sun reduction				0,42		0,53
Oper. time red.				0,99		0,99
Wind dir. red.				0,66		0,69
Total reduction				0,28		0,36
Total, real				2		3

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:13>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (829)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	06:29 (5) 06:32 (5)	07:02 18:36	07:11 16:15
2	04:04 22:02	04:54 21:16	06:00 19:58	06:31 (5) 06:33 (5)	07:04 18:34	07:13 16:13
3	04:05 22:02	04:57 21:14	06:02 19:55	06:33 (5) 06:34 (5)	07:06 18:31	07:15 16:10
4	04:06 22:01	04:59 21:12	06:04 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	04:08 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:16
7	04:09 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:01	08:26 15:15
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 15:49	08:34 15:13
14	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:36 15:12
16	04:22 21:48	05:24 20:43	06:30 19:19	07:34 17:55	07:45 15:43	08:37 15:12
17	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:38 15:12
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
20	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	04:39 21:32	05:43 20:19	06:49 18:53	07:55 16:32	08:04 15:28	08:43 15:16
26	04:40 21:30	05:45 20:17	06:51 18:50	07:57 16:30	08:06 15:27	08:43 15:16
27	04:42 21:29	05:47 20:15	06:53 18:48	07:59 16:27	08:08 15:25	08:44 15:17
28	04:44 21:27	05:50 20:12	06:55 18:45	08:01 16:25	08:10 15:24	08:44 15:18
29	04:46 21:24	05:52 20:10	06:57 18:42	08:04 16:22	08:12 15:23	08:44 15:19
30	04:48 21:22	05:54 20:06	06:59 18:39	08:06 16:20	08:14 15:22	08:44 15:20
31	04:50 21:20	05:56 20:03		08:08 16:17		08:44 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case	9		6			62
Sun reduction	0,38		0,31			0,13
Oper. time red.	0,99		0,99			0,99
Wind dir. red.	0,69		0,66			0,68
Total reduction	0,26		0,20			0,09
Total, real	2		1			5

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:19>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (898)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June
1	08:44	12:44 (A0001)	08:04	08:51 (A0005)	06:57	06:31	05:11	04:10		
	15:23	19 13:03 (A0001)	16:23	11 09:02 (A0005)	17:29	19:38	20:45	21:46		
2	08:43	12:45 (A0001)	08:02	08:51 (A0005)	06:54	06:28	05:09	04:09		
	15:24	19 13:04 (A0001)	16:26	10 09:01 (A0005)	17:32	19:41	20:47	21:47		
3	08:43	12:46 (A0001)	08:00	08:54 (A0005)	06:51	06:25	05:06	04:08		
	15:26	18 13:04 (A0001)	16:28	5 08:59 (A0005)	17:34	19:43	20:49	21:49		
4	08:42	12:47 (A0001)	07:58		06:49	06:23	05:04	04:07		
	15:27	16 13:03 (A0001)	16:31		17:36	19:45	20:51	21:50		
5	08:42	12:48 (A0001)	07:56		06:46	06:20	05:01	04:06		
	15:29	15 13:03 (A0001)	16:33		17:38	19:47	20:53	21:52		
6	08:41	12:49 (A0001)	07:54		06:43	06:17	04:59	04:05		
	15:30	14 13:03 (A0001)	16:35		17:41	19:49	20:56	21:53		
7	08:41	12:50 (A0001)	07:51		06:41	06:14	04:57	04:04		
	15:32	12 13:02 (A0001)	16:38		17:43	19:52	20:58	21:54		
8	08:40	12:52 (A0001)	07:49		06:38	06:12	04:54	04:03		
	15:33	10 13:02 (A0001)	16:40		17:45	19:54	21:00	21:55		
9	08:39	12:55 (A0001)	07:47		06:35	06:09	04:52	04:02		
	15:35	5 13:00 (A0001)	16:42		17:48	19:56	21:02	21:56		
10	08:38		07:44		06:32	06:06	04:50	04:02		
	15:37		16:45		17:50	19:58	21:04	21:57		
11	08:37		07:42		06:30	06:03	04:48	04:01		
	15:39		16:47		17:52	20:00	21:06	21:58		
12	08:36		07:40		06:27	06:01	04:46	04:00		
	15:40		16:50		17:54	20:03	21:08	21:59		
13	08:35		07:37		06:24	05:58	04:43	04:00		
	15:42		16:52		17:57	20:05	21:11	22:00		
14	08:34		07:35		06:21	05:55	04:41	03:59		
	15:44		16:54		17:59	20:07	21:13	22:01		
15	08:33		07:33		06:19	05:53	04:39	03:59		
	15:46		16:57		18:01	20:09	21:15	22:02		
16	08:31		07:30		06:16	05:50	04:37	03:59		
	15:48		16:59		18:03	20:11	21:17	22:02		
17	08:30		07:28		06:13	05:47	04:35	03:59		
	15:50		17:01		18:05	20:14	21:19	22:03		
18	08:29		07:25		06:10	05:44	04:33	03:58		
	15:52		17:04		18:08	20:16	21:21	22:03		
19	08:27		07:23		06:07	05:42	04:31	03:58		
	15:54		17:06		18:10	20:18	21:23	22:04		
20	08:26		07:20		06:05	05:39	04:29	03:58		
	15:56		17:08		18:12	20:20	21:25	22:04		
21	08:24		07:18		06:02	05:37	04:28	03:59		
	15:59		17:11		18:14	20:23	21:27	22:04		
22	08:23		07:15		05:59	05:34	04:26	03:59		
	16:01		17:13		18:16	20:25	21:29	22:05		
23	08:21	08:56 (A0005)	07:12		05:56	05:31	04:24	03:59		
	16:03	3 08:59 (A0005)	17:15		18:19	20:27	21:30	22:05		
24	08:19	08:54 (A0005)	07:10		05:53	05:29	04:22	03:59		
	16:05	6 09:00 (A0005)	17:18		18:21	20:29	21:32	22:05		
25	08:18	08:52 (A0005)	07:07		05:51	05:26	04:21	04:00		
	16:07	9 09:01 (A0005)	17:20		18:23	20:31	21:34	22:05		
26	08:16	08:50 (A0005)	07:05		05:48	05:24	04:19	04:00		
	16:10	12 09:02 (A0005)	17:22		18:25	20:34	21:36	22:05		
27	08:14	08:48 (A0005)	07:02		05:45	05:21	04:17	04:01		
	16:12	15 09:03 (A0005)	17:25		18:27	20:36	21:38	22:05		
28	08:12	08:49 (A0005)	06:59		05:42	05:19	04:16	04:01		
	16:14	14 09:03 (A0005)	17:27		18:30	20:38	21:39	22:04		
29	08:10	08:48 (A0005)			06:39	05:16	04:14	04:02		
	16:17	15 09:03 (A0005)			19:32	20:40	21:41	22:04		
30	08:08	08:49 (A0005)			06:37	05:14	04:13	04:03		
	16:19	14 09:03 (A0005)			19:34	20:42	21:43	22:04		
31	08:06	08:50 (A0005)			06:34		04:12			
	16:21	13 09:03 (A0005)			19:36		21:44			
Potential sun hours	228		262		366	429	515	539		
Total, worst case	229		26							
Sun reduction	0,19		0,16							
Oper. time red.	0,99		0,99							
Wind dir. red.	0,62		0,55							
Total reduction	0,11		0,09							
Total, real	26		2							

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

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



## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:19>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (898)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:04 22:03	04:53 21:18	05:58 20:01	07:02 18:37	07:11 16:15	08:16 15:21
2	04:04 22:03	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	04:05 22:02	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	04:07 22:01	05:01 21:10	06:07 19:50	07:10 18:26	07:20 16:06	08:23 15:17
6	04:09 22:00	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04	08:25 15:16
7	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:15
8	04:11 21:58	05:07 21:03	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:15	07:29 15:57	08:29 15:14
10	04:14 21:56	05:11 20:58	06:17 19:36	07:21 18:12	07:32 15:55	08:31 15:14
11	04:15 21:55	05:14 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	04:16 21:53	05:16 20:53	06:22 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:36 15:13
15	04:21 21:49	05:22 20:45	06:28 19:22	07:32 17:58	07:43 15:45	08:37 15:13
16	04:23 21:48	05:24 20:43	06:30 19:19	07:35 17:56	07:45 15:43	08:38 15:12
17	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:39 15:13
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:50 15:40	08:39 15:13
19	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	04:30 21:42	05:33 20:33	06:38 19:08	07:43 17:45	07:54 15:36	08:41 15:13
21	04:31 21:40	05:35 20:30	06:41 19:05	07:46 17:43	07:56 15:35	08:42 15:14
22	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:31	08:43 15:15
24	04:37 21:35	05:41 20:22	06:47 18:56	07:53 17:35	08:02 15:30	08:43 15:15
25	04:39 21:33	05:43 20:19	06:49 18:53	06:55 16:32	08:04 15:28	08:43 15:16
26	04:41 21:31	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:44 15:17
27	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:26	08:44 15:17
28	04:45 21:27	05:50 20:11	06:55 18:45	07:02 16:25	08:10 15:24	08:44 15:18
29	04:47 21:25	05:52 20:09	06:58 18:42	07:04 16:23	08:12 15:23	08:44 15:19
30	04:49 21:23	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:44 15:20
31	04:51 21:21	05:56 20:03		07:09 16:18		08:44 15:22
Potential sun hours	538	474	386	321	241	207
Total, worst case					127	550
Sun reduction					0,17	0,13
Oper. time red.					0,99	0,99
Wind dir. red.					0,55	0,66
Total reduction					0,09	0,09
Total, real					12	48

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:3>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (865)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 15:23	08:04 16:23	06:57 17:29	06:31 19:38	05:11 20:45	04:10 21:46	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:41	05:08 20:47	04:09 21:47	04:04 22:03	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:49	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	08:42 15:27	07:58 16:30	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	08:42 15:28	07:56 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	04:59 20:56	04:05 21:53	04:08 22:00	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:25 15:16
7	08:41 15:31	07:51 16:38	06:40 17:43	06:14 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:15
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:31 15:14
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:55	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	08:36 15:40	07:40 16:49	06:27 17:54	06:01 20:03	04:45 21:08	04:00 21:59	04:16 21:53	05:16 20:53	06:21 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:41 21:13	03:59 22:01	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:36 15:12
15	08:33 15:46	07:32 16:57	06:18 18:01	05:52 20:09	04:39 21:15	03:59 22:02	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:37 15:12
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:17	03:59 22:02	04:22 21:48	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:43	08:38 15:12
17	08:30 15:50	07:28 17:01	06:13 18:05	05:47 20:14	04:35 21:19	03:58 22:03	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:39 15:12
18	08:29 15:52	07:25 17:04	06:10 18:08	05:44 20:16	04:33 21:21	03:58 22:03	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:23 17:06	06:07 18:10	05:42 20:18	04:31 21:23	03:58 22:04	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:25	03:58 22:04	04:29 21:42	05:33 20:33	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	08:24 15:58	07:17 17:11	06:02 18:14	05:36 20:22	04:27 21:27	03:58 22:04	04:31 21:40	05:35 20:30	06:40 19:05	07:46 17:42	07:56 15:34	08:42 15:13
22	08:23 16:01	07:15 17:13	05:59 18:16	05:34 20:25	04:26 21:29	03:59 22:05	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:43 15:14
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:22 21:32	03:59 22:05	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:05	04:39 21:33	05:43 20:19	06:49 18:53	06:55 16:32	08:04 15:28	08:43 15:16
26	08:16 16:09	07:05 17:22	05:48 18:25	05:23 20:34	04:19 21:36	04:00 22:05	04:41 21:31	05:45 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:44 15:16
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:36	04:17 21:38	04:00 22:05	04:42 21:29	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:25	08:44 15:17
28	08:12 16:14	06:59 17:27	05:42 18:30	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:27	05:50 20:11	06:55 18:45	07:02 16:25	08:10 15:24	08:44 15:18
29	08:10 16:16	06:59 19:32	05:42 20:40	05:16 21:41	04:14 22:04	04:02 21:25	04:46 20:09	05:52 18:42	06:57 16:22	07:04 15:23	08:12 15:19	08:44 15:19
30	08:08 16:19	06:56 19:34	05:43 20:42	05:13 21:43	04:13 22:04	04:02 21:23	04:48 21:23	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:44 15:20
31	08:06 16:21	06:54 19:36	05:43 20:42	05:13 21:44	04:11 22:04	04:00 21:20	04:50 20:03	05:56 16:18	07:08 15:21	07:08 15:21	08:14 15:21	08:44 15:21
Potential sun hours	227	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:6>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (841)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 15:23	08:04 16:23	06:57 17:29	06:31 19:38	05:11 20:45	04:10 21:46	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:41	05:08 20:47	04:09 21:47	04:04 22:03	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:49	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	08:42 15:27	07:58 16:30	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	08:42 15:28	07:56 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	04:59 20:56	04:05 21:53	04:08 22:00	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:25 15:16
7	08:41 15:31	07:51 16:38	06:40 17:43	06:14 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:15
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
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11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:55	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
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13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
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22	08:23 16:01	07:15 17:13	05:59 18:16	05:34 20:25	04:26 21:29	03:59 22:05	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:43 15:14
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:22 21:32	03:59 22:05	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
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26	08:16 16:09	07:05 17:22	05:48 18:25	05:23 20:34	04:19 21:36	04:00 22:05	04:41 21:31	05:45 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:44 15:16
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31	08:06 16:21	06:54 19:36	05:43 20:42	05:13 21:44	04:11 22:04	04:02 21:23	04:50 21:20	05:56 20:03	07:08 16:18	07:08 15:21	08:44 15:21	08:44 15:21
Potential sun hours	227	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (887)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 15:23	08:04 16:23	06:57 17:29	06:31 19:38	05:11 20:45	04:10 21:46	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:41	05:08 20:47	04:09 21:47	04:04 22:03	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:49	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	08:42 15:27	07:58 16:30	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:08	08:21 15:18
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19	08:27 15:54	07:23 17:06	06:07 18:10	05:42 20:18	04:31 21:23	03:58 22:04	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
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Total, worst case												
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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)
	Minutes with flicker		

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: BROKABO 1:8>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (827)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:57 17:29	06:31 19:38	05:11 20:45	04:10 21:46	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
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7	08:41 15:31	07:51 16:38	06:40 17:43	06:14 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:15
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:31 15:14
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:55	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	08:36 15:40	07:40 16:49	06:27 17:54	06:01 20:03	04:45 21:08	04:00 21:59	04:16 21:53	05:16 20:53	06:21 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:41 21:13	03:59 22:01	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:36 15:12
15	08:33 15:46	07:32 16:57	06:18 18:01	05:52 20:09	04:39 21:15	03:59 22:02	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:37 15:12
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:17	03:59 22:02	04:22 21:48	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:43	08:38 15:12
17	08:30 15:50	07:28 17:01	06:13 18:05	05:47 20:14	04:35 21:19	03:58 22:03	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:39 15:12
18	08:29 15:52	07:25 17:04	06:10 18:07	05:44 20:16	04:33 21:21	03:58 22:03	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:23 17:06	06:07 18:10	05:42 20:18	04:31 21:23	03:58 22:04	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:25	03:58 22:04	04:29 21:42	05:33 20:33	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	08:24 15:58	07:17 17:11	06:02 18:14	05:36 20:22	04:27 21:27	03:58 22:04	04:31 21:40	05:35 20:30	06:40 19:05	07:46 17:42	07:56 15:34	08:42 15:13
22	08:23 16:01	07:15 17:13	05:59 18:16	05:34 20:25	04:26 21:28	03:59 22:05	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:43 15:14
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:22 21:32	03:59 22:05	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:05	04:39 21:33	05:43 20:19	06:49 18:53	06:55 16:32	08:04 15:28	08:43 15:16
26	08:16 16:09	07:05 17:22	05:48 18:25	05:23 20:34	04:19 21:36	04:00 22:05	04:41 21:31	05:45 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:44 15:16
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:36	04:17 21:38	04:00 22:05	04:42 21:29	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:25	08:44 15:17
28	08:12 16:14	06:59 17:27	05:42 18:30	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:27	05:50 20:11	06:55 18:45	07:02 16:25	08:10 15:24	08:44 15:18
29	08:10 16:16	06:59 19:32	05:42 20:40	05:16 21:41	04:14 22:04	04:02 21:25	04:46 20:09	05:52 18:42	06:57 16:22	07:04 15:23	08:12 15:19	08:44 15:19
30	08:08 16:19	06:56 19:34	05:43 20:42	05:13 21:43	04:13 22:04	04:02 21:23	04:48 21:23	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:44 15:20
31	08:06 16:21	06:54 19:36	05:43 20:42	05:13 21:44	04:11 22:04	04:00 21:20	04:50 20:03	05:56 16:18	07:08 15:21	07:08 15:21	08:14 15:21	08:44 15:21
Potential sun hours	227	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÄNHULT 1:2>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (876)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:43	08:04	06:56	06:31	05:11	04:10	04:03	04:52	05:58	07:01	17:36 (A0021)	07:10	08:15			
	15:23	16:23	17:29	19:38	20:44	21:45	22:02	21:18	20:00	18:36	5	17:41 (A0021)	16:15	15:21		
2	08:43	08:02	06:54	06:28	05:08	04:09	04:04	04:54	06:00	07:04		17:33 (A0021)	07:13	08:17		
	15:24	16:26	17:31	19:40	20:46	21:47	22:02	21:16	19:57	18:33	10	17:43 (A0021)	16:13	15:20		
3	08:42	07:59	06:51	06:25	05:06	04:08	04:05	04:57	06:02	07:06		17:31 (A0021)	07:15	08:19		
	15:25	16:28	17:34	19:42	20:48	21:48	22:01	21:13	19:55	18:31	12	17:43 (A0021)	16:10	15:19		
4	08:42	07:57	06:48	06:22	05:04	04:07	04:06	04:59	06:04	07:08		17:30 (A0021)	07:17	08:21		
	15:27	16:30	17:36	19:45	20:51	21:49	22:01	21:11	19:52	18:28	13	17:43 (A0021)	16:08	15:18		
5	08:41	07:55	06:45	16:56 (A0021)	06:20	05:01	04:06	04:07	05:01	06:06	07:10	17:30 (A0021)	07:20	08:22		
	15:28	16:33	17:38	8	17:04 (A0021)	19:47	20:53	21:51	22:00	21:09	19:49	18:25	14	17:44 (A0021)	16:06	15:17
6	08:41	07:53	06:43	16:55 (A0021)	06:17	04:59	04:05	04:08	05:03	06:09	07:12	17:30 (A0021)	07:22	08:24		
	15:30	16:35	17:40	12	17:07 (A0021)	19:49	20:55	21:52	21:59	21:07	19:46	18:22	13	17:43 (A0021)	16:04	15:16
7	08:40	07:51	06:40	16:54 (A0021)	06:14	04:57	04:04	04:10	05:05	06:11	07:14	17:30 (A0021)	07:24	08:26		
	15:31	16:37	17:43	13	17:07 (A0021)	19:51	20:57	21:53	21:58	21:04	19:43	18:20	12	17:42 (A0021)	16:01	15:15
8	08:39	07:49	06:37	16:53 (A0021)	06:11	04:54	04:03	04:11	05:07	06:13	07:16	17:30 (A0021)	07:26	08:27		
	15:33	16:40	17:45	14	17:07 (A0021)	19:53	20:59	21:55	21:57	21:02	19:41	18:17	11	17:41 (A0021)	15:59	15:15
9	08:38	07:46	06:35	16:53 (A0021)	06:09	04:52	04:02	04:12	05:09	06:15	07:19	17:33 (A0021)	07:29	08:29		
	15:35	16:42	17:47	13	17:06 (A0021)	19:56	21:01	21:56	21:56	21:00	19:38	18:14	6	17:39 (A0021)	15:57	15:14
10	08:37	07:44	06:32	16:53 (A0021)	06:06	04:50	04:01	04:13	05:11	06:17	07:21			07:31	08:30	
	15:37	16:44	17:49	13	17:06 (A0021)	19:58	21:04	21:57	21:55	20:57	19:35	18:11			15:55	15:14
11	08:37	07:42	06:29	16:54 (A0021)	06:03	04:48	04:01	04:15	05:13	06:19	07:23			07:33	08:31	
	15:38	16:47	17:52	11	17:05 (A0021)	20:00	21:06	21:58	21:54	20:55	19:32	18:09			15:53	15:13
12	08:35	07:39	06:26	16:56 (A0021)	06:00	04:45	04:00	04:16	05:15	06:21	07:25			07:36	08:33	
	15:40	16:49	17:54	7	17:03 (A0021)	20:02	21:08	21:59	21:53	20:52	19:30	18:06			15:51	15:13
13	08:34	07:37	06:24		05:58	04:43	04:00	04:18	05:18	06:23	07:27			07:38	08:34	
	15:42	16:52	17:56		20:04	21:10	21:59	21:51	20:50	19:27	18:03			15:49	15:13	
14	08:33	07:34	06:21		05:55	04:41	03:59	04:19	05:20	06:25	07:30			07:40	08:35	
	15:44	16:54	17:58		20:07	21:12	22:00	21:50	20:47	19:24	18:01			15:47	15:12	
15	08:32	07:32	06:18		05:52	04:39	03:59	04:21	05:22	06:28	07:32			16:50 (A0022)	07:42	08:36
	15:46	16:56	18:01		20:09	21:14	22:01	21:49	20:45	19:21	17:58	6	16:56 (A0022)	15:45	15:12	
16	08:31	07:30	06:15		05:50	04:37	03:59	04:22	05:24	06:30	07:34			16:48 (A0022)	07:45	08:37
	15:48	16:59	18:03		20:11	21:16	22:02	21:47	20:42	19:18	17:55	10	16:58 (A0022)	15:43	15:12	
17	08:29	07:27	06:13		05:47	04:35	03:58	04:24	05:26	06:32	07:36			16:47 (A0022)	07:47	08:38
	15:50	17:01	18:05		20:13	21:18	22:02	21:46	20:40	19:16	17:53	12	16:59 (A0022)	15:41	15:12	
18	08:28	07:25	06:10		05:44	04:33	03:58	04:26	05:28	06:34	07:38			16:46 (A0022)	07:49	08:39
	15:52	17:03	6	16:24 (A0022)	18:07	20:15	21:20	22:03	21:44	20:37	19:13	17:50	14	17:00 (A0022)	15:39	15:13
19	08:27	07:22	06:17 (A0022)	06:07	05:42	04:31	03:58	04:28	05:30	06:36	07:41			16:45 (A0022)	07:51	08:40
	15:54	17:06	10	16:27 (A0022)	18:09	20:18	21:22	22:03	21:43	20:35	19:10	17:47	15	17:00 (A0022)	15:38	15:13
20	08:25	07:20	06:15 (A0022)	06:04	05:39	04:29	03:58	04:29	05:32	06:38	07:43			16:45 (A0022)	07:53	08:40
	15:56	17:08	13	16:28 (A0022)	18:12	20:20	21:24	22:03	21:41	20:32	19:07	17:45	14	16:59 (A0022)	15:36	15:13
21	08:24	07:17	06:14 (A0022)	06:01	05:36	04:27	03:58	04:31	05:35	06:40	07:45			16:46 (A0022)	07:55	08:41
	15:58	17:10	14	16:28 (A0022)	18:14	20:22	21:26	22:04	21:39	20:30	19:04	17:42	13	16:59 (A0022)	15:34	15:13
22	08:22	07:15	06:15 (A0022)	05:59	05:34	04:26	03:59	04:33	05:37	06:42	07:47			16:46 (A0022)	07:58	08:42
	16:00	17:13	14	16:29 (A0022)	18:16	20:24	21:28	22:04	21:38	20:27	19:01	17:40	12	16:58 (A0022)	15:33	15:14
23	08:20	07:12	06:14 (A0022)	05:56	05:31	04:24	03:59	04:35	05:39	06:44	07:50			16:48 (A0022)	08:00	08:42
	16:03	17:15	14	16:28 (A0022)	18:18	20:26	21:30	22:04	21:36	20:24	18:59	17:37	9	16:57 (A0022)	15:31	15:14
24	08:19	07:09	06:14 (A0022)	05:53	05:28	04:22	03:59	04:37	05:41	06:46	07:52			16:50 (A0022)	08:02	08:42
	16:05	17:17	14	16:28 (A0022)	18:20	20:29	21:32	22:04	21:34	20:22	18:56	17:35	3	16:53 (A0022)	15:30	15:15
25	08:17	07:07	06:16 (A0022)	05:50	05:26	04:20	04:00	04:39	05:43	06:49	06:54			08:04	08:43	
	16:07	17:20	12	16:28 (A0022)	18:23	20:31	21:33	22:04	21:32	20:19	18:53	16:32			15:28	15:16
26	08:15	07:04	06:17 (A0022)	05:47	05:23	04:19	04:00	04:40	05:45	06:51	06:57			08:06	08:43	
	16:09	17:22	9	16:26 (A0022)	18:25	20:33	21:35	22:04	21:30	20:16	18:50	16:30			15:27	15:16
27	08:13	07:02	05:45		05:21	04:17	04:01	04:42	05:47	06:53	06:59			08:08	08:43	
	16:12	17:24		18:27	20:35	21:37	22:04	21:28	20:14	18:47	16:27			15:25	15:17	
28	08:11	06:59	05:42		05:18	04:16	04:01	04:44	05:49	06:55	07:01			08:10	08:43	
	16:14	17:27		18:29	20:37	21:39	22:04	21:26	20:11	18:45	16:25			15:24	15:18	
29	08:10		06:39		05:16	04:14	04:02	04:46	05:52	06:57	07:03			08:12	08:43	
	16:16		19:31		20:40	21:40	22:03	21:24	20:08	18:42	16:22			15:23	15:19	
30	08:08		06:36		05:13	04:13	04:03	04:48	05:54	06:59	07:06			08:14	08:43	
	16:19		19:34		20:42	21:42	22:03	21:22	20:06	18:39	16:20			15:22	15:20	
31	08:06		06:33			04:11		04:50	05:56		07:08			08:43	08:43	
	16:21		19:36			21:44		21:20	20:03		16:17			15:21	15:21	
Potential sun hours	228	263	366	429	515	539	538	474	386	321		241	207			
Total, worst case		106	91							204						
Sun reduction		0,16	0,22							0,26						
Oper. time red.		0,99	0,99							0,99						
Wind dir. red.		0,69	0,66							0,68						
Total reduction		0,11	0,15							0,17						
Total, real		12	13							35						

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

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



Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:4>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (817)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January			February			March			April	May	June
1	08:43	14:00 (A0018)	08:04	14:53 (A0017)	06:56				06:31	05:11	04:10	
	15:23	12 14:12 (A0018)	16:23	43 15:37 (A0020)	17:29				19:38	20:44	21:45	
2	08:43	14:00 (A0018)	08:02	14:54 (A0017)	06:54				06:28	05:08	04:09	
	15:24	12 14:12 (A0018)	16:26	43 15:37 (A0020)	17:31				19:40	20:46	21:47	
3	08:42	14:02 (A0018)	08:00	14:54 (A0017)	06:51		16:45 (A0015)	06:25	05:06	04:08		
	15:25	11 14:13 (A0018)	16:28	42 15:37 (A0020)	17:34	9	16:54 (A0015)	19:43	20:49	21:48		
4	08:42	14:02 (A0018)	07:58	14:54 (A0017)	06:48		16:42 (A0015)	06:22	05:04	04:07		
	15:27	11 14:13 (A0018)	16:30	40 15:36 (A0020)	17:36	14	16:56 (A0015)	19:45	20:51	21:50		
5	08:41	14:03 (A0018)	07:55	14:55 (A0017)	06:46		16:41 (A0015)	06:20	05:01	04:06		
	15:28	10 14:13 (A0018)	16:33	36 15:35 (A0020)	17:38	18	16:59 (A0015)	19:47	20:53	21:51		
6	08:41	14:04 (A0018)	07:53	14:55 (A0017)	06:43		16:39 (A0015)	06:17	04:59	04:05		
	15:30	8 14:12 (A0018)	16:35	31 15:33 (A0020)	17:40	25	17:11 (A0010)	19:49	20:55	21:52		
7	08:40	14:06 (A0018)	07:51	14:56 (A0017)	06:40		16:38 (A0015)	06:14	04:57	04:04		
	15:31	5 14:11 (A0018)	16:37	24 15:20 (A0017)	17:43	32	17:13 (A0010)	19:51	20:57	21:54		
8	08:39		07:49	14:57 (A0017)	06:37		16:38 (A0015)	06:11	04:54	04:03		
	15:33		16:40	22 15:19 (A0017)	17:45	35	17:14 (A0010)	19:54	21:00	21:55		
9	08:39		07:46	14:59 (A0017)	06:35		16:37 (A0015)	06:09	04:52	04:02		
	15:35		16:42	19 15:18 (A0017)	17:47	37	17:15 (A0010)	19:56	21:02	21:56		
10	08:38		07:44	15:00 (A0017)	06:32		16:38 (A0015)	06:06	04:50	04:01		
	15:37		16:45	16 15:16 (A0017)	17:50	37	17:15 (A0010)	19:58	21:04	21:57		
11	08:37		07:42	15:03 (A0017)	06:29		16:37 (A0015)	06:03	04:48	04:01		
	15:38		16:47	12 15:15 (A0017)	17:52	37	17:15 (A0010)	20:00	21:06	21:58		
12	08:36		07:39	15:08 (A0017)	06:27		16:38 (A0015)	06:00	04:45	04:00		
	15:40		16:49	1 15:09 (A0017)	17:54	34	17:14 (A0010)	20:02	21:08	21:59		
13	08:35		07:37		06:24		16:38 (A0015)	05:58	04:43	04:00		
	15:42		16:52		17:56	32	17:13 (A0010)	20:05	21:10	22:00		
14	08:34		07:35	16:15 (A0016)	06:21		16:39 (A0015)	05:55	04:41	03:59		
	15:44		16:54	6 16:21 (A0016)	17:58	28	17:12 (A0010)	20:07	21:12	22:01		
15	08:32		07:32	16:13 (A0016)	06:18		16:40 (A0015)	05:52	04:39	03:59		
	15:46		16:56	10 16:23 (A0016)	18:01	20	17:09 (A0010)	20:09	21:14	22:01		
16	08:31		07:30	16:12 (A0016)	06:15		16:44 (A0015)	05:50	04:37	03:59		
	15:48		16:59	14 16:26 (A0016)	18:03	7	16:51 (A0015)	20:11	21:16	22:02		
17	08:30		07:27	16:11 (A0016)	06:13			05:47	04:35	03:58		
	15:50		17:01	15 16:26 (A0016)	18:05			20:13	21:18	22:02		
18	08:28		07:25	16:11 (A0016)	06:10			05:44	04:33	03:58		
	15:52		17:03	16 16:27 (A0016)	18:07			20:16	21:20	22:03		
19	08:27		07:22	16:11 (A0016)	06:07			05:42	04:31	03:58		
	15:54		17:06	16 16:27 (A0016)	18:10			20:18	21:22	22:03		
20	08:25		07:20	16:11 (A0016)	06:04			05:39	04:29	03:58		
	15:56		17:08	16 16:27 (A0016)	18:12			20:20	21:24	22:04		
21	08:24	15:02 (A0017)	07:17	16:12 (A0016)	06:02			05:36	04:27	03:58		
	15:58	5 15:07 (A0017)	17:11	15 16:27 (A0016)	18:14			20:22	21:26	22:04		
22	08:22	14:59 (A0017)	07:15	16:12 (A0016)	05:59			05:34	04:26	03:59		
	16:01	11 15:10 (A0017)	17:13	14 16:26 (A0016)	18:16			20:24	21:28	22:04		
23	08:21	14:58 (A0017)	07:12	16:13 (A0016)	05:56			05:31	04:24	03:59		
	16:03	14 15:12 (A0017)	17:15	11 16:24 (A0016)	18:18			20:27	21:30	22:04		
24	08:19	14:57 (A0017)	07:10	16:15 (A0016)	05:53			05:28	04:22	03:59		
	16:05	19 15:26 (A0020)	17:18	6 16:21 (A0016)	18:21			20:29	21:32	22:04		
25	08:17	14:56 (A0017)	07:07		05:50			05:26	04:20	04:00		
	16:07	26 15:29 (A0020)	17:20		18:23			20:31	21:34	22:04		
26	08:15	14:55 (A0017)	07:04		05:48			05:23	04:19	04:00		
	16:09	31 15:31 (A0020)	17:22		18:25			20:33	21:36	22:04		
27	08:14	14:54 (A0017)	07:02		05:45			05:21	04:17	04:01		
	16:12	35 15:33 (A0020)	17:24		18:27			20:35	21:37	22:04		
28	08:12	14:54 (A0017)	06:59		05:42			05:18	04:16	04:01		
	16:14	39 15:35 (A0020)	17:27		18:29			20:38	21:39	22:04		
29	08:10	14:54 (A0017)			06:39			05:16	04:14	04:02		
	16:16	41 15:36 (A0020)			19:32			20:40	21:41	22:04		
30	08:08	14:54 (A0017)			06:36			05:13	04:13	04:03		
	16:19	42 15:37 (A0020)			19:34			20:42	21:42	22:03		
31	08:06	14:54 (A0017)			06:34				04:11			
	16:21	43 15:37 (A0020)			19:36				21:44			
Potential sun hours	228		262		366			429	515	539		
Total, worst case	375		468		365							
Sun reduction	0,19		0,16		0,22							
Oper. time red.	0,99		0,99		0,99							
Wind dir. red.	0,69		0,69		0,67							
Total reduction	0,13		0,11		0,15							
Total, real	47		52		54							

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:4>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (817)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July	August	September	October	November	December			
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	17:17 (A0015) 17:53 (A0010)	07:11 16:15	14:29 (A0017) 14:46 (A0017)	08:16 15:21	
2	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:34	17:16 (A0015) 17:53 (A0010)	07:13 16:13	14:28 (A0017) 14:48 (A0017)	08:18 15:20	
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	17:15 (A0015) 17:53 (A0010)	07:15 16:10	14:26 (A0017) 14:48 (A0017)	08:19 15:19	
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	17:15 (A0015) 17:53 (A0010)	07:17 16:08	14:26 (A0017) 14:50 (A0017)	08:21 15:18	
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	17:15 (A0015) 17:52 (A0010)	07:20 16:06	14:25 (A0017) 15:03 (A0020)	08:23 15:17	13:51 (A0018) 13:56 (A0018)
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	17:14 (A0015) 17:50 (A0010)	07:22 16:04	14:25 (A0017) 15:05 (A0020)	08:24 15:16	13:51 (A0018) 13:58 (A0018)
7	04:10 21:58	05:05 21:05	06:11 19:44	07:14 18:20	17:14 (A0015) 17:48 (A0010)	07:24 16:01	14:25 (A0017) 15:07 (A0020)	08:26 15:15	13:50 (A0018) 14:00 (A0018)
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	17:16 (A0015) 17:34 (A0015)	07:27 15:59	14:24 (A0017) 15:07 (A0020)	08:27 15:15	13:49 (A0018) 14:00 (A0018)
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	17:16 (A0015) 17:33 (A0015)	07:29 15:57	14:25 (A0017) 15:08 (A0020)	08:29 15:14	13:50 (A0018) 14:01 (A0018)
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12	17:18 (A0015) 17:30 (A0015)	07:31 15:55	14:24 (A0017) 15:08 (A0020)	08:30 15:14	13:50 (A0018) 14:02 (A0018)
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	17:20 (A0015) 17:26 (A0015)	07:33 15:53	14:25 (A0017) 15:08 (A0020)	08:32 15:13	13:50 (A0018) 14:03 (A0018)
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	07:36 15:51	14:25 (A0017) 15:08 (A0020)	08:33 15:13	13:50 (A0018) 14:03 (A0018)
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 15:49	07:38 15:49	14:26 (A0017) 15:08 (A0020)	08:34 15:13	13:51 (A0018) 14:04 (A0018)
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	07:40 15:47	14:27 (A0017) 15:08 (A0020)	08:35 15:12	13:51 (A0018) 14:04 (A0018)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	07:43 15:45	14:27 (A0017) 15:06 (A0020)	08:36 15:12	13:51 (A0018) 14:05 (A0018)
16	04:22 21:48	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	07:45 15:43	14:28 (A0017) 15:04 (A0020)	08:37 15:12	13:51 (A0018) 14:05 (A0018)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	07:47 15:41	14:29 (A0017) 15:02 (A0020)	08:38 15:12	13:52 (A0018) 14:06 (A0018)
18	04:26 21:44	05:28 20:38	06:34 19:13	07:39 17:50	16:46 (A0016) 16:54 (A0016)	07:49 15:39	14:31 (A0017) 15:00 (A0020)	08:39 15:12	13:52 (A0018) 14:07 (A0018)
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	16:44 (A0016) 16:56 (A0016)	07:51 15:38	14:32 (A0017) 14:46 (A0017)	08:40 15:13	13:53 (A0018) 14:07 (A0018)
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	16:43 (A0016) 16:57 (A0016)	07:54 15:36	14:34 (A0017) 14:45 (A0017)	08:41 15:13	13:53 (A0018) 14:07 (A0018)
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	16:42 (A0016) 16:57 (A0016)	07:56 15:34	14:37 (A0017) 14:42 (A0017)	08:41 15:13	13:53 (A0018) 14:08 (A0018)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	16:41 (A0016) 16:57 (A0016)	07:58 15:33	08:42 15:14	13:54 (A0018) 14:09 (A0018)	
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	16:41 (A0016) 16:57 (A0016)	08:00 15:31	08:42 15:14	13:54 (A0018) 14:09 (A0018)	
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	16:41 (A0016) 16:57 (A0016)	08:02 15:30	08:43 15:15	13:55 (A0018) 14:09 (A0018)	
25	04:39 21:32	05:43 20:19	06:49 18:53	07:54 16:32	15:42 (A0016) 15:56 (A0016)	08:04 15:28	08:43 15:16	13:55 (A0018) 14:09 (A0018)	
26	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30	15:42 (A0016) 15:55 (A0016)	08:06 15:27	08:43 15:16	13:55 (A0018) 14:10 (A0018)	
27	04:42 21:28	05:47 20:14	06:53 18:48	06:59 17:30 (A0015)	15:44 (A0016) 15:53 (A0016)	08:08 15:25	08:43 15:17	13:56 (A0018) 14:10 (A0018)	
28	04:44 21:26	05:50 20:11	06:55 18:45	07:01 17:23 (A0015)	15:45 (A0016) 15:50 (A0016)	08:10 15:24	08:44 15:18	13:57 (A0018) 14:11 (A0018)	
29	04:46 21:24	05:52 20:08	06:57 18:42	07:04 17:20 (A0015)	15:50 (A0016) 14:35 (A0017)	08:12 15:23	08:44 15:19	13:57 (A0018) 14:11 (A0018)	
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 17:18 (A0015)	14:41 (A0017) 14:32 (A0017)	08:14 15:22	08:44 15:20	13:58 (A0018) 14:12 (A0018)	
31	04:50 21:20	05:56 20:03		07:08 16:17	14:32 (A0017) 14:45 (A0017)		08:43 15:21	13:58 (A0018) 14:11 (A0018)	
Potential sun hours	538	474	386	321	241	207			
Total, worst case			71	455	627	350			
Sun reduction			0,31	0,26	0,17	0,13			
Oper. time red.			0,99	0,99	0,99	0,99			
Wind dir. red.			0,67	0,68	0,69	0,69			
Total reduction			0,21	0,17	0,12	0,09			
Total, real			15	79	73	32			

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:4>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (889)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

January		February		March		April	May	June
1	08:43	14:01 (A0018)	08:04	14:55 (A0017)	06:56	06:31	05:11	04:10
	15:23	14:14 (A0018)	16:23	15:37 (A0020)	17:29	19:38	20:44	21:45
2	08:43	14:01 (A0018)	08:02	14:55 (A0017)	06:54	16:45 (A0015)	06:28	05:08
	15:24	14:14 (A0018)	16:26	15:37 (A0020)	17:31	16:52 (A0015)	19:40	20:46
3	08:42	14:03 (A0018)	08:00	14:56 (A0017)	06:51	16:42 (A0015)	06:25	05:06
	15:25	14:15 (A0018)	16:28	15:37 (A0020)	17:34	16:55 (A0015)	19:43	20:49
4	08:42	14:04 (A0018)	07:58	14:56 (A0017)	06:48	16:40 (A0015)	06:22	05:04
	15:27	14:14 (A0018)	16:30	15:36 (A0020)	17:36	16:56 (A0015)	19:45	20:51
5	08:41	14:04 (A0018)	07:55	14:57 (A0017)	06:46	16:39 (A0015)	06:20	05:01
	15:28	14:14 (A0018)	16:33	15:35 (A0020)	17:38	16:58 (A0015)	19:47	20:53
6	08:41	14:05 (A0018)	07:53	14:57 (A0017)	06:43	16:38 (A0015)	06:17	04:59
	15:30	14:14 (A0018)	16:35	15:33 (A0020)	17:40	17:11 (A0010)	19:49	20:55
7	08:40	14:07 (A0018)	07:51	14:58 (A0017)	06:40	16:37 (A0015)	06:14	04:57
	15:31	14:13 (A0018)	16:37	15:21 (A0017)	17:43	17:13 (A0010)	19:51	20:57
8	08:39	14:09 (A0018)	07:49	14:59 (A0017)	06:37	16:36 (A0015)	06:11	04:54
	15:33	14:12 (A0018)	16:40	15:19 (A0017)	17:45	17:13 (A0010)	19:54	21:00
9	08:39		07:46	15:00 (A0017)	06:35	16:36 (A0015)	06:09	04:52
	15:35		16:42	15:19 (A0017)	17:47	17:14 (A0010)	19:56	21:02
10	08:38		07:44	15:02 (A0017)	06:32	16:37 (A0015)	06:06	04:50
	15:37		16:45	15:17 (A0017)	17:50	17:14 (A0010)	19:58	21:04
11	08:37		07:42	15:05 (A0017)	06:29	16:37 (A0015)	06:03	04:48
	15:38		16:47	15:15 (A0017)	17:52	17:14 (A0010)	20:00	21:06
12	08:36		07:39		06:27	16:37 (A0015)	06:00	04:45
	15:40		16:49		17:54	17:13 (A0010)	20:02	21:08
13	08:35		07:37		06:24	16:38 (A0015)	05:58	04:43
	15:42		16:52		17:56	17:11 (A0010)	20:05	21:10
14	08:34		07:35	16:15 (A0016)	06:21	16:39 (A0015)	05:55	04:41
	15:44		16:54	16:21 (A0016)	17:58	17:09 (A0010)	20:07	21:12
15	08:32		07:32	16:12 (A0016)	06:18	16:42 (A0015)	05:52	04:39
	15:46		16:56	16:23 (A0016)	18:01	16:50 (A0015)	20:09	21:14
16	08:31		07:30	16:12 (A0016)	06:15		05:50	04:37
	15:48		16:59	16:26 (A0016)	18:03		20:11	21:16
17	08:30		07:27	16:11 (A0016)	06:13		05:47	04:35
	15:50		17:01	16:26 (A0016)	18:05		20:13	21:18
18	08:28		07:25	16:11 (A0016)	06:10		05:44	04:33
	15:52		17:03	16:27 (A0016)	18:07		20:16	21:20
19	08:27		07:22	16:11 (A0016)	06:07		05:42	04:31
	15:54		17:06	16:27 (A0016)	18:10		20:18	21:22
20	08:25		07:20	16:11 (A0016)	06:04		05:39	04:29
	15:56		17:08	16:26 (A0016)	18:12		20:20	21:24
21	08:24		07:17	16:12 (A0016)	06:01		05:36	04:27
	15:58		17:11	16:26 (A0016)	18:14		20:22	21:26
22	08:22	15:01 (A0017)	07:15	16:12 (A0016)	05:59		05:34	04:26
	16:01	15:10 (A0017)	17:13	16:25 (A0016)	18:16		20:24	21:28
23	08:21	15:00 (A0017)	07:12	16:14 (A0016)	05:56		05:31	04:24
	16:03	15:13 (A0017)	17:15	16:23 (A0016)	18:18		20:27	21:30
24	08:19	14:58 (A0017)	07:10	16:17 (A0016)	05:53		05:28	04:22
	16:05	15:26 (A0020)	17:18	16:19 (A0016)	18:21		20:29	21:32
25	08:17	14:58 (A0017)	07:07		05:50		05:26	04:20
	16:07	15:29 (A0020)	17:20		18:23		20:31	21:34
26	08:15	14:57 (A0017)	07:04		05:48		05:23	04:19
	16:09	15:31 (A0020)	17:22		18:25		20:33	21:36
27	08:14	14:56 (A0017)	07:02		05:45		05:21	04:17
	16:12	15:33 (A0020)	17:24		18:27		20:35	21:37
28	08:12	14:55 (A0017)	06:59		05:42		05:18	04:16
	16:14	15:36 (A0020)	17:27		18:29		20:38	21:39
29	08:10	14:55 (A0017)			06:39		05:16	04:14
	16:16	15:36 (A0020)			19:32		20:40	21:41
30	08:08	14:55 (A0017)			06:36		05:13	04:13
	16:19	15:37 (A0020)			19:34		20:42	21:42
31	08:06	14:56 (A0017)			06:34			04:11
	16:21	15:38 (A0020)			19:36			21:44
Potential sun hours	228		262		366		429	515
Total, worst case	364		445		351			
Sun reduction	0,19		0,16		0,22			
Oper. time red.	0,99		0,99		0,99			
Wind dir. red.	0,69		0,69		0,67			
Total reduction	0,13		0,11		0,15			
Total, real	46		49		52			

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:4>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (889)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	17:17 (A0015) 16:15	14:31 (A0017) 15:21
2	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:34	17:15 (A0015) 16:13	14:30 (A0017) 15:20
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	17:14 (A0015) 16:10	14:28 (A0017) 15:19
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	17:14 (A0015) 16:08	14:28 (A0017) 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	17:14 (A0015) 16:06	14:26 (A0017) 15:17
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	17:13 (A0015) 16:04	14:26 (A0017) 15:16
7	04:10 21:58	05:05 21:05	06:11 19:44	07:14 18:20	17:13 (A0015) 16:01	14:27 (A0017) 15:15
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	17:14 (A0015) 15:59	14:26 (A0017) 15:15
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	17:14 (A0015) 15:57	14:26 (A0017) 15:14
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12	17:15 (A0015) 15:55	14:26 (A0017) 15:14
11	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	17:17 (A0015) 15:53	14:27 (A0017) 15:13
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	14:26 (A0017) 15:13
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 15:49	14:27 (A0017) 15:13
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	14:28 (A0017) 15:12
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	14:29 (A0017) 15:12
16	04:22 21:48	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	14:30 (A0017) 15:12
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	14:31 (A0017) 15:12
18	04:26 21:44	05:28 20:38	06:34 19:13	07:39 17:50	16:47 (A0016) 15:39	14:32 (A0017) 15:12
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	16:44 (A0016) 15:38	14:34 (A0017) 15:13
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	16:43 (A0016) 15:36	14:36 (A0017) 15:13
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	16:42 (A0016) 15:34	08:41 15:13
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	16:41 (A0016) 15:33	08:42 15:14
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	16:41 (A0016) 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	16:40 (A0016) 15:30	08:43 15:15
25	04:39 21:32	05:43 20:19	06:49 18:53	07:54 16:32	15:41 (A0016) 15:28	08:43 15:16
26	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30	15:41 (A0016) 15:27	08:43 15:16
27	04:42 21:28	05:47 20:14	06:53 18:48	06:59 16:27	15:43 (A0016) 15:25	08:43 15:17
28	04:44 21:26	05:50 20:11	06:55 18:45	17:25 (A0015) 16:25	15:45 (A0016) 15:24	08:44 15:18
29	04:46 21:24	05:52 20:08	06:57 18:42	17:30 (A0015) 16:22	15:50 (A0016) 15:23	15:18 15:19
30	04:48 21:22	05:54 20:06	06:59 18:39	17:49 (A0010) 17:19 (A0015)	16:22 17:06	15:19 15:20
31	04:50 21:20	05:56 20:03		17:51 (A0010)	16:20 14:34 (A0017)	15:20 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case			49	455	592	354
Sun reduction			0,31	0,26	0,17	0,13
Oper. time red.			0,99	0,99	0,99	0,99
Wind dir. red.			0,67	0,68	0,69	0,69
Total reduction			0,21	0,17	0,12	0,09
Total, real			10	79	69	32

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:4>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (919)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

January			February			March			April	May	June
1	08:43	13:58 (A0018)	08:04	14:51 (A0017)	06:56				06:31	05:11	04:10
	15:23	13	14:11 (A0018)	16:23	44	15:36 (A0020)	17:29		19:38	20:44	21:45
2	08:43	13:59 (A0018)	08:02	14:52 (A0017)	06:54				06:28	05:08	04:09
	15:24	12	14:11 (A0018)	16:26	43	15:36 (A0020)	17:31		19:40	20:46	21:47
3	08:42	14:00 (A0018)	08:00	14:52 (A0017)	06:51		16:45 (A0015)	06:25	05:06	04:08	
	15:25	11	14:11 (A0018)	16:28	42	15:36 (A0020)	17:34	9	16:54 (A0015)	19:43	20:49
4	08:42	14:01 (A0018)	07:58	14:52 (A0017)	06:48		16:42 (A0015)	06:22	05:04	04:07	
	15:27	10	14:11 (A0018)	16:30	40	15:35 (A0020)	17:36	14	16:56 (A0015)	19:45	20:51
5	08:41	14:02 (A0018)	07:55	14:53 (A0017)	06:46		16:41 (A0015)	06:20	05:01	04:06	
	15:28	9	14:11 (A0018)	16:33	36	15:34 (A0020)	17:38	17	16:58 (A0015)	19:47	20:53
6	08:41	14:03 (A0018)	07:53	14:53 (A0017)	06:43		16:40 (A0015)	06:17	04:59	04:05	
	15:30	7	14:10 (A0018)	16:35	30	15:31 (A0020)	17:40	22	17:10 (A0010)	19:49	20:55
7	08:40	14:05 (A0018)	07:51	14:54 (A0017)	06:40		16:38 (A0015)	06:14	04:57	04:04	
	15:31	4	14:09 (A0018)	16:37	24	15:18 (A0017)	17:43	32	17:13 (A0010)	19:51	20:57
8	08:39		07:49	14:55 (A0017)	06:37		16:38 (A0015)	06:11	04:54	04:03	
	15:33		16:40	15:17 (A0017)	17:45	34	17:14 (A0010)	19:54	21:00	21:55	
9	08:39		07:46	14:57 (A0017)	06:35		16:37 (A0015)	06:09	04:52	04:02	
	15:35		16:42	15:16 (A0017)	17:47	38	17:15 (A0010)	19:56	21:02	21:56	
10	08:38		07:44	14:58 (A0017)	06:32		16:37 (A0015)	06:06	04:50	04:01	
	15:37		16:45	15:14 (A0017)	17:50	39	17:16 (A0010)	19:58	21:04	21:57	
11	08:37		07:42	15:01 (A0017)	06:29		16:37 (A0015)	06:03	04:48	04:01	
	15:38		16:47	15:13 (A0017)	17:52	38	17:15 (A0010)	20:00	21:06	21:58	
12	08:36		07:39	15:06 (A0017)	06:27		16:37 (A0015)	06:00	04:45	04:00	
	15:40		16:49	15:08 (A0017)	17:54	37	17:15 (A0010)	20:02	21:08	21:59	
13	08:35	14:57 (A0013)	07:37		06:24		16:38 (A0015)	05:58	04:43	04:00	
	15:42	2	14:59 (A0013)	16:52		34	17:14 (A0010)	20:05	21:10	22:00	
14	08:34	14:57 (A0013)	07:35	16:15 (A0016)	06:21		16:38 (A0015)	05:55	04:41	03:59	
	15:44	5	15:02 (A0013)	16:54	6	16:21 (A0016)	17:58	29	17:12 (A0010)	20:07	22:01
15	08:32	14:57 (A0013)	07:32	16:13 (A0016)	06:18		16:39 (A0015)	05:52	04:39	03:59	
	15:46	6	15:03 (A0013)	16:56	10	16:23 (A0016)	18:01	24	17:10 (A0010)	20:09	22:01
16	08:31	14:58 (A0013)	07:30	16:12 (A0016)	06:15		16:42 (A0015)	05:50	04:37	03:59	
	15:48	8	15:06 (A0013)	16:59	14	16:26 (A0016)	18:03	11	16:53 (A0015)	20:11	22:02
17	08:30	14:58 (A0013)	07:27	16:11 (A0016)	06:13			05:47	04:35	03:58	
	15:50	11	15:09 (A0013)	17:01	15	16:26 (A0016)	18:05		20:13	21:18	22:02
18	08:28	14:58 (A0013)	07:25	16:11 (A0016)	06:10			05:44	04:33	03:58	
	15:52	13	15:11 (A0013)	17:03	16	16:27 (A0016)	18:07		20:16	21:20	22:03
19	08:27	14:58 (A0013)	07:22	16:11 (A0016)	06:07			05:42	04:31	03:58	
	15:54	13	15:11 (A0013)	17:06	16	16:27 (A0016)	18:10		20:18	21:22	22:03
20	08:25	15:00 (A0013)	07:20	16:10 (A0016)	06:04			05:39	04:29	03:58	
	15:56	12	15:12 (A0013)	17:08	16	16:26 (A0016)	18:12		20:20	21:24	22:04
21	08:24	14:58 (A0017)	07:17	16:11 (A0016)	06:02			05:36	04:27	03:58	
	15:58	14	15:12 (A0013)	17:11	16	16:27 (A0016)	18:14		20:22	21:26	22:04
22	08:22	14:56 (A0017)	07:15	16:12 (A0016)	05:59			05:34	04:26	03:59	
	16:01	16	15:12 (A0013)	17:13	14	16:26 (A0016)	18:16		20:24	21:28	22:04
23	08:21	14:55 (A0017)	07:12	16:13 (A0016)	05:56			05:31	04:24	03:59	
	16:03	16	15:11 (A0017)	17:15	11	16:24 (A0016)	18:18		20:27	21:30	22:04
24	08:19	14:54 (A0017)	07:10	16:15 (A0016)	05:53			05:29	04:22	03:59	
	16:05	22	15:26 (A0020)	17:18	6	16:21 (A0016)	18:21		20:29	21:32	22:04
25	08:17	14:54 (A0017)	07:07		05:50			05:26	04:20	04:00	
	16:07	27	15:29 (A0020)	17:20				20:31	21:34	22:04	
26	08:15	14:53 (A0017)	07:04		05:48			05:23	04:19	04:00	
	16:09	32	15:31 (A0020)	17:22				20:33	21:36	22:04	
27	08:14	14:52 (A0017)	07:02		05:45			05:21	04:17	04:01	
	16:12	38	15:33 (A0020)	17:24				20:35	21:37	22:04	
28	08:12	14:52 (A0017)	06:59		05:42			05:18	04:16	04:01	
	16:14	41	15:35 (A0020)	17:27				20:38	21:39	22:04	
29	08:10	14:52 (A0017)			06:39			05:16	04:14	04:02	
	16:16	41	15:35 (A0020)		19:32			20:40	21:41	22:04	
30	08:08	14:52 (A0017)			06:36			05:13	04:13	04:03	
	16:19	42	15:36 (A0020)		19:34			20:42	21:42	22:03	
31	08:06	14:52 (A0017)			06:34				04:11		
	16:21	44	15:37 (A0020)		19:36				21:44		
Potential sun hours	228		262		366			429	515	539	
Total, worst case	469		470		378						
Sun reduction	0,19		0,16		0,22						
Oper. time red.	0,99		0,99		0,99						
Wind dir. red.	0,69		0,69		0,67						
Total reduction	0,13		0,11		0,15						
Total, real	59		52		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)

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:4&gt;1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (919)

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	July	August	September	October	November	December								
1	04:03	04:52	05:58	07:02	17:17 (A0015)	07:11	14:27 (A0017)	08:16						
	22:03	21:18	20:00	18:36	36	17:54 (A0010)	16:15	17	14:44 (A0017)	15:21				
2	04:04	04:55	06:00	07:04	17:15 (A0015)	07:13	14:26 (A0017)	08:18						
	22:02	21:16	19:57	18:34	39	17:54 (A0010)	16:13	20	14:46 (A0017)	15:20				
3	04:05	04:57	06:02	07:06	17:15 (A0015)	07:15	14:24 (A0017)	08:19						
	22:02	21:14	19:55	18:31	37	17:53 (A0010)	16:10	23	14:47 (A0017)	15:19				
4	04:06	04:59	06:04	07:08	17:15 (A0015)	07:17	14:24 (A0017)	08:21						
	22:01	21:11	19:52	18:28	38	17:53 (A0010)	16:08	24	14:48 (A0017)	15:18				
5	04:07	05:01	06:07	07:10	17:15 (A0015)	07:20	14:23 (A0017)	08:23		13:51 (A0018)				
	22:00	21:09	19:49	18:25	36	17:52 (A0010)	16:06	31	15:01 (A0020)	15:17	3	13:54 (A0018)		
6	04:08	05:03	06:09	07:12	17:14 (A0015)	07:22	14:23 (A0017)	08:24		13:49 (A0018)				
	21:59	21:07	19:46	18:23	33	17:50 (A0010)	16:04	37	15:04 (A0020)	15:16	7	13:56 (A0018)		
7	04:10	05:05	06:11	07:14	17:15 (A0015)	07:24	14:23 (A0017)	08:26		13:49 (A0018)				
	21:58	21:05	19:44	18:20	28	17:48 (A0010)	16:01	40	15:06 (A0020)	15:15	9	13:58 (A0018)		
8	04:11	05:07	06:13	07:17	17:16 (A0015)	07:27	14:22 (A0017)	08:27		13:48 (A0018)				
	21:57	21:02	19:41	18:17	18	17:34 (A0015)	15:59	42	15:06 (A0020)	15:15	10	13:58 (A0018)		
9	04:12	05:09	06:15	07:19	17:17 (A0015)	07:29	14:23 (A0017)	08:29		13:48 (A0018)				
	21:56	21:00	19:38	18:14	15	17:32 (A0015)	15:57	43	15:07 (A0020)	15:14	11	13:59 (A0018)		
10	04:13	05:11	06:17	07:21	17:18 (A0015)	07:31	14:22 (A0017)	08:30		13:49 (A0018)				
	21:55	20:57	19:35	18:12	12	17:30 (A0015)	15:55	44	15:07 (A0020)	15:14	12	14:01 (A0018)		
11	04:15	05:13	06:19	07:23	17:22 (A0015)	07:33	14:23 (A0017)	08:32		13:49 (A0018)				
	21:54	20:55	19:33	18:09	3	17:25 (A0015)	15:53	43	15:07 (A0020)	15:13	12	14:01 (A0018)		
12	04:16	05:15	06:21	07:25		07:36	14:23 (A0017)	08:33		13:48 (A0018)				
	21:53	20:53	19:30	18:06		15:51	15:51	43	15:07 (A0020)	15:13	13	14:01 (A0018)		
13	04:18	05:18	06:23	07:28		07:38	14:23 (A0017)	08:34		13:49 (A0018)				
	21:52	20:50	19:27	18:03		15:49	15:49	42	15:07 (A0020)	15:13	13	14:02 (A0018)		
14	04:19	05:20	06:26	07:30		07:40	14:25 (A0017)	08:35		13:49 (A0018)				
	21:50	20:48	19:24	18:01		15:47	15:47	39	15:07 (A0020)	15:12	14	14:03 (A0018)		
15	04:21	05:22	06:28	07:32		07:43	14:25 (A0017)	08:36		13:49 (A0018)				
	21:49	20:45	19:21	17:58		15:45	15:45	37	15:06 (A0020)	15:12	14	14:03 (A0018)		
16	04:22	05:24	06:30	07:34		07:45	14:26 (A0017)	08:37		13:50 (A0018)				
	21:48	20:43	19:18	17:55		15:43	15:43	32	15:04 (A0020)	15:12	14	14:04 (A0018)		
17	04:24	05:26	06:32	07:36		07:47	14:27 (A0017)	08:38		13:50 (A0018)				
	21:46	20:40	19:16	17:53		15:41	15:41	27	15:02 (A0020)	15:12	14	14:04 (A0018)		
18	04:26	05:28	06:34	07:39		16:46 (A0016)	07:49	14:28 (A0017)		08:39	13:51 (A0018)			
	21:44	20:38	19:13	17:50	8	16:54 (A0016)	15:39	22	15:00 (A0020)	15:12	14	14:05 (A0018)		
19	04:28	05:30	06:36	07:41		16:43 (A0016)	07:51	14:29 (A0017)		08:40	13:51 (A0018)			
	21:43	20:35	19:10	17:48	13	16:56 (A0016)	15:38	16	14:45 (A0017)	15:13	15	14:06 (A0018)		
20	04:29	05:33	06:38	07:43		16:43 (A0016)	07:54	14:31 (A0017)		08:41	13:51 (A0018)			
	21:41	20:32	19:07	17:45	14	16:57 (A0016)	15:36	16	14:47 (A0013)	15:13	14	14:05 (A0018)		
21	04:31	05:35	06:40	07:45		16:41 (A0016)	07:56	14:33 (A0017)		08:41	13:52 (A0018)			
	21:40	20:30	19:04	17:42	16	16:57 (A0016)	15:34	14	14:47 (A0013)	15:13	14	14:06 (A0018)		
22	04:33	05:37	06:42	07:48		16:40 (A0016)	07:58	14:36 (A0013)		08:42	13:53 (A0018)			
	21:38	20:27	19:02	17:40	17	16:57 (A0016)	15:33	12	14:48 (A0013)	15:14	14	14:07 (A0018)		
23	04:35	05:39	06:44	07:50		16:41 (A0016)	08:00	14:35 (A0013)		08:42	13:53 (A0018)			
	21:36	20:24	18:59	17:37	16	16:57 (A0016)	15:31	13	14:48 (A0013)	15:14	14	14:07 (A0018)		
24	04:37	05:41	06:47	07:52		16:40 (A0016)	08:02	14:35 (A0013)		08:43	13:53 (A0018)			
	21:34	20:22	18:56	17:35	16	16:56 (A0016)	15:30	13	14:48 (A0013)	15:15	15	14:08 (A0018)		
25	04:39	05:43	06:49	06:54		15:41 (A0016)	08:04	14:36 (A0013)		08:43	13:53 (A0018)			
	21:32	20:19	18:53	16:32	15	15:56 (A0016)	15:28	11	14:47 (A0013)	15:16	15	14:08 (A0018)		
26	04:40	05:45	06:51	06:57		15:42 (A0016)	08:06	14:36 (A0013)		08:43	13:54 (A0018)			
	21:30	20:16	18:50	16:30	13	15:55 (A0016)	15:27	9	14:45 (A0013)	15:16	14	14:08 (A0018)		
27	04:42	05:47	06:53	17:24 (A0015)	06:59	15:43 (A0016)	08:08	14:36 (A0013)		08:43	13:54 (A0018)			
	21:28	20:14	18:48	9	17:33 (A0015)	16:27	10	15:53 (A0016)	15:25	7	14:43 (A0013)	15:17	15	14:09 (A0018)
28	04:44	05:50	06:55	17:22 (A0015)	07:01	15:45 (A0016)	08:10	14:38 (A0013)		08:44	13:55 (A0018)			
	21:26	20:11	18:45	19	17:51 (A0010)	16:25	5	15:50 (A0016)	15:24	4	14:42 (A0013)	15:18	14	14:09 (A0018)
29	04:46	05:52	06:57	17:20 (A0015)	07:04		08:12	14:38 (A0013)		08:44	13:56 (A0018)			
	21:24	20:08	18:42	28	17:53 (A0010)	16:22		15:23	2	14:40 (A0013)	15:19	14	14:10 (A0018)	
30	04:48	05:54	06:59	17:18 (A0015)	07:06		14:33 (A0017)	08:14		08:44	13:57 (A0018)			
	21:22	20:06	18:39	33	17:53 (A0010)	16:20	6	14:39 (A0017)	15:22		15:20	13	14:10 (A0018)	
31	04:50	05:56			07:08		14:30 (A0017)			08:43	13:57 (A0018)			
	21:20	20:03			16:17	13	14:43 (A0017)			15:21	13	14:10 (A0018)		
Potential sun hours	538	474	386	321		241		207						
Total, worst case			89	457		723		344						
Sun reduction			0,31	0,26		0,17		0,13						
Oper. time red.			0,99	0,99		0,99		0,99						
Wind dir. red.			0,67	0,68		0,69		0,69						
Total reduction			0,21	0,17		0,12		0,09						
Total, real			18	79		85		31						

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)



## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:5>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (830)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	January		February		March		April	May	June
1	08:43	14:12 (A0018)	08:04		06:56	16:30 (A0016)	06:31	05:11	04:10
	15:23	14:28 (A0018)	16:23		17:29	15	16:45 (A0016)	19:38	20:44
2	08:43	14:12 (A0018)	08:02	15:43 (A0020)	06:54	16:30 (A0016)	06:28	05:08	04:09
	15:24	14:28 (A0018)	16:26	7	15:50 (A0020)	17:31	16:43 (A0016)	19:40	20:46
3	08:42	14:13 (A0018)	08:00	15:42 (A0020)	06:51	16:32 (A0016)	06:25	05:06	04:08
	15:26	14:29 (A0018)	16:28	11	15:53 (A0020)	17:34	16:42 (A0016)	19:43	20:49
4	08:42	14:13 (A0018)	07:58	15:34 (A0017)	06:48	16:35 (A0016)	06:22	05:04	04:07
	15:27	14:29 (A0018)	16:30	17	15:54 (A0020)	17:36	3	16:38 (A0016)	19:45
5	08:41	14:13 (A0018)	07:55	15:30 (A0017)	06:46		06:20	05:01	04:06
	15:28	14:30 (A0018)	16:33	25	15:55 (A0020)	17:38		20:53	21:51
6	08:41	14:14 (A0018)	07:53	15:28 (A0017)	06:43		06:17	04:59	04:05
	15:30	14:30 (A0018)	16:35	28	15:56 (A0020)	17:40		20:55	21:52
7	08:40	14:14 (A0018)	07:51	15:27 (A0017)	06:40		06:14	04:57	04:04
	15:31	14:30 (A0018)	16:37	29	15:56 (A0020)	17:43		20:57	21:54
8	08:39	14:15 (A0018)	07:49	15:25 (A0017)	06:37		06:11	04:54	04:03
	15:33	14:31 (A0018)	16:40	31	15:56 (A0020)	17:45		21:00	21:55
9	08:39	14:16 (A0018)	07:46	15:25 (A0017)	06:35		06:09	04:52	04:02
	15:35	14:31 (A0018)	16:42	32	15:57 (A0020)	17:47		21:02	21:56
10	08:38	14:15 (A0018)	07:44	15:24 (A0017)	06:32		06:06	04:50	04:01
	15:37	14:31 (A0018)	16:45	32	15:56 (A0020)	17:50		21:04	21:57
11	08:37	14:16 (A0018)	07:42	15:24 (A0017)	06:29		06:03	04:48	04:01
	15:38	14:31 (A0018)	16:47	32	15:56 (A0020)	17:52		21:06	21:58
12	08:36	14:18 (A0018)	07:39	15:23 (A0017)	06:27		06:00	04:45	04:00
	15:40	14:31 (A0018)	16:49	31	15:54 (A0020)	17:54		21:08	21:59
13	08:35	14:18 (A0018)	07:37	15:23 (A0017)	06:24		05:58	04:43	04:00
	15:42	14:31 (A0018)	16:52	31	15:54 (A0020)	17:56		21:10	22:00
14	08:34	14:20 (A0018)	07:35	15:23 (A0017)	06:21	17:09 (A0015)	05:55	04:41	03:59
	15:44	14:31 (A0018)	16:54	29	15:52 (A0017)	17:58	18	20:07	22:01
15	08:32	14:20 (A0018)	07:32	15:22 (A0017)	06:18	17:06 (A0015)	05:52	04:39	03:59
	15:46	14:30 (A0018)	16:56	29	15:51 (A0017)	18:01	24	20:09	22:01
16	08:31	14:23 (A0018)	07:30	15:23 (A0017)	06:15	17:05 (A0015)	05:50	04:37	03:59
	15:48	7	14:30 (A0018)	16:59	29	15:52 (A0017)	18:03	26	20:11
17	08:30		07:27	15:23 (A0017)	06:13	17:04 (A0015)	05:47	04:35	03:58
	15:50		17:01	28	15:51 (A0017)	18:05	28	20:13	21:18
18	08:28		07:25	15:24 (A0017)	06:10	17:02 (A0015)	05:44	04:33	03:58
	15:52		17:03	27	15:51 (A0017)	18:07	29	20:16	22:03
19	08:27		07:22	15:25 (A0017)	06:07	17:02 (A0015)	05:42	04:31	03:58
	15:54		17:06	25	15:50 (A0017)	18:10	29	20:18	22:03
20	08:25		07:20	15:25 (A0017)	06:04	17:01 (A0015)	05:39	04:29	03:58
	15:56		17:08	24	15:49 (A0017)	18:12	29	20:20	22:04
21	08:24	15:15 (A0013)	07:17	15:27 (A0017)	06:01	17:01 (A0015)	05:36	04:27	03:58
	15:58	4	15:19 (A0013)	17:11	21	15:48 (A0017)	18:14	28	20:22
22	08:22	15:15 (A0013)	07:15	15:28 (A0017)	05:59	17:01 (A0015)	05:34	04:26	03:59
	16:01	6	15:21 (A0013)	17:13	26	16:41 (A0016)	18:16	26	20:24
23	08:21	15:15 (A0013)	07:12	15:31 (A0017)	05:56	17:01 (A0015)	05:31	04:24	03:59
	16:03	9	15:24 (A0013)	17:15	24	16:43 (A0016)	18:18	21	20:27
24	08:19	15:15 (A0013)	07:10	15:35 (A0017)	05:53	17:02 (A0015)	05:29	04:22	03:59
	16:05	11	15:26 (A0013)	17:18	18	16:44 (A0016)	18:21	19	20:29
25	08:17	15:15 (A0013)	07:07	16:30 (A0016)	05:50	17:03 (A0015)	05:26	04:20	04:00
	16:07	14	15:29 (A0013)	17:20	15	16:45 (A0016)	18:23	16	20:31
26	08:15	15:16 (A0013)	07:04	16:29 (A0016)	05:48	17:04 (A0015)	05:23	04:19	04:00
	16:09	13	15:29 (A0013)	17:22	16	16:45 (A0016)	18:25	13	20:33
27	08:14	15:15 (A0013)	07:02	16:29 (A0016)	05:45	17:07 (A0015)	05:21	04:17	04:01
	16:12	13	15:28 (A0013)	17:24	16	16:45 (A0016)	18:27	8	20:35
28	08:12	15:16 (A0013)	06:59	16:29 (A0016)	05:42		05:18	04:16	04:01
	16:14	12	15:28 (A0013)	17:27	16	16:45 (A0016)	18:29		20:38
29	08:10	15:17 (A0013)			06:39		05:16	04:14	04:02
	16:16	11	15:28 (A0013)		19:32		20:40	21:41	22:04
30	08:08	15:19 (A0013)			06:36		05:13	04:13	04:03
	16:19	8	15:27 (A0013)		19:34		20:42	21:42	22:03
31	08:06	15:22 (A0013)			06:34			04:11	
	16:21	3	15:25 (A0013)		19:36			21:44	
Potential sun hours	228		262		366		429	515	539
Total, worst case	333		649		355				
Sun reduction	0,19		0,16		0,22				
Oper. time red.	0,99		0,99		0,99				
Wind dir. red.	0,69		0,69		0,66				
Total reduction	0,13		0,11		0,15				
Total, real	42		72		52				

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:5>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (830)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	07:11 16:15	14:53 (A0017) 15:25 (A0020)	08:16 15:21	13:59 (A0018) 14:13 (A0018)
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	14:55 (A0017) 15:26 (A0020)	08:18 15:20	13:59 (A0018) 14:14 (A0018)
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10	14:55 (A0017) 15:26 (A0020)	08:19 15:19	13:59 (A0018) 14:14 (A0018)
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	14:57 (A0017) 15:26 (A0020)	08:21 15:18	13:59 (A0018) 14:15 (A0018)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	14:58 (A0017) 15:25 (A0020)	08:23 15:17	13:59 (A0018) 14:15 (A0018)
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	07:22 16:04	15:00 (A0017) 15:25 (A0020)	08:24 15:16	14:00 (A0018) 14:16 (A0018)
7	04:10 21:58	05:05 21:05	06:11 19:44	07:14 18:20	07:24 16:01	15:06 (A0017) 15:25 (A0020)	08:26 15:15	14:00 (A0018) 14:17 (A0018)
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	15:12 (A0020) 15:22 (A0020)	08:27 15:15	14:00 (A0018) 14:16 (A0018)
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	15:14 (A0020) 15:20 (A0020)	08:29 15:14	14:01 (A0018) 14:17 (A0018)
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12	07:31 15:55	15:20 (A0020)	08:30 15:14	14:02 (A0018) 14:18 (A0018)
11	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	14:53 (A0013) 14:56 (A0013)	08:32 15:13	14:02 (A0018) 14:18 (A0018)
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	14:50 (A0013) 14:58 (A0013)	08:33 15:13	14:02 (A0018) 14:18 (A0018)
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 15:49	14:49 (A0013) 15:00 (A0013)	08:34 15:13	14:03 (A0018) 14:19 (A0018)
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	14:49 (A0013) 15:01 (A0013)	08:35 15:12	14:04 (A0018) 14:19 (A0018)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	14:48 (A0013) 15:01 (A0013)	08:36 15:12	14:04 (A0018) 14:19 (A0018)
16	04:23 21:48	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	14:49 (A0013) 15:02 (A0013)	08:37 15:12	14:04 (A0018) 14:19 (A0018)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	14:48 (A0013) 15:02 (A0013)	08:38 15:12	14:05 (A0018) 14:20 (A0018)
18	04:26 21:44	05:28 20:38	06:34 19:13	07:39 18:07	07:49 15:39	14:49 (A0013) 15:00 (A0013)	08:39 15:13	14:06 (A0018) 14:20 (A0018)
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 18:07	07:51 15:38	14:49 (A0013) 14:58 (A0013)	08:40 15:13	14:06 (A0018) 14:21 (A0018)
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 18:09	07:54 15:36	14:50 (A0013) 14:56 (A0013)	08:41 15:13	14:06 (A0018) 14:21 (A0018)
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 18:12	07:56 15:34	14:50 (A0013) 14:54 (A0013)	08:41 15:13	14:07 (A0018) 14:22 (A0018)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 18:14	07:58 15:33	14:55 (A0017) 16:19 (A0017)	08:42 15:14	14:07 (A0018) 14:21 (A0018)
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 18:14	08:00 15:31	15:55 (A0017) 16:21 (A0017)	08:42 15:14	14:08 (A0018) 14:23 (A0018)
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 18:14	08:02 16:21	15:53 (A0017) 16:21 (A0017)	08:43 15:15	14:08 (A0018) 14:23 (A0018)
25	04:39 21:32	05:43 20:19	06:49 18:53	07:54 18:14	08:04 15:21	14:53 (A0017) 15:21 (A0017)	08:43 15:16	14:09 (A0018) 14:23 (A0018)
26	04:41 21:30	05:45 20:16	06:51 18:50	07:57 18:14	08:06 15:27	14:53 (A0017) 15:21 (A0017)	08:43 15:16	14:09 (A0018) 14:24 (A0018)
27	04:42 21:28	05:47 20:14	06:53 18:48	07:59 18:13	08:08 15:25	14:53 (A0017) 15:22 (A0017)	08:43 15:17	14:09 (A0018) 14:24 (A0018)
28	04:44 21:26	05:50 20:11	06:55 18:45	08:01 18:11	08:10 15:21	14:52 (A0017) 15:21 (A0020)	08:44 15:18	14:10 (A0018) 14:25 (A0018)
29	04:46 21:24	05:52 20:08	06:57 18:42	08:04 18:10	08:12 15:23	14:53 (A0017) 15:23 (A0020)	08:44 15:19	14:10 (A0018) 14:26 (A0018)
30	04:48 21:22	05:54 20:06	06:59 18:39	08:06 17:52	08:14 15:24	14:53 (A0017) 15:24 (A0020)	08:44 15:20	14:11 (A0018) 14:26 (A0018)
31	04:50 21:20	05:56 20:03		08:08 16:17	14:53 (A0017) 15:25 (A0020)		08:43 15:21	14:11 (A0018) 14:26 (A0018)
Potential sun hours	538	474	386	321	241		207	
Total, worst case			323	491	365		473	
Sun reduction			0,31	0,26	0,17		0,13	
Oper. time red.			0,99	0,99	0,99		0,99	
Wind dir. red.			0,66	0,69	0,69		0,70	
Total reduction			0,20	0,18	0,12		0,09	
Total, real			66	87	43		43	

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:5>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (868)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April		May		June	
1	08:43		14:09 (A0018)	08:04		15:39 (A0020)	06:56		16:28 (A0016)	06:31		05:11		04:10	
	15:23	16	14:25 (A0018)	16:23	8	15:47 (A0020)	17:29	13	16:41 (A0016)	19:38		20:44		21:45	
2	08:43		14:09 (A0018)	08:02		15:28 (A0017)	06:54		16:29 (A0016)	06:28		05:08		04:09	
	15:24	16	14:25 (A0018)	16:26	18	15:50 (A0020)	17:31	10	16:39 (A0016)	19:40		20:46		21:47	
3	08:42		14:10 (A0018)	08:00		15:25 (A0017)	06:51		16:32 (A0016)	06:25		05:06		04:08	
	15:26	16	14:26 (A0018)	16:28	26	15:52 (A0020)	17:34	4	16:36 (A0016)	19:43		20:49		21:48	
4	08:42		14:10 (A0018)	07:58		15:22 (A0017)	06:48			06:22		05:04		04:07	
	15:27	16	14:26 (A0018)	16:30	30	15:52 (A0020)	17:36			19:45		20:51		21:50	
5	08:41		14:10 (A0018)	07:55		15:21 (A0017)	06:46			06:20		05:01		04:06	
	15:28	16	14:26 (A0018)	16:33	32	15:53 (A0020)	17:38			19:47		20:53		21:51	
6	08:41		14:11 (A0018)	07:53		15:20 (A0017)	06:43			06:17		04:59		04:05	
	15:30	16	14:27 (A0018)	16:35	33	15:53 (A0020)	17:40			19:49		20:55		21:52	
7	08:40		14:11 (A0018)	07:51		15:19 (A0017)	06:40			06:14		04:57		04:04	
	15:31	16	14:27 (A0018)	16:37	34	15:53 (A0020)	17:43			19:51		20:57		21:54	
8	08:39		14:12 (A0018)	07:49		15:18 (A0017)	06:37			06:11		04:54		04:03	
	15:33	15	14:27 (A0018)	16:40	35	15:53 (A0020)	17:45			19:54		21:00		21:55	
9	08:39		14:13 (A0018)	07:46		15:18 (A0017)	06:35			06:09		04:52		04:02	
	15:35	15	14:28 (A0018)	16:42	35	15:53 (A0020)	17:47			19:56		21:02		21:56	
10	08:38		14:13 (A0018)	07:44		15:17 (A0017)	06:32			06:06		04:50		04:01	
	15:37	14	14:27 (A0018)	16:45	35	15:52 (A0020)	17:50			19:58		21:04		21:57	
11	08:37		14:14 (A0018)	07:42		15:18 (A0017)	06:29			06:03		04:48		04:01	
	15:38	13	14:27 (A0018)	16:47	34	15:52 (A0020)	17:52			20:00		21:06		21:58	
12	08:36		14:15 (A0018)	07:39		15:17 (A0017)	06:27			06:00		04:45		04:00	
	15:40	13	14:28 (A0018)	16:49	33	15:50 (A0020)	17:54			20:02		21:08		21:59	
13	08:35		14:16 (A0018)	07:37		15:18 (A0017)	06:24		17:05 (A0015)	05:58		04:43		04:00	
	15:42	11	14:27 (A0018)	16:52	29	15:47 (A0017)	17:56	18	17:26 (A0010)	20:05		21:10		22:00	
14	08:34		14:18 (A0018)	07:35		15:18 (A0017)	06:21		17:02 (A0015)	05:55		04:41		03:59	
	15:44	9	14:27 (A0018)	16:54	28	15:46 (A0017)	17:58	26	17:28 (A0010)	20:07		21:12		22:01	
15	08:32		14:20 (A0018)	07:32		15:17 (A0017)	06:18		17:01 (A0015)	05:52		04:39		03:59	
	15:46	5	14:25 (A0018)	16:56	29	15:46 (A0017)	18:01	28	17:29 (A0010)	20:09		21:14		22:01	
16	08:31			07:30		15:18 (A0017)	06:15		17:00 (A0015)	05:50		04:37		03:59	
	15:48			16:59	28	15:46 (A0017)	18:03	30	17:30 (A0010)	20:11		21:16		22:02	
17	08:30			07:27		15:19 (A0017)	06:13		16:59 (A0015)	05:47		04:35		03:58	
	15:50			17:01	26	15:45 (A0017)	18:05	31	17:30 (A0010)	20:13		21:18		22:02	
18	08:28			07:25		15:20 (A0017)	06:10		16:58 (A0015)	05:44		04:33		03:58	
	15:52			17:03	25	15:45 (A0017)	18:07	31	17:29 (A0010)	20:16		21:20		22:03	
19	08:27		15:12 (A0013)	07:22		15:21 (A0017)	06:07		16:58 (A0015)	05:42		04:31		03:58	
	15:54	1	15:13 (A0013)	17:06	22	15:43 (A0017)	18:10	30	17:28 (A0010)	20:18		21:22		22:03	
20	08:25		15:12 (A0013)	07:20		15:22 (A0017)	06:04		16:57 (A0015)	05:39		04:29		03:58	
	15:56	4	15:16 (A0013)	17:08	19	15:41 (A0017)	18:12	30	17:27 (A0010)	20:20		21:24		22:04	
21	08:24		15:12 (A0013)	07:17		15:25 (A0017)	06:01		16:58 (A0015)	05:36		04:27		03:58	
	15:58	7	15:19 (A0013)	17:11	23	16:39 (A0016)	18:14	28	17:26 (A0010)	20:22		21:26		22:04	
22	08:22		15:12 (A0013)	07:15		15:28 (A0017)	05:59		16:58 (A0015)	05:34		04:26		03:59	
	16:01	9	15:21 (A0013)	17:13	21	16:41 (A0016)	18:16	22	17:21 (A0010)	20:24		21:28		22:04	
23	08:21		15:12 (A0013)	07:12		16:28 (A0016)	05:56		16:59 (A0015)	05:31		04:24		03:59	
	16:03	12	15:24 (A0013)	17:15	14	16:42 (A0016)	18:18	19	17:18 (A0015)	20:27		21:30		22:04	
24	08:19		15:12 (A0013)	07:10		16:26 (A0016)	05:53		17:00 (A0015)	05:29		04:22		03:59	
	16:05	14	15:26 (A0013)	17:18	16	16:42 (A0016)	18:21	16	17:16 (A0015)	20:29		21:32		22:04	
25	08:17		15:13 (A0013)	07:07		16:27 (A0016)	05:50		17:01 (A0015)	05:26		04:20		04:00	
	16:07	13	15:26 (A0013)	17:20	16	16:43 (A0016)	18:23	13	17:14 (A0015)	20:31		21:34		22:04	
26	08:15		15:13 (A0013)	07:04		16:26 (A0016)	05:48		17:04 (A0015)	05:23		04:19		04:00	
	16:09	13	15:26 (A0013)	17:22	17	16:43 (A0016)	18:25	6	17:10 (A0015)	20:33		21:36		22:04	
27	08:14		15:13 (A0013)	07:02		16:26 (A0016)	05:45			05:21		04:17		04:01	
	16:12	12	15:25 (A0013)	17:24	16	16:42 (A0016)	18:27			20:35		21:37		22:04	
28	08:12		15:14 (A0013)	06:59		16:26 (A0016)	05:42			05:18		04:16		04:01	
	16:14	11	15:25 (A0013)	17:27	15	16:41 (A0016)	18:29			20:38		21:39		22:04	
29	08:10		15:16 (A0013)				06:39			05:16		04:14		04:02	
	16:16	8	15:24 (A0013)				19:32			20:40		21:41		22:04	
30	08:08		15:19 (A0013)				06:36			05:13		04:13		04:03	
	16:19	3	15:22 (A0013)				19:34			20:42		21:42		22:03	
31	08:06		15:43 (A0020)				06:34					04:11			
	16:21	2	15:45 (A0020)				19:36					21:44			
Potential sun hours	228			262			366			429		515		539	
Total, worst case		316		697			355								
Sun reduction		0,19		0,16			0,22								
Oper. time red.		0,99		0,99			0,99								
Wind dir. red.		0,69		0,69			0,66								
Total reduction		0,13		0,11			0,15								
Total, real		40		77			52								

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:5>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (868)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July	August	September	October	November	December				
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	17:46 (A0015) 18:03 (A0010)	07:11 16:15	14:47 (A0017) 15:22 (A0020)	08:16 15:21	13:56 (A0018) 14:09 (A0018)	
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34		07:13 16:13	14:48 (A0017) 15:23 (A0020)	08:18 15:20	13:56 (A0018) 14:10 (A0018)	
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31		07:15 16:10	14:48 (A0017) 15:22 (A0020)	08:19 15:19	13:56 (A0018) 14:11 (A0018)	
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28		07:17 16:08	14:49 (A0017) 15:23 (A0020)	08:21 15:18	13:56 (A0018) 14:11 (A0018)	
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25		07:20 16:06	14:50 (A0017) 15:22 (A0020)	08:23 15:17	13:57 (A0018) 14:12 (A0018)	
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23		07:22 16:04	14:51 (A0017) 15:23 (A0020)	08:24 15:16	13:57 (A0018) 14:13 (A0018)	
7	04:10 21:58	05:05 21:05	06:11 19:44	07:14 18:20		07:24 16:01	14:53 (A0017) 15:23 (A0020)	08:26 15:15	13:57 (A0018) 14:14 (A0018)	
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17		07:27 15:59	14:55 (A0017) 15:21 (A0020)	08:27 15:15	13:57 (A0018) 14:13 (A0018)	
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14		07:29 15:57	14:59 (A0017) 15:20 (A0020)	08:29 15:14	13:58 (A0018) 14:14 (A0018)	
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12		07:31 15:55	15:10 (A0020) 15:17 (A0020)	08:30 15:14	13:59 (A0018) 14:15 (A0018)	
11	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	17:04 (A0016) 17:11 (A0016)	07:33 15:53		08:32 15:13	13:59 (A0018) 14:15 (A0018)	
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	17:02 (A0016) 17:14 (A0016)	07:36 15:51	14:50 (A0013) 14:53 (A0013)	08:33 15:13	13:59 (A0018) 14:15 (A0018)	
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	17:00 (A0016) 17:14 (A0016)	07:38 15:49	14:48 (A0013) 14:56 (A0013)	08:34 15:13	14:00 (A0018) 14:16 (A0018)	
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01	16:59 (A0016) 17:15 (A0016)	07:40 15:47	14:47 (A0013) 14:58 (A0013)	08:35 15:12	14:00 (A0018) 14:16 (A0018)	
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	16:59 (A0016) 17:15 (A0016)	07:43 15:45	14:46 (A0013) 14:58 (A0013)	08:36 15:12	14:01 (A0018) 14:16 (A0018)	
16	04:23 21:48	05:24 20:43	06:30 19:18	07:34 17:55	16:58 (A0016) 17:15 (A0016)	07:45 15:43	14:46 (A0013) 14:59 (A0013)	08:37 15:12	14:01 (A0018) 14:17 (A0018)	
17	04:24 21:46	05:26 20:40	06:32 19:16	17:54 (A0015) 17:58 (A0015)	07:36 17:53	16:58 (A0016) 17:14 (A0016)	07:47 15:41	14:46 (A0013) 14:59 (A0013)	08:38 15:12	14:02 (A0018) 14:17 (A0018)
18	04:26 21:44	05:28 20:38	06:34 19:13	17:49 (A0015) 18:01 (A0015)	07:39 17:50	16:59 (A0016) 17:14 (A0016)	07:49 15:39	14:46 (A0013) 15:00 (A0013)	08:39 15:13	14:02 (A0018) 14:18 (A0018)
19	04:28 21:43	05:30 20:35	06:36 19:10	17:47 (A0015) 18:03 (A0015)	07:41 17:48	16:59 (A0016) 17:12 (A0016)	07:51 15:38	14:46 (A0013) 14:58 (A0013)	08:40 15:13	14:03 (A0018) 14:18 (A0018)
20	04:29 21:41	05:33 20:32	06:38 19:07	17:46 (A0015) 18:04 (A0015)	07:43 17:45	15:58 (A0017) 17:11 (A0016)	07:54 15:36	14:47 (A0013) 14:56 (A0013)	08:41 15:13	14:03 (A0018) 14:18 (A0018)
21	04:31 21:40	05:35 20:30	06:40 19:04	17:44 (A0015) 18:05 (A0015)	07:45 17:42	15:54 (A0017) 17:08 (A0016)	07:56 15:34	14:47 (A0013) 14:54 (A0013)	08:41 15:13	14:04 (A0018) 14:19 (A0018)
22	04:33 21:38	05:37 20:27	06:42 19:02	17:43 (A0015) 18:10 (A0010)	07:48 17:40	15:52 (A0017) 16:12 (A0017)	07:58 15:33	14:48 (A0013) 14:52 (A0013)	08:42 15:14	14:04 (A0018) 14:19 (A0018)
23	04:35 21:36	05:39 20:24	06:44 18:59	17:42 (A0015) 18:11 (A0010)	07:50 17:37	15:51 (A0017) 16:14 (A0017)	08:00 15:31	14:49 (A0013) 14:50 (A0013)	08:42 15:14	14:05 (A0018) 14:20 (A0018)
24	04:37 21:34	05:41 20:22	06:47 18:56	17:42 (A0015) 18:12 (A0010)	07:52 17:35	15:49 (A0017) 16:14 (A0017)	08:02 15:30		08:43 15:15	14:05 (A0018) 14:20 (A0018)
25	04:39 21:32	05:43 20:19	06:49 18:53	17:41 (A0015) 18:12 (A0010)	06:54 16:32	14:49 (A0017) 15:15 (A0017)	08:04 15:28		08:43 15:16	14:05 (A0018) 14:21 (A0018)
26	04:41 21:30	05:45 20:16	06:51 18:50	17:41 (A0015) 18:11 (A0010)	06:57 16:30	14:48 (A0017) 15:15 (A0017)	08:06 15:27		08:43 15:16	14:05 (A0018) 14:21 (A0018)
27	04:42 21:28	05:47 20:14	06:53 18:48	17:41 (A0015) 18:11 (A0010)	06:59 16:27	14:48 (A0017) 15:16 (A0017)	08:08 15:25	13:59 (A0018) 14:04 (A0018)	08:43 15:17	14:06 (A0018) 14:21 (A0018)
28	04:44 21:26	05:50 20:11	06:55 18:45	17:42 (A0015) 18:11 (A0010)	07:01 16:25	14:47 (A0017) 15:16 (A0017)	08:10 15:24	13:58 (A0018) 14:07 (A0018)	08:44 15:18	14:06 (A0018) 14:22 (A0018)
29	04:46 21:24	05:52 20:08	06:57 18:42	17:43 (A0015) 18:09 (A0010)	07:04 16:22	14:47 (A0017) 15:17 (A0020)	08:12 15:23	13:57 (A0018) 14:08 (A0018)	08:44 15:19	14:07 (A0018) 14:23 (A0018)
30	04:48 21:22	05:54 20:06	06:59 18:39	17:44 (A0015) 18:07 (A0010)	07:06 16:20	14:47 (A0017) 15:20 (A0020)	08:14 15:22	13:57 (A0018) 14:09 (A0018)	08:44 15:20	14:08 (A0018) 14:24 (A0018)
31	04:50 21:20	05:56 20:03			07:08 16:18	14:47 (A0017) 15:21 (A0020)			08:43 15:21	14:07 (A0018) 14:23 (A0018)
Potential sun hours	538	474	386	321		241			207	
Total, worst case			325	454		425			480	
Sun reduction			0,31	0,26		0,17			0,13	
Oper. time red.			0,99	0,99		0,99			0,99	
Wind dir. red.			0,66	0,69		0,69			0,70	
Total reduction			0,20	0,18		0,12			0,09	
Total, real			66	80		50			44	

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:7>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (831)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January			February			March			April	May	June
1	08:43	14:09 (A0018)	08:04	15:17 (A0017)	06:56				06:31	05:11	04:10
	15:23	16 14:25 (A0018)	16:23	30 15:47 (A0020)	17:29				19:38	20:44	21:45
2	08:43	14:09 (A0018)	08:02	15:16 (A0017)	06:54				06:28	05:08	04:09
	15:24	16 14:25 (A0018)	16:26	32 15:48 (A0020)	17:31				19:40	20:46	21:47
3	08:42	14:11 (A0018)	08:00	15:16 (A0017)	06:51				06:25	05:06	04:08
	15:25	15 14:26 (A0018)	16:28	33 15:49 (A0020)	17:34				19:43	20:49	21:48
4	08:42	14:11 (A0018)	07:58	15:14 (A0017)	06:48				06:22	05:04	04:07
	15:27	15 14:26 (A0018)	16:30	35 15:49 (A0020)	17:36				19:45	20:51	21:50
5	08:41	14:11 (A0018)	07:55	15:14 (A0017)	06:46				06:20	05:01	04:06
	15:28	15 14:26 (A0018)	16:33	35 15:49 (A0020)	17:38				19:47	20:53	21:51
6	08:41	14:12 (A0018)	07:53	15:13 (A0017)	06:43				06:17	04:59	04:05
	15:30	14 14:26 (A0018)	16:35	35 15:48 (A0020)	17:40				19:49	20:55	21:52
7	08:40	14:12 (A0018)	07:51	15:14 (A0017)	06:40				06:14	04:57	04:04
	15:31	15 14:27 (A0018)	16:37	35 15:49 (A0020)	17:43				19:51	20:57	21:54
8	08:39	14:13 (A0018)	07:49	15:13 (A0017)	06:37			16:56 (A0015)	06:11	04:54	04:03
	15:33	14 14:27 (A0018)	16:40	34 15:47 (A0020)	17:45	10		17:06 (A0015)	19:54	21:00	21:55
9	08:39	14:14 (A0018)	07:46	15:14 (A0017)	06:35			16:54 (A0015)	06:09	04:52	04:02
	15:35	13 14:27 (A0018)	16:42	33 15:47 (A0020)	17:47	14		17:08 (A0015)	19:56	21:02	21:56
10	08:38	14:14 (A0018)	07:44	15:13 (A0017)	06:32			16:53 (A0015)	06:06	04:50	04:01
	15:37	12 14:26 (A0018)	16:45	32 15:45 (A0020)	17:49	25		17:20 (A0010)	19:58	21:04	21:57
11	08:37	14:16 (A0018)	07:42	15:14 (A0017)	06:29			16:51 (A0015)	06:03	04:48	04:01
	15:38	10 14:26 (A0018)	16:47	26 15:40 (A0017)	17:52	31		17:22 (A0010)	20:00	21:06	21:58
12	08:36	14:17 (A0018)	07:39	15:14 (A0017)	06:27			16:50 (A0015)	06:00	04:45	04:00
	15:40	9 14:26 (A0018)	16:49	25 15:39 (A0017)	17:54	32		17:22 (A0010)	20:02	21:08	21:59
13	08:35	14:19 (A0018)	07:37	15:15 (A0017)	06:24			16:50 (A0015)	05:58	04:43	04:00
	15:42	6 14:25 (A0018)	16:52	24 15:39 (A0017)	17:56	32		17:22 (A0010)	20:05	21:10	22:00
14	08:34		07:35	15:16 (A0017)	06:21			16:49 (A0015)	05:55	04:41	03:59
	15:44		16:54	22 15:38 (A0017)	17:58	33		17:22 (A0010)	20:07	21:12	22:01
15	08:32		07:32	15:17 (A0017)	06:18			16:49 (A0015)	05:52	04:39	03:59
	15:46		16:56	20 15:37 (A0017)	18:01	32		17:21 (A0010)	20:09	21:14	22:01
16	08:31		07:30	15:19 (A0017)	06:15			16:50 (A0015)	05:50	04:37	03:59
	15:48		16:59	17 15:36 (A0017)	18:03	31		17:21 (A0010)	20:11	21:16	22:02
17	08:30		07:27	15:21 (A0017)	06:13			16:50 (A0015)	05:47	04:35	03:58
	15:50		17:01	12 15:33 (A0017)	18:05	29		17:19 (A0010)	20:13	21:18	22:02
18	08:28		07:25	15:26 (A0017)	06:10			16:51 (A0015)	05:44	04:33	03:58
	15:52		17:03	10 16:32 (A0016)	18:07	23		17:17 (A0010)	20:16	21:20	22:03
19	08:27		07:22	16:24 (A0016)	06:07			16:52 (A0015)	05:42	04:31	03:58
	15:54		17:06	10 16:34 (A0016)	18:10	14		17:06 (A0015)	20:18	21:22	22:03
20	08:25		07:20	16:22 (A0016)	06:04			16:54 (A0015)	05:39	04:29	03:58
	15:56		17:08	13 16:35 (A0016)	18:12	9		17:03 (A0015)	20:20	21:24	22:04
21	08:24		07:17	16:22 (A0016)	06:01			05:36	04:27	03:58	
	15:58		17:11	15 16:37 (A0016)	18:14			20:22	21:26	22:04	
22	08:22		07:15	16:21 (A0016)	05:59			05:34	04:26	03:59	
	16:01		17:13	16 16:37 (A0016)	18:16			20:24	21:28	22:04	
23	08:21		07:12	16:21 (A0016)	05:56			05:31	04:24	03:59	
	16:03		17:15	16 16:37 (A0016)	18:18			20:27	21:30	22:04	
24	08:19		07:10	16:21 (A0016)	05:53			05:28	04:22	03:59	
	16:05		17:18	15 16:36 (A0016)	18:21			20:29	21:32	22:04	
25	08:17		07:07	16:22 (A0016)	05:50			05:26	04:20	04:00	
	16:07		17:20	14 16:36 (A0016)	18:23			20:31	21:34	22:04	
26	08:15		07:04	16:22 (A0016)	05:48			05:23	04:19	04:00	
	16:09		17:22	13 16:35 (A0016)	18:25			20:33	21:36	22:04	
27	08:14		07:02	16:23 (A0016)	05:45			05:21	04:17	04:01	
	16:12		17:24	10 16:33 (A0016)	18:27			20:35	21:37	22:04	
28	08:12		06:59	16:27 (A0016)	05:42			05:18	04:16	04:01	
	16:14		17:27	2 16:29 (A0016)	18:29			20:38	21:39	22:04	
29	08:10	15:38 (A0020)			06:39			05:16	04:14	04:02	
	16:16	1 15:39 (A0020)			19:32			20:40	21:41	22:04	
30	08:08	15:21 (A0017)			06:36			05:13	04:13	04:03	
	16:19	16 15:42 (A0020)			19:34			20:42	21:42	22:03	
31	08:06	15:19 (A0017)			06:34				04:11		
	16:21	24 15:45 (A0020)			19:36				21:44		
Potential sun hours	228		262		366			429	515	539	
Total, worst case	211		614		315						
Sun reduction	0,19		0,16		0,22						
Oper. time red.	0,99		0,99		0,99						
Wind dir. red.	0,69		0,69		0,66						
Total reduction	0,13		0,11		0,15						
Total, real	27		68		46						

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:7&gt;1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (831)

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	July	August	September	October	November	December			
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	17:29 (A0015) 18:01 (A0010)	07:11 16:15	14:43 (A0017) 15:15 (A0020)	08:16 15:21	13:58 (A0018) 14:08 (A0018)
2	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:34	17:29 (A0015) 18:00 (A0010)	07:13 16:13	14:43 (A0017) 15:17 (A0020)	08:18 15:20	13:58 (A0018) 14:09 (A0018)
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	17:29 (A0015) 17:58 (A0010)	07:15 16:10	14:43 (A0017) 15:17 (A0020)	08:19 15:19	13:57 (A0018) 14:10 (A0018)
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	17:31 (A0015) 17:57 (A0010)	07:17 16:08	14:43 (A0017) 15:18 (A0020)	08:21 15:18	13:57 (A0018) 14:11 (A0018)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	17:32 (A0015) 17:45 (A0015)	07:20 16:06	14:43 (A0017) 15:18 (A0020)	08:23 15:17	13:58 (A0018) 14:12 (A0018)
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	17:35 (A0015) 17:41 (A0015)	07:22 16:04	14:44 (A0017) 15:19 (A0020)	08:24 15:16	13:58 (A0018) 14:12 (A0018)
7	04:10 21:58	05:05 21:05	06:11 19:44	07:14 18:20	07:24 16:01	14:45 (A0017) 15:19 (A0020)	08:26 15:15	13:58 (A0018) 14:13 (A0018)	
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	14:45 (A0017) 15:19 (A0020)	08:27 15:15	13:58 (A0018) 14:13 (A0018)	
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	14:47 (A0017) 15:19 (A0020)	08:29 15:14	13:59 (A0018) 14:14 (A0018)	
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12	07:31 15:55	14:48 (A0017) 15:17 (A0020)	08:30 15:14	14:00 (A0018) 14:15 (A0018)	
11	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	14:50 (A0017) 15:15 (A0020)	08:32 15:13	13:59 (A0018) 14:15 (A0018)	
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	14:52 (A0017) 15:12 (A0020)	08:33 15:13	13:59 (A0018) 14:15 (A0018)	
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 15:49	15:10 (A0020)	08:34 15:13	14:01 (A0018) 14:16 (A0018)	
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01	16:58 (A0016) 17:04 (A0016)	07:40 15:47	08:35 15:12	14:01 (A0018) 14:16 (A0018)	
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	16:56 (A0016) 17:07 (A0016)	07:43 15:45	08:36 15:12	14:01 (A0018) 14:16 (A0018)	
16	04:22 21:48	05:24 20:43	06:30 19:18	07:34 17:55	16:54 (A0016) 17:07 (A0016)	07:45 15:43	08:37 15:12	14:02 (A0018) 14:17 (A0018)	
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	16:53 (A0016) 17:07 (A0016)	07:47 15:41	08:38 15:12	14:02 (A0018) 14:17 (A0018)	
18	04:26 21:44	05:28 20:38	06:34 19:13	07:39 17:50	16:53 (A0016) 17:08 (A0016)	07:49 15:39	08:39 15:12	14:03 (A0018) 14:18 (A0018)	
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	16:52 (A0016) 17:08 (A0016)	07:51 15:38	08:40 15:13	14:03 (A0018) 14:18 (A0018)	
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	16:52 (A0016) 17:08 (A0016)	07:54 15:36	08:41 15:13	14:03 (A0018) 14:18 (A0018)	
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	16:52 (A0016) 17:07 (A0016)	07:56 15:34	08:41 15:13	14:04 (A0018) 14:19 (A0018)	
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	16:53 (A0016) 17:05 (A0016)	07:58 15:33	08:42 15:14	14:05 (A0018) 14:20 (A0018)	
23	04:35 21:36	05:39 20:24	06:44 18:59	17:40 (A0015) 17:47 (A0015)	16:55 (A0016) 17:04 (A0016)	08:00 15:31	08:42 15:14	14:05 (A0018) 14:20 (A0018)	
24	04:37 21:34	05:41 20:22	06:47 18:56	17:36 (A0015) 17:49 (A0015)	16:53 (A0017) 17:00 (A0016)	08:02 15:30	08:43 15:15	14:05 (A0018) 14:20 (A0018)	
25	04:39 21:32	05:43 20:19	06:49 18:53	17:34 (A0015) 17:57 (A0010)	16:54 (A0016) 15:04 (A0017)	08:04 15:28	08:43 15:16	14:06 (A0018) 14:21 (A0018)	
26	04:40 21:30	05:45 20:16	06:51 18:50	17:32 (A0015) 18:01 (A0010)	16:57 (A0016) 15:06 (A0017)	08:06 15:27	08:43 15:16	14:06 (A0018) 14:21 (A0018)	
27	04:42 21:28	05:47 20:14	06:53 18:48	17:31 (A0015) 18:02 (A0010)	16:59 (A0016) 16:27 (A0016)	08:08 15:25	08:43 15:17	14:06 (A0018) 14:22 (A0018)	
28	04:44 21:26	05:50 20:11	06:55 18:45	17:30 (A0015) 18:02 (A0010)	16:57 (A0016) 16:25 (A0016)	08:10 15:24	08:44 15:18	14:07 (A0018) 14:22 (A0018)	
29	04:46 21:24	05:52 20:08	06:57 18:42	17:30 (A0015) 18:03 (A0010)	16:54 (A0016) 16:22 (A0016)	08:12 15:23	14:00 (A0018) 14:06 (A0018)	08:44 15:19	
30	04:48 21:22	05:54 20:06	06:59 18:39	17:30 (A0015) 18:02 (A0010)	16:54 (A0016) 16:20 (A0016)	08:14 15:22	13:59 (A0018) 14:07 (A0018)	08:44 15:20	
31	04:50 21:20	05:56 20:03		17:30 (A0015) 16:17 (A0016)	16:54 (A0016) 15:09 (A0017)		08:43 15:21	14:08 (A0018) 14:23 (A0018)	
Potential sun hours	538	474	386	321	241		207		
Total, worst case			193	420	386		455		
Sun reduction			0,31	0,26	0,17		0,13		
Oper. time red.			0,99	0,99	0,99		0,99		
Wind dir. red.			0,66	0,68	0,69		0,70		
Total reduction			0,20	0,17	0,12		0,09		
Total, real			39	73	45		41		

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

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



Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:7>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (843)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

January		February		March		April	May	June
1	08:43	14:11 (A0018)	08:04	15:22 (A0017)	06:56	06:31	05:11	04:10
	15:23	16	14:27 (A0018)	16:23	24	15:47 (A0020)	17:29	21:45
2	08:43	14:11 (A0018)	08:02	15:21 (A0017)	06:54	19:38	20:44	21:45
	15:24	16	14:27 (A0018)	16:26	28	15:49 (A0020)	17:31	21:47
3	08:42	14:13 (A0018)	08:00	15:20 (A0017)	06:51	19:40	20:46	21:47
	15:25	15	14:28 (A0018)	16:28	30	15:50 (A0020)	17:34	21:48
4	08:42	14:13 (A0018)	07:58	15:19 (A0017)	06:48	19:43	20:49	21:48
	15:27	15	14:28 (A0018)	16:30	31	15:50 (A0020)	17:36	21:50
5	08:41	14:13 (A0018)	07:55	15:18 (A0017)	06:46	19:45	20:51	21:50
	15:28	15	14:28 (A0018)	16:33	33	15:51 (A0020)	17:38	21:51
6	08:41	14:14 (A0018)	07:53	15:17 (A0017)	06:43	19:47	20:53	21:51
	15:30	15	14:29 (A0018)	16:35	34	15:51 (A0020)	17:40	21:52
7	08:40	14:14 (A0018)	07:51	15:17 (A0017)	06:40	19:49	20:55	21:52
	15:31	15	14:29 (A0018)	16:37	34	15:51 (A0020)	17:43	21:54
8	08:39	14:15 (A0018)	07:49	15:17 (A0017)	06:37	19:51	20:57	21:54
	15:33	14	14:29 (A0018)	16:40	33	15:50 (A0020)	17:45	21:55
9	08:39	14:16 (A0018)	07:46	15:17 (A0017)	06:35	17:02 (A0015)	19:54	21:55
	15:35	13	14:29 (A0018)	16:42	33	15:50 (A0020)	17:47	21:56
10	08:38	14:16 (A0018)	07:44	15:16 (A0017)	06:32	16:57 (A0015)	06:09	04:52
	15:37	13	14:29 (A0018)	16:45	32	15:48 (A0020)	17:49	21:57
11	08:37	14:17 (A0018)	07:42	15:17 (A0017)	06:29	17:08 (A0015)	19:56	21:56
	15:38	12	14:29 (A0018)	16:47	29	15:46 (A0020)	17:52	21:58
12	08:36	14:18 (A0018)	07:39	15:17 (A0017)	06:27	16:56 (A0015)	06:06	04:50
	15:40	11	14:29 (A0018)	16:49	26	15:43 (A0017)	17:54	21:59
13	08:35	14:19 (A0018)	07:37	15:18 (A0017)	06:24	16:53 (A0015)	06:00	04:45
	15:42	9	14:28 (A0018)	16:52	25	15:43 (A0017)	17:56	21:56
14	08:34	14:21 (A0018)	07:35	15:18 (A0017)	06:21	16:52 (A0015)	05:58	04:43
	15:44	7	14:28 (A0018)	16:54	24	15:42 (A0017)	17:58	21:58
15	08:32		07:32	15:19 (A0017)	06:18	16:51 (A0015)	05:55	04:41
	15:46		16:56	22	15:41 (A0017)	18:01	20:07	22:01
16	08:31		07:30	15:21 (A0017)	06:15	16:51 (A0015)	05:52	04:39
	15:48		16:59	19	15:40 (A0017)	18:03	20:09	22:01
17	08:30		07:27	15:22 (A0017)	06:13	16:51 (A0015)	05:50	04:37
	15:50		17:01	17	15:39 (A0017)	18:05	20:11	22:02
18	08:28		07:25	15:25 (A0017)	06:10	17:23 (A0010)	20:13	22:03
	15:52		17:03	12	15:37 (A0017)	18:07	20:16	22:04
19	08:27		07:22	15:29 (A0017)	06:07	16:52 (A0015)	05:44	04:33
	15:54		17:06	10	16:34 (A0016)	18:10	20:16	22:04
20	08:25		07:20	16:25 (A0016)	06:04	16:53 (A0015)	05:42	04:31
	15:56		17:08	11	16:36 (A0016)	18:12	20:18	22:03
21	08:24		07:17	16:24 (A0016)	06:01	16:54 (A0015)	05:39	04:29
	15:58		17:11	14	16:38 (A0016)	18:14	20:20	22:04
22	08:22		07:15	16:23 (A0016)	05:59	16:58 (A0015)	05:36	04:27
	16:01		17:13	15	16:38 (A0016)	18:16	20:22	22:04
23	08:21		07:12	16:22 (A0016)	05:56	17:04 (A0015)	20:22	22:04
	16:03		17:15	16	16:38 (A0016)	18:18	20:24	22:04
24	08:19		07:10	16:22 (A0016)	05:53		05:34	04:26
	16:05		17:18	16	16:38 (A0016)	18:21	20:24	21:28
25	08:17		07:07	16:23 (A0016)	05:50		05:31	04:24
	16:07		17:20	15	16:38 (A0016)	18:23	20:27	21:30
26	08:15		07:04	16:23 (A0016)	05:48		05:28	04:22
	16:09		17:22	14	16:37 (A0016)	18:25	20:29	21:32
27	08:14		07:02	16:24 (A0016)	05:45		05:26	04:20
	16:12		17:24	12	16:36 (A0016)	18:27	20:31	21:34
28	08:12		06:59	16:26 (A0016)	05:42		05:23	04:19
	16:14		17:27	7	16:33 (A0016)	18:29	20:33	21:36
29	08:10				06:39		05:21	04:17
	16:16				19:32		20:35	21:37
30	08:08	15:39 (A0020)			06:36		05:18	04:16
	16:19	3	15:42 (A0020)		19:34		20:38	21:39
31	08:06	15:26 (A0017)			06:34		05:16	04:14
	16:21	13	15:45 (A0020)		19:36		20:40	21:41
Potential sun hours	228		262		366		429	515
Total, worst case	202		616		311			
Sun reduction	0,19		0,16		0,22			
Oper. time red.	0,99		0,99		0,99			
Wind dir. red.	0,70		0,69		0,66			
Total reduction	0,13		0,11		0,15			
Total, real	26		68		45			

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (843)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July	August	September	October	November	December			
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	17:32 (A0015) 18:02 (A0010)	07:11 16:15	14:46 (A0017) 15:18 (A0020)	08:16 15:21	13:59 (A0018) 14:11 (A0018)
2	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:34	17:32 (A0015) 18:01 (A0010)	07:13 16:13	14:47 (A0017) 15:19 (A0020)	08:18 15:20	13:59 (A0018) 14:12 (A0018)
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	17:32 (A0015) 17:59 (A0010)	07:15 16:10	14:46 (A0017) 15:20 (A0020)	08:19 15:19	13:59 (A0018) 14:13 (A0018)
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	17:34 (A0015) 17:48 (A0015)	07:17 16:08	14:47 (A0017) 15:20 (A0020)	08:21 15:18	13:59 (A0018) 14:13 (A0018)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	17:36 (A0015) 17:44 (A0015)	07:20 16:06	14:47 (A0017) 15:20 (A0020)	08:23 15:17	13:59 (A0018) 14:14 (A0018)
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23		07:22 16:04	14:48 (A0017) 15:21 (A0020)	08:24 15:16	14:00 (A0018) 14:15 (A0018)
7	04:10 21:58	05:05 21:05	06:11 19:44	07:14 18:20		07:24 16:01	14:49 (A0017) 15:21 (A0020)	08:26 15:15	14:00 (A0018) 14:15 (A0018)
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17		07:27 15:59	14:50 (A0017) 15:20 (A0020)	08:27 15:15	14:00 (A0018) 14:15 (A0018)
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14		07:29 15:57	14:52 (A0017) 15:20 (A0020)	08:29 15:14	14:01 (A0018) 14:16 (A0018)
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12		07:31 15:55	14:53 (A0017) 15:17 (A0020)	08:30 15:14	14:01 (A0018) 14:17 (A0018)
11	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09		07:33 15:53	14:57 (A0017) 15:15 (A0020)	08:32 15:13	14:01 (A0018) 14:17 (A0018)
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06		07:36 15:51	15:11 (A0020) 15:12 (A0020)	08:33 15:13	14:02 (A0018) 14:17 (A0018)
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	17:02 (A0016)	07:38 15:49		08:34 15:13	14:03 (A0018) 14:18 (A0018)
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01	16:58 (A0016)	07:40 15:47		08:35 15:12	14:03 (A0018) 14:18 (A0018)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	16:57 (A0016)	07:43 15:45		08:36 15:12	14:03 (A0018) 14:18 (A0018)
16	04:22 21:48	05:24 20:43	06:30 19:18	07:34 17:55	16:55 (A0016)	07:45 15:43		08:37 15:12	14:04 (A0018) 14:19 (A0018)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	16:54 (A0016)	07:47 15:41		08:38 15:12	14:04 (A0018) 14:19 (A0018)
18	04:26 21:44	05:28 20:38	06:34 19:13	07:39 17:50	16:54 (A0016)	07:49 15:39		08:39 15:12	14:05 (A0018) 14:20 (A0018)
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	16:54 (A0016)	07:51 15:38		08:40 15:13	14:06 (A0018) 14:20 (A0018)
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	16:54 (A0016)	07:54 15:36		08:41 15:13	14:05 (A0018) 14:20 (A0018)
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	16:55 (A0016)	07:56 15:34		08:41 15:13	14:06 (A0018) 14:21 (A0018)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:47	16:55 (A0016)	07:58 15:33		08:42 15:14	14:07 (A0018) 14:22 (A0018)
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	15:57 (A0017)	08:00 15:31		08:42 15:14	14:07 (A0018) 14:22 (A0018)
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	15:53 (A0017)	08:02 15:30		08:43 15:15	14:08 (A0018) 14:22 (A0018)
25	04:39 21:32	05:43 20:19	06:49 18:53	07:54 18:01	14:52 (A0017)	08:04 15:28		08:43 15:16	14:08 (A0018) 14:22 (A0018)
26	04:40 21:30	05:45 20:16	06:51 18:50	06:57 18:03	14:50 (A0017)	08:06 15:27		08:43 15:16	14:08 (A0018) 14:23 (A0018)
27	04:42 21:28	05:47 20:14	06:53 18:48	06:59 18:03	14:49 (A0017)	08:08 15:25		08:43 15:17	14:09 (A0018) 14:23 (A0018)
28	04:44 21:26	05:50 20:11	06:55 18:45	07:01 16:25	14:48 (A0017)	08:10 15:24	14:02 (A0018)	08:44 15:18	14:09 (A0018) 14:24 (A0018)
29	04:46 21:24	05:52 20:08	06:57 18:42	07:04 16:22	14:47 (A0017)	08:12 15:23	14:00 (A0018)	08:44 15:19	14:10 (A0018) 14:25 (A0018)
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	14:46 (A0017)	08:14 15:22	14:00 (A0018)	08:44 15:20	14:10 (A0018) 14:25 (A0018)
31	04:50 21:20	05:56 20:03		07:08 16:17	14:47 (A0017)		14:10 (A0018)	08:43 15:21	14:10 (A0018) 14:25 (A0018)
Potential sun hours	538	474	386	321		241		207	
Total, worst case			207	418		346		456	
Sun reduction			0,31	0,26		0,17		0,13	
Oper. time red.			0,99	0,99		0,99		0,99	
Wind dir. red.			0,66	0,68		0,69		0,70	
Total reduction			0,20	0,17		0,12		0,09	
Total, real			42	73		41		42	

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:8>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (918)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	January			February			March			April	May	June
1	08:43	13:56 (A0018)	08:04	14:44 (A0017)	06:56	16:36 (A0015)	06:31	05:11	04:10			
	15:23	9 14:05 (A0018)	16:23	40 15:30 (A0020)	17:29	13 16:49 (A0015)	19:38	20:44	21:45			
2	08:43	13:57 (A0018)	08:02	14:45 (A0017)	06:54	16:34 (A0015)	06:28	05:08	04:09			
	15:24	8 14:05 (A0018)	16:26	38 15:30 (A0020)	17:31	17 16:51 (A0015)	19:40	20:46	21:47			
3	08:42	13:59 (A0018)	08:00	14:46 (A0017)	06:51	16:32 (A0015)	06:25	05:06	04:08			
	15:25	6 14:05 (A0018)	16:28	34 15:29 (A0020)	17:34	20 16:52 (A0015)	19:43	20:49	21:48			
4	08:42	14:00 (A0018)	07:58	14:46 (A0017)	06:48	16:31 (A0015)	06:22	05:04	04:07			
	15:27	4 14:04 (A0018)	16:30	28 15:26 (A0020)	17:36	24 17:05 (A0010)	19:45	20:51	21:50			
5	08:41		07:55	14:48 (A0017)	06:46	16:31 (A0015)	06:20	05:01	04:06			
	15:28		16:33	21 15:09 (A0017)	17:38	32 17:09 (A0010)	19:47	20:53	21:51			
6	08:41		07:53	14:48 (A0017)	06:43	16:31 (A0015)	06:17	04:59	04:05			
	15:30		16:35	19 15:07 (A0017)	17:40	35 17:10 (A0010)	19:49	20:55	21:52			
7	08:40		07:51	14:50 (A0017)	06:40	16:30 (A0015)	06:14	04:57	04:04			
	15:31		16:37	17 15:07 (A0017)	17:43	37 17:10 (A0010)	19:51	20:57	21:54			
8	08:39		07:49	14:52 (A0017)	06:37	16:30 (A0015)	06:11	04:54	04:03			
	15:33		16:40	12 15:04 (A0017)	17:45	38 17:11 (A0010)	19:54	21:00	21:55			
9	08:39		07:46	14:58 (A0017)	06:35	16:30 (A0015)	06:09	04:52	04:02			
	15:35		16:42	1 14:59 (A0017)	17:47	37 17:10 (A0010)	19:56	21:02	21:56			
10	08:38		07:44		06:32	16:31 (A0015)	06:06	04:50	04:01			
	15:37		16:45		17:50	36 17:11 (A0010)	19:58	21:04	21:57			
11	08:37		07:42		06:29	16:32 (A0015)	06:03	04:48	04:01			
	15:38		16:47		17:52	32 17:10 (A0010)	20:00	21:06	21:58			
12	08:36		07:39	16:09 (A0016)	06:27	16:33 (A0015)	06:00	04:45	04:00			
	15:40		16:49	7 16:16 (A0016)	17:54	28 17:08 (A0010)	20:02	21:08	21:59			
13	08:35		07:37	16:08 (A0016)	06:24	16:35 (A0015)	05:58	04:43	04:00			
	15:42		16:52	11 16:19 (A0016)	17:56	19 17:06 (A0010)	20:05	21:10	22:00			
14	08:34		07:35	16:06 (A0016)	06:21	16:39 (A0015)	05:55	04:41	03:59			
	15:44		16:54	14 16:20 (A0016)	17:58	2 16:41 (A0015)	20:07	21:12	22:01			
15	08:32		07:32	16:06 (A0016)	06:18		05:52	04:39	03:59			
	15:46		16:56	16 16:22 (A0016)	18:01		20:09	21:14	22:01			
16	08:31		07:30	16:05 (A0016)	06:15		05:50	04:37	03:59			
	15:48		16:59	17 16:22 (A0016)	18:03		20:11	21:16	22:02			
17	08:30	14:49 (A0017)	07:27	16:05 (A0016)	06:13		05:47	04:35	03:58			
	15:50	8 14:57 (A0017)	17:01	16 16:21 (A0016)	18:05		20:13	21:18	22:03			
18	08:28	14:47 (A0017)	07:25	16:06 (A0016)	06:10		05:44	04:33	03:58			
	15:52	12 14:59 (A0017)	17:03	16 16:22 (A0016)	18:07		20:16	21:20	22:03			
19	08:27	14:46 (A0017)	07:22	16:06 (A0016)	06:07		05:42	04:31	03:58			
	15:54	15 15:01 (A0017)	17:06	15 16:21 (A0016)	18:10		20:18	21:22	22:03			
20	08:25	14:46 (A0017)	07:20	16:06 (A0016)	06:04		05:39	04:29	03:58			
	15:56	18 15:04 (A0017)	17:08	14 16:20 (A0016)	18:12		20:20	21:24	22:04			
21	08:24	14:45 (A0017)	07:17	16:08 (A0016)	06:02		05:36	04:27	03:58			
	15:58	21 15:19 (A0020)	17:11	11 16:19 (A0016)	18:14		20:22	21:26	22:04			
22	08:22	14:44 (A0017)	07:15	16:10 (A0016)	05:59		05:34	04:26	03:59			
	16:01	27 15:21 (A0020)	17:13	7 16:17 (A0016)	18:16		20:24	21:28	22:04			
23	08:21	14:44 (A0017)	07:12		05:56		05:31	04:24	03:59			
	16:03	32 15:24 (A0020)	17:15		18:18		20:27	21:30	22:04			
24	08:19	14:44 (A0017)	07:10		05:53		05:29	04:22	03:59			
	16:05	35 15:26 (A0020)	17:18		18:21		20:29	21:32	22:04			
25	08:17	14:44 (A0017)	07:07		05:50		05:26	04:20	04:00			
	16:07	39 15:29 (A0020)	17:20		18:23		20:31	21:34	22:04			
26	08:15	14:44 (A0017)	07:04		05:48		05:23	04:19	04:00			
	16:09	41 15:30 (A0020)	17:22		18:25		20:33	21:36	22:04			
27	08:14	14:43 (A0017)	07:02		05:45		05:21	04:17	04:01			
	16:12	43 15:30 (A0020)	17:24		18:27		20:35	21:37	22:04			
28	08:12	14:43 (A0017)	06:59	16:38 (A0015)	05:42		05:18	04:16	04:01			
	16:14	42 15:30 (A0020)	17:27	8 16:46 (A0015)	18:29		20:38	21:39	22:04			
29	08:10	14:43 (A0017)			06:39		05:16	04:14	04:02			
	16:16	44 15:31 (A0020)			19:32		20:40	21:41	22:04			
30	08:08	14:44 (A0017)			06:36		05:13	04:13	04:03			
	16:19	42 15:31 (A0020)			19:34		20:42	21:42	22:03			
31	08:06	14:44 (A0017)			06:34			04:11				
	16:21	42 15:31 (A0020)			19:36			21:44				
Potential sun hours	228		262		366		429	515	539			
Total, worst case	488		362		370							
Sun reduction	0,19		0,16		0,22							
Oper. time red.	0,99		0,99		0,99							
Wind dir. red.	0,69		0,69		0,67							
Total reduction	0,13		0,11		0,15							
Total, real	62		40		55							

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: DÖDRINGSHULT 1:8>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (918)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	17:13 (A0015) 17:47 (A0010)	07:11 16:15
2	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:34	17:10 (A0015) 17:47 (A0010)	07:13 16:13
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	17:09 (A0015) 17:48 (A0010)	07:15 16:10
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	17:08 (A0015) 17:48 (A0010)	07:17 16:08
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	17:07 (A0015) 17:48 (A0010)	07:20 16:06
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	17:06 (A0015) 17:47 (A0010)	07:22 16:04
7	04:10 21:58	05:05 21:05	06:11 19:44	07:14 18:20	17:06 (A0015) 17:46 (A0010)	07:24 16:01
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	17:06 (A0015) 17:45 (A0010)	07:27 15:59
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	17:06 (A0015) 17:42 (A0010)	07:29 15:57
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12	17:06 (A0015) 17:27 (A0015)	07:31 15:55
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	17:07 (A0015) 17:25 (A0015)	07:33 15:53
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	17:09 (A0015) 17:24 (A0015)	07:36 15:51
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	17:10 (A0015) 17:21 (A0015)	07:38 15:49
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01	17:10 (A0015) 17:21 (A0015)	15:49 15:47
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	17:21 (A0015) 17:21 (A0015)	15:47 15:45
16	04:22 21:48	05:24 20:43	06:30 19:18	07:34 17:55	17:21 (A0015) 17:21 (A0015)	15:45 15:43
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	17:21 (A0015) 17:21 (A0015)	15:43 15:41
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	17:21 (A0015) 17:21 (A0015)	15:41 15:39
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	17:21 (A0015) 17:21 (A0015)	15:37 15:35
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	17:21 (A0015) 17:21 (A0015)	15:33 15:31
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	17:21 (A0015) 17:21 (A0015)	15:29 15:27
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	17:21 (A0015) 17:21 (A0015)	15:25 15:23
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	17:21 (A0015) 17:21 (A0015)	15:21 15:19
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	17:21 (A0015) 17:21 (A0015)	15:17 15:15
25	04:39 21:32	05:43 20:19	06:49 18:53	07:54 17:32	17:21 (A0015) 17:21 (A0015)	15:13 15:11
26	04:40 21:30	05:45 20:16	06:51 18:50	07:56 17:30	17:21 (A0015) 17:21 (A0015)	15:09 15:07
27	04:42 21:28	05:47 20:14	06:53 18:48	07:58 17:27	17:21 (A0015) 17:21 (A0015)	15:05 15:03
28	04:44 21:26	05:50 20:11	06:55 18:45	08:00 17:25	17:21 (A0015) 17:21 (A0015)	15:01 14:59
29	04:46 21:24	05:52 20:08	06:57 18:42	08:02 17:22	17:21 (A0015) 17:21 (A0015)	15:00 14:58
30	04:48 21:22	05:54 20:06	06:59 18:39	08:04 17:20	17:21 (A0015) 17:21 (A0015)	14:56 14:54
31	04:50 21:20	05:56 20:03		08:06 17:17	17:21 (A0015) 17:21 (A0015)	14:52 14:50
Potential sun hours	538	474	386	321	241	207
Total, worst case			15	513	679	265
Sun reduction			0,31	0,26	0,17	0,13
Oper. time red.			0,99	0,99	0,99	0,99
Wind dir. red.			0,67	0,68	0,69	0,69
Total reduction			0,21	0,17	0,12	0,09
Total, real			3	89	80	24

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: Grevekulla - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (806)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	08:43		14:08 (6)	08:04			06:56			06:31		18:36 (4)	05:11		19:36 (3)	04:10		19:40 (3)
	15:22	25	14:33 (6)	16:23			17:29			19:38	25	19:01 (4)	20:44	29	20:05 (3)	21:45	24	20:04 (3)
2	08:43		14:08 (6)	08:02			06:54			06:28		18:36 (4)	05:08		19:34 (3)	04:09		19:41 (3)
	15:24	25	14:33 (6)	16:25			17:31			19:40	25	19:01 (4)	20:46	32	20:06 (3)	21:47	22	20:03 (3)
3	08:42		14:09 (6)	08:00			06:51			06:25		18:35 (4)	05:06		19:33 (3)	04:07		19:42 (3)
	15:25	26	14:35 (6)	16:28			17:33			19:42	26	19:01 (4)	20:49	34	20:07 (3)	21:48	20	20:02 (3)
4	08:42		14:09 (6)	07:57			06:48			06:22		18:35 (4)	05:03		19:33 (3)	04:06		19:43 (3)
	15:27	26	14:35 (6)	16:30			17:36			19:45	25	19:00 (4)	20:51	36	20:17 (2)	21:50	19	20:02 (3)
5	08:41		14:09 (6)	07:55			06:45			06:19		18:35 (4)	05:01		19:32 (3)	04:05		19:45 (3)
	15:28	26	14:35 (6)	16:32			17:38			19:47	26	19:17 (1)	20:53	40	20:19 (2)	21:51	17	20:02 (3)
6	08:41		14:09 (6)	07:53			06:43			06:17		18:35 (4)	04:59		19:32 (3)	04:04		19:46 (3)
	15:30	27	14:36 (6)	16:35			17:40			19:49	29	19:19 (1)	20:55	45	20:21 (2)	21:52	14	20:00 (3)
7	08:40		14:09 (6)	07:51			06:40			06:14		18:36 (4)	04:56		19:30 (3)	04:03		19:47 (3)
	15:31	28	14:37 (6)	16:37			17:43			19:51	30	19:21 (1)	20:57	49	20:22 (2)	21:54	12	19:59 (3)
8	08:39		14:10 (6)	07:49			06:37			06:11		18:36 (4)	04:54		19:30 (3)	04:03		19:49 (3)
	15:33	27	14:37 (6)	16:40			17:45			19:53	31	19:23 (1)	20:59	52	20:24 (2)	21:55	10	19:59 (3)
9	08:39		14:10 (6)	07:46			06:35			06:08		18:38 (4)	04:52		19:30 (3)	04:02		19:51 (3)
	15:34	28	14:38 (6)	16:42			17:47			19:56	31	19:26 (1)	21:02	54	20:26 (2)	21:56	5	19:56 (3)
10	08:38		14:10 (6)	07:44			06:32			06:06		18:40 (4)	04:49		19:30 (3)	04:01		
	15:36	28	14:38 (6)	16:44			17:49			19:58	29	19:27 (1)	21:04	57	20:28 (2)	21:57		
11	08:37		14:10 (6)	07:42			06:29			06:03		18:43 (4)	04:47		19:29 (3)	04:00		
	15:38	29	14:39 (6)	16:47			17:52			20:00	24	19:29 (1)	21:06	61	20:30 (2)	21:58		
12	08:36		14:11 (6)	07:39		16:13 (5)	06:26			06:00		19:12 (1)	04:45		19:29 (3)	04:00		
	15:40	28	14:39 (6)	16:49	2	16:15 (5)	17:54			20:02	18	19:30 (1)	21:08	63	20:32 (2)	21:59		
13	08:35		14:11 (6)	07:37		16:11 (5)	06:24			05:57		19:12 (1)	04:43		19:29 (3)	03:59		
	15:42	28	14:39 (6)	16:51	8	16:19 (5)	17:56			20:04	16	19:28 (1)	21:10	63	20:32 (2)	22:00		
14	08:33		14:12 (6)	07:35		16:10 (5)	06:21			05:55		19:13 (1)	04:41		19:30 (3)	03:59		
	15:44	28	14:40 (6)	16:54	11	16:21 (5)	17:58			20:07	13	19:26 (1)	21:12	62	20:33 (2)	22:01		
15	08:32		14:12 (6)	07:32		16:08 (5)	06:18			05:52		19:16 (1)	04:39		19:30 (3)	03:59		
	15:46	28	14:40 (6)	16:56	15	16:23 (5)	18:00			20:09	9	19:25 (1)	21:14	61	20:32 (2)	22:01		
16	08:31		14:13 (6)	07:30		16:08 (5)	06:15			05:49			04:37		19:30 (3)	03:58		
	15:48	28	14:41 (6)	16:59	18	16:26 (5)	18:03			20:11			21:16	61	20:32 (2)	22:02		
17	08:30		14:13 (6)	07:27		16:07 (5)	06:12			05:47			04:35		19:30 (3)	03:58		
	15:50	28	14:41 (6)	17:01	21	16:28 (5)	18:05			20:13			21:18	59	20:31 (2)	22:02		
18	08:28		14:14 (6)	07:25		16:07 (5)	06:10			05:44			04:33		19:30 (3)	03:58		
	15:52	27	14:41 (6)	17:03	23	16:30 (5)	18:07			20:15			21:20	57	20:30 (2)	22:03		
19	08:27		14:14 (6)	07:22		16:07 (5)	06:07			05:41			04:31		19:31 (3)	03:58		
	15:54	26	14:40 (6)	17:06	23	16:30 (5)	18:09			20:18			21:22	57	20:31 (2)	22:03		
20	08:25		14:16 (6)	07:20		16:07 (5)	06:04			05:39			04:29		19:31 (3)	03:58		
	15:56	25	14:41 (6)	17:08	23	16:30 (5)	18:12			20:20			21:24	54	20:29 (2)	22:04		
21	08:24		14:16 (6)	07:17		16:07 (5)	06:01			05:36			04:27		19:32 (3)	03:58		
	15:58	25	14:41 (6)	17:10	22	16:29 (5)	18:14			20:22			21:26	51	20:29 (2)	22:04		
22	08:22		14:17 (6)	07:15		16:08 (5)	05:59			05:33			04:25		19:32 (3)	03:58		
	16:00	24	14:41 (6)	17:13	21	16:29 (5)	18:16			20:24			21:28	48	20:28 (2)	22:04		
23	08:21		14:18 (6)	07:12		16:09 (5)	05:56			05:31			04:23		19:33 (3)	03:58		
	16:02	22	14:40 (6)	17:15	19	16:28 (5)	18:18			20:27			21:30	45	20:27 (2)	22:04		
24	08:19		14:20 (6)	07:09		16:09 (5)	05:53			05:28			04:22		19:33 (3)	03:59		
	16:05	20	14:40 (6)	17:17	18	16:27 (5)	18:20			20:29			21:32	37	20:23 (2)	22:04		
25	08:17		14:21 (6)	07:07		16:12 (5)	05:50			05:26			04:20		19:34 (3)	03:59		
	16:07	18	14:39 (6)	17:20	14	16:26 (5)	18:23			20:31			21:34	34	20:08 (3)	22:04		
26	08:15		14:23 (6)	07:04		16:14 (5)	05:47		17:47 (4)	05:23			04:18		19:34 (3)	04:00		
	16:09	15	14:38 (6)	17:22	9	16:23 (5)	18:25	6	17:53 (4)	20:33			21:35	33	20:07 (3)	22:04		
27	08:14		14:25 (6)	07:02			05:45		17:44 (4)	05:21		19:44 (3)	04:17		19:36 (3)	04:00		
	16:11	10	14:35 (6)	17:24			18:27	13	17:57 (4)	20:35	13	19:57 (3)	21:37	31	20:07 (3)	22:04		
28	08:12			06:59			05:42		17:41 (4)	05:18		19:42 (3)	04:15		19:37 (3)	04:01		
	16:14			17:27			18:29	18	17:59 (4)	20:38	18	20:00 (3)	21:39	29	20:06 (3)	22:04		
29	08:10						06:39		18:39 (4)	05:16		19:39 (3)	04:14		19:38 (3)	04:01		
	16:16						19:31	21	19:00 (4)	20:40	23	20:02 (3)	21:41	28	20:06 (3)	22:04		
30	08:08						06:36		18:38 (4)	05:13		19:37 (3)	04:12		19:38 (3)	04:02		
	16:18						19:34	22	19:00 (4)	20:42	27	20:04 (3)	21:42	27	20:05 (3)	22:03		
31	08:06						06:33		18:36 (4)				04:11		19:39 (3)			
	16:21						19:36	25	19:01 (4)				21:44	25	20:04 (3)			
Potential sun hours	227			262			366			429			515			539		
Total, worst case		675			247		105			438			1414				143	
Sun reduction		0,19			0,16		0,22			0,42			0,53				0,43	
Oper. time red.		0,99			0,99		0,99			0,99			0,99				0,99	
Wind dir. red.		0,70			0,69		0,65			0,63			0,60				0,60	
Total reduction		0,13			0,11		0,15			0,27			0,32				0,26	
Total, real		89			28		15			119			455				37	

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: Grevekulla - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (806)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	19:40 (3) 20:42 (2)	05:58 20:00	18:43 (4) 19:29 (1)	07:01 18:36
2	04:04 22:02	04:54 21:16	19:40 (3) 20:39 (2)	06:00 19:57	18:39 (4) 19:26 (1)	07:03 18:33
3	04:05 22:02	19:57 (3) 04:56	21:14 19:40 (3)	06:02 19:55	18:36 (4) 19:24 (1)	07:06 18:31
4	04:06 22:01	3 19:55 (3)	04:58 21:11	06:04 19:52	18:34 (4) 19:21 (1)	07:08 18:28
5	04:07 22:00	8 19:54 (3)	05:00 21:09	06:06 19:40 (3)	18:33 (4) 19:18 (1)	07:10 18:25
6	04:08 21:59	11 20:05 (3)	05:02 21:07	06:08 19:41 (3)	18:32 (4) 19:15 (1)	07:12 18:22
7	04:09 21:58	13 20:06 (3)	05:05 21:04	06:11 19:41 (3)	18:31 (4) 19:13 (1)	07:14 18:20
8	04:10 21:57	16 20:08 (3)	05:07 21:02	06:13 19:42 (3)	18:20 18:55 (4)	07:16 18:17
9	04:12 21:56	18 19:50 (3)	05:09 21:00	06:15 19:42 (3)	18:29 (4) 18:55 (4)	07:19 18:14
10	04:13 21:55	19 19:49 (3)	05:11 20:57	06:17 19:43 (3)	18:29 (4) 18:55 (4)	07:21 18:11
11	04:14 21:54	21 20:10 (3)	05:13 20:57	06:19 19:44 (3)	18:29 (4) 18:54 (4)	07:23 18:09
12	04:16 21:53	23 20:12 (3)	05:15 20:55	06:21 19:45 (3)	18:29 (4) 18:53 (4)	07:25 18:06
13	04:17 21:52	24 20:12 (3)	05:17 20:52	06:23 19:46 (3)	18:29 (4) 18:52 (4)	07:27 18:03
14	04:19 21:50	26 20:13 (3)	05:19 20:50	06:25 19:48 (3)	18:29 (4) 18:50 (4)	07:30 18:01
15	04:20 21:49	27 20:14 (3)	05:22 20:48	06:27 19:50 (3)	18:30 (4) 18:49 (4)	07:32 17:58
16	04:22 21:48	29 20:15 (3)	05:24 20:43	06:30 19:52 (3)	18:32 (4) 18:46 (4)	07:34 17:55
17	04:24 21:46	30 20:15 (3)	05:26 20:40	06:32 19:15	18:43 (4) 17:53	11 16:56 (5)
18	04:25 21:44	31 20:16 (3)	05:28 20:37	06:34 19:13	17:53 17:50	16 16:58 (5)
19	04:27 21:43	33 19:43 (3)	05:30 20:35	06:36 19:10	07:41 17:47	18 16:59 (5)
20	04:29 21:41	34 20:17 (3)	05:32 20:32	06:38 19:07	21 17:45	22 17:00 (5)
21	04:31 21:40	41 20:35 (2)	05:34 20:30	06:40 19:04	22 17:45	24 17:00 (5)
22	04:33 21:38	46 20:37 (2)	05:37 20:27	06:42 19:01	23 17:42	25 17:01 (5)
23	04:34 21:36	49 20:38 (2)	05:39 20:24	06:44 18:59	23 17:40	25 17:00 (5)
24	04:36 21:34	53 19:42 (3)	05:41 20:22	06:46 18:56	23 17:37	27 17:01 (5)
25	04:38 21:32	55 20:40 (2)	05:43 20:19	06:49 18:53	23 17:34	27 17:00 (5)
26	04:40 21:30	57 20:41 (2)	05:45 20:16	06:51 18:50	20 16:32	28 15:58 (5)
27	04:42 21:28	58 20:42 (2)	05:47 20:14	06:53 18:47	17 16:29	28 15:55 (5)
28	04:44 21:26	61 19:40 (3)	05:49 20:11	06:55 19:16 (1)	14 16:27	28 15:53 (5)
29	04:46 21:24	61 20:42 (2)	05:51 20:08	06:57 19:26 (1)	11 16:24	28 15:50 (5)
30	04:48 21:22	62 19:40 (3)	05:54 20:06	06:59 19:12 (1)	6 16:22	28 15:47 (5)
31	04:50 21:20	63 20:43 (2)	05:56 20:03	18:39 19:30 (1)	1 16:20	29 15:44 (5)
Potential sun hours	538	474	386	321	241	207
Total, worst case	1035	675	411	249	382	759
Sun reduction	0,38	0,35	0,31	0,26	0,17	0,13
Oper. time red.	0,99	0,99	0,99	0,99	0,99	0,99
Wind dir. red.	0,60	0,60	0,64	0,69	0,70	0,70
Total reduction	0,23	0,22	0,20	0,18	0,12	0,09
Total, real	241	146	84	45	46	71

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

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



Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: Grevekulla 1:11 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (802)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January		February		March		April		May		June	
1	08:43		09:26 (5)	08:04	08:36 (1)	06:56	07:24 (3)	06:31	07:36 (2)	05:11	04:10	
	15:23	6	09:32 (5)	16:23	09:02 (1)	17:29	10	07:34 (3)	19:38	14	07:50 (2)	20:44
2	08:43		09:26 (5)	08:02	08:34 (4)	06:54		07:21 (3)	06:28		07:40 (2)	20:08
	15:24	7	09:33 (5)	16:25	09:03 (1)	17:31	13	07:34 (3)	19:40	4	07:44 (2)	20:47
3	08:43		09:25 (5)	08:00	08:32 (4)	06:51		07:18 (3)	06:25		05:06	04:07
	15:25	9	09:34 (5)	16:28	09:05 (1)	17:34	16	07:34 (3)	19:43		20:49	21:49
4	08:42		09:24 (5)	07:58	08:29 (4)	06:48		07:15 (3)	06:22		05:03	04:06
	15:27	10	09:34 (5)	16:30	09:05 (1)	17:36	18	07:33 (3)	19:45		20:51	21:50
5	08:42		09:23 (5)	07:55	08:27 (4)	06:46		07:15 (3)	06:20		05:01	04:05
	15:28	11	09:34 (5)	16:33	09:06 (1)	17:38	19	07:34 (3)	19:47		20:53	21:51
6	08:41		09:22 (5)	07:53	08:24 (4)	06:43		07:15 (3)	06:17		04:59	04:04
	15:30	13	09:35 (5)	16:35	09:06 (1)	17:40	18	07:33 (3)	19:49		20:55	21:53
7	08:40		09:21 (5)	07:51	08:24 (4)	06:40		07:16 (3)	06:14		04:56	04:03
	15:31	14	09:35 (5)	16:37	09:06 (1)	17:43	15	07:31 (3)	19:51		20:57	21:54
8	08:40		09:20 (5)	07:49	08:23 (4)	06:37		07:17 (3)	06:11		04:54	04:03
	15:33	16	09:36 (5)	16:40	09:06 (1)	17:45	12	07:29 (3)	19:54		21:00	21:55
9	08:39		09:19 (5)	07:47	08:23 (4)	06:35		07:19 (3)	06:09		04:52	04:02
	15:35	17	09:36 (5)	16:42	09:07 (1)	17:47	7	07:26 (3)	19:56		21:02	21:56
10	08:38		09:19 (5)	07:44	08:22 (4)	06:32			06:06		04:50	04:01
	15:36	18	09:37 (5)	16:44	09:06 (1)	17:49			19:58		21:04	21:57
11	08:37		09:19 (5)	07:42	08:23 (4)	06:29			06:03		04:47	04:00
	15:38	17	09:36 (5)	16:47	09:07 (1)	17:52			20:00		21:06	21:58
12	08:36		09:20 (5)	07:40	08:23 (4)	06:26			06:00		04:45	04:00
	15:40	17	09:37 (5)	16:49	09:06 (1)	17:54			20:02		21:08	21:59
13	08:35		09:21 (5)	07:37	08:24 (4)	06:24			05:58		04:43	03:59
	15:42	16	09:37 (5)	16:52	09:06 (1)	17:56			20:05		21:10	22:00
14	08:34		09:21 (5)	07:35	08:24 (4)	06:21		06:47 (2)	05:55		04:41	03:59
	15:44	16	09:37 (5)	16:54	09:05 (1)	17:58	7	06:54 (2)	20:07		21:12	22:01
15	08:32		09:22 (5)	07:32	08:25 (4)	06:18		06:44 (2)	05:52		04:39	03:59
	15:46	14	09:36 (5)	16:56	09:05 (1)	18:01	13	06:57 (2)	20:09		21:14	22:01
16	08:31		09:09 (6)	07:30	08:26 (4)	06:15		06:42 (2)	05:49		04:37	03:58
	15:48	14	09:36 (5)	16:59	09:04 (1)	18:03	18	07:00 (2)	20:11		21:16	22:02
17	08:30		09:07 (6)	07:27	08:27 (4)	06:13		06:39 (2)	05:47		04:35	03:58
	15:50	14	09:35 (5)	17:01	09:02 (1)	18:05	22	07:01 (2)	20:13		21:19	22:03
18	08:28		09:05 (6)	07:25	08:29 (4)	06:10		06:36 (2)	05:44		04:33	03:58
	15:52	13	09:33 (5)	17:03	09:01 (1)	18:07	25	07:01 (2)	20:16		21:21	22:03
19	08:27		09:04 (6)	07:22	08:37 (1)	06:07		06:33 (2)	05:41		04:31	03:58
	15:54	7	09:11 (6)	17:06	08:59 (1)	18:09	29	07:02 (2)	20:18		21:23	22:04
20	08:26		09:02 (6)	07:20	08:39 (1)	06:04		06:32 (2)	05:39		04:29	03:58
	15:56	9	09:11 (6)	17:08	08:56 (1)	18:12	30	07:02 (2)	20:20		21:24	22:04
21	08:24		09:00 (6)	07:17	08:43 (1)	06:01		06:31 (2)	05:36		04:27	03:58
	15:58	11	09:11 (6)	17:10	08:53 (1)	18:14	31	07:02 (2)	20:22		21:26	22:04
22	08:22		09:01 (6)	07:15		05:59		06:31 (2)	05:34		04:25	03:58
	16:00	9	09:10 (6)	17:13		18:16	31	07:02 (2)	20:24		21:28	22:04
23	08:21		09:03 (6)	07:12		05:56		06:30 (2)	05:31		04:23	03:58
	16:02	5	09:08 (6)	17:15		18:18	32	07:02 (2)	20:27		21:30	22:05
24	08:19			07:10		05:53		06:30 (2)	05:28		04:22	03:59
	16:05			17:17		18:21	31	07:01 (2)	20:29		21:32	22:05
25	08:17			07:07		05:50		06:30 (2)	05:26		04:20	03:59
	16:07			17:20		18:23	31	07:01 (2)	20:31		21:34	22:05
26	08:16		08:50 (1)	07:04		05:47		06:29 (2)	05:23		04:18	04:00
	16:09	2	08:52 (1)	17:22		18:25	31	07:00 (2)	20:33		21:36	22:05
27	08:14		08:48 (1)	07:02	07:29 (3)	05:45		06:30 (2)	05:21		04:17	04:00
	16:11	7	08:55 (1)	17:24	07:32 (3)	18:27	29	06:59 (2)	20:36		21:37	22:04
28	08:12		08:45 (1)	06:59	07:26 (3)	05:42		06:31 (2)	05:18		04:15	04:01
	16:14	12	08:57 (1)	17:27	07:33 (3)	18:29	27	06:58 (2)	20:38		21:39	22:04
29	08:10		08:43 (1)			06:39		07:31 (2)	05:16		04:14	04:01
	16:16	16	08:59 (1)			19:32	25	07:56 (2)	20:40		21:41	22:04
30	08:08		08:41 (1)			06:36		07:32 (2)	05:13		04:13	04:02
	16:18	19	09:00 (1)			19:34	22	07:54 (2)	20:42		21:42	22:03
31	08:06		08:39 (1)			06:33		07:33 (2)			04:11	
	16:21	23	09:02 (1)			19:36	19	07:52 (2)			21:44	
Potential sun hours	227			262		366		429			515	539
Total, worst case	362			752		581		18				
Sun reduction	0,19			0,16		0,22		0,42				
Oper. time red.	0,99			0,99		0,99		0,99				
Wind dir. red.	0,57			0,57		0,62		0,62				
Total reduction	0,10			0,09		0,13		0,26				
Total, real	38			68		78		5				

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: Grevekulla 1:11 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (802)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:11 16:15	07:52 (4) 08:36 (1)
2	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:34	07:13 16:13	07:53 (4) 08:36 (1)
3	04:05 22:02	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	07:53 (4) 08:36 (1)
4	04:06 22:01	04:58 21:12	06:04 19:52	07:08 18:28	07:17 16:08	07:54 (4) 08:36 (1)
5	04:07 22:00	05:00 21:09	06:06 19:49	07:10 18:25	07:20 16:06	07:55 (4) 08:36 (1)
6	04:08 22:00	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:03	07:57 (4) 08:35 (1)
7	04:09 21:59	05:05 21:05	06:11 19:44	07:14 18:20	07:24 16:01	08:00 (4) 08:35 (1)
8	04:10 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:02 (4) 08:34 (1)
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:05 (4) 08:34 (1)
10	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:11	07:31 15:55	08:07 (1) 08:33 (1)
11	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:34 15:53	08:10 (1) 08:33 (1)
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:13 (1) 08:32 (1)
13	04:17 21:52	05:17 20:50	06:23 19:27	07:28 18:03	07:38 15:49	08:15 (1) 08:30 (1)
14	04:19 21:51	05:20 20:48	06:25 19:24	07:30 18:01	07:40 15:47	08:18 (1) 08:29 (1)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:20 (1) 08:23 (1)
16	04:22 21:48	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	08:23 (1) 08:25 (1)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:25 (1) 15:12
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39	08:30 (1) 15:12
19	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:37	08:32 (6) 08:42 (6)
20	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:36 (6) 08:45 (6)
21	04:31 21:40	05:34 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:35 (6) 08:46 (6)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:32	08:38 (6) 08:47 (6)
23	04:35 21:36	05:39 20:25	06:44 18:59	07:50 17:37	08:00 15:31	08:40 (6) 08:47 (6)
24	04:36 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:29	08:43 (6) 09:11 (5)
25	04:38 21:32	05:43 20:19	06:49 18:53	07:54 16:32	08:04 15:28	08:43 (6) 09:13 (5)
26	04:40 21:30	05:45 20:17	06:51 18:50	07:57 16:30	08:06 15:26	08:47 (6) 09:14 (5)
27	04:42 21:29	05:47 20:14	06:53 18:47	07:59 16:27	08:08 15:25	09:02 (5) 09:16 (5)
28	04:44 21:27	05:49 20:11	06:55 18:45	08:01 16:25	08:10 15:24	09:02 (5) 09:17 (5)
29	04:46 21:24	05:52 20:08	06:57 18:42	08:04 16:22	08:12 15:23	09:01 (5) 09:17 (5)
30	04:48 21:22	05:54 20:06	06:59 18:39	08:06 16:20	08:14 15:21	09:01 (5) 09:18 (5)
31	04:50 21:20	05:56 20:03		08:08 16:17	08:16 15:21	09:04 (5) 09:32 (5)
Potential sun hours	538	474	386	321	241	207
Total, worst case			474	514	594	178
Sun reduction			0,31	0,26	0,17	0,13
Oper. time red.			0,99	0,99	0,99	0,99
Wind dir. red.			0,62	0,58	0,57	0,58
Total reduction			0,19	0,15	0,10	0,07
Total, real			91	75	57	13

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:10>2 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (873)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April		May		June	
1	08:43 15:23		08:04 16:23	16	15:34 (A0021) 17:29	6	16:58 (A0019) 19:38		05:11 20:44	11	19:44 (A0017) 21:45
2	08:43 15:24		08:02 16:26	17	15:35 (A0021) 17:31	10	16:59 (A0019) 19:40		05:08 20:46	9	19:45 (A0017) 21:47
3	08:42 15:26	3	14:26 (A0022) 16:28	18	15:36 (A0021) 17:34	12	16:48 (A0019) 19:42		05:06 20:49	6	19:54 (A0017) 21:48
4	08:42 15:27	6	14:29 (A0022) 16:30	18	15:36 (A0021) 17:36	13	16:47 (A0019) 19:45		05:04 20:51		21:50
5	08:41 15:28	8	14:24 (A0022) 16:33	18	15:36 (A0021) 17:38	14	16:46 (A0019) 19:47		05:01 20:53		21:51
6	08:41 15:30	10	14:25 (A0022) 16:35	17	15:36 (A0021) 17:40	14	16:47 (A0019) 19:49		05:01 20:55		21:52
7	08:40 15:31	12	14:24 (A0022) 16:37	15	15:35 (A0021) 17:43	13	16:47 (A0019) 19:51		04:59 20:57		21:53
8	08:39 15:33	13	14:36 (A0022) 16:40	14	15:20 (A0021) 17:45	10	16:48 (A0019) 19:53		04:54 20:59		21:55
9	08:38 15:35	14	14:24 (A0022) 16:42	11	15:22 (A0021) 17:47	6	16:50 (A0019) 19:56		04:52 21:02		21:56
10	08:38 15:37	14	14:37 (A0022) 16:45	7	15:24 (A0021) 17:49		06:06 19:58		04:50 21:04		21:57
11	08:37 15:38	15	14:38 (A0022) 16:47		06:29 17:52		06:03 20:00		04:48 21:06		21:58
12	08:36 15:40	16	14:24 (A0022) 16:49		06:26 17:54		06:00 20:02		04:45 21:08		21:59
13	08:34 15:42	16	14:24 (A0022) 16:52		06:24 17:56		05:58 20:04		04:43 21:10		22:00
14	08:33 15:44	16	14:25 (A0022) 16:54		06:21 17:58		05:55 20:07		04:41 21:12		22:00
15	08:32 15:46	16	14:25 (A0022) 16:56		06:18 18:01	4	17:25 (A0018) 20:09		04:39 21:14		22:01
16	08:31 15:48	16	14:25 (A0022) 16:59		06:15 18:03	9	17:23 (A0018) 20:11		04:37 21:16		22:02
17	08:30 15:50	16	14:41 (A0022) 17:01		06:13 18:05	12	17:32 (A0018) 20:13		04:35 21:18		22:03
18	08:28 15:52	16	14:26 (A0022) 17:03		06:10 18:07	13	17:20 (A0018) 20:15		04:33 21:20		22:04
19	08:27 15:54	16	14:26 (A0022) 17:06		06:07 18:09	13	17:20 (A0018) 20:18		04:31 21:22		22:05
20	08:25 15:56	15	14:27 (A0022) 17:08		06:04 18:12	13	17:19 (A0018) 20:20		04:29 21:24		22:06
21	08:24 15:58	14	14:28 (A0022) 17:10		06:01 18:14	11	17:32 (A0018) 20:22		04:27 21:26		22:07
22	08:22 16:01	12	14:30 (A0022) 17:13		05:59 18:16	8	17:22 (A0018) 20:24		04:26 21:28		22:08
23	08:20 16:03	10	14:31 (A0022) 17:15		05:56 18:18	1	17:25 (A0018) 20:26	19:47 (A0017) 19:54 (A0017)	04:24 21:30		22:09
24	08:19 16:05	7	14:41 (A0022) 17:17		05:53 18:20		05:28 20:29	7	19:45 (A0017) 21:32		22:10
25	08:17 16:07		07:07 17:20		05:50 18:23		05:26 20:31	10	19:44 (A0017) 21:34		22:11
26	08:15 16:09		07:04 17:22		05:47 18:25		05:23 20:33	13	19:43 (A0017) 21:35		22:12
27	08:13 16:12		07:02 17:24		05:45 18:27		05:21 20:35	15	19:42 (A0017) 21:37		22:13
28	08:12 16:14	8	15:21 (A0021) 17:27		05:42 18:29		05:18 20:38	14	19:43 (A0017) 21:39		22:14
29	08:10 16:16	11	15:20 (A0021) 17:31		06:39 19:31		05:16 20:40	14	19:42 (A0017) 21:40		22:15
30	08:08 16:19	14	15:31 (A0021) 17:34		06:36 19:34		05:13 20:42	13	19:56 (A0017) 21:42		22:16
31	08:06 16:21	15	15:18 (A0021) 17:36		06:33 19:36		05:12 20:44		04:12 21:44		22:17
Potential sun hours	228		262		366		429		515		539
Total, worst case		329		151		182		99		26	
Sun reduction		0,19		0,16		0,22		0,42		0,53	
Oper. time red.		0,99		0,99		0,99		0,99		0,99	
Wind dir. red.		0,69		0,68		0,66		0,60		0,60	
Total reduction		0,13		0,11		0,15		0,26		0,32	
Total, real		43		17		27		25		8	

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:10>2 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (873)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	14:53 (A0021) 15:01 (A0021)	08:16 15:21	14:06 (A0022) 14:21 (A0022)
2	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:34	07:13 16:13	14:51 (A0021) 15:03 (A0021)	08:17 15:20	14:07 (A0022) 14:21 (A0022)
3	04:05 22:01	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10	14:49 (A0021) 15:04 (A0021)	08:19 15:19	14:08 (A0022) 14:21 (A0022)
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	14:49 (A0021) 15:05 (A0021)	08:21 15:18	14:08 (A0022) 14:21 (A0022)
5	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	17:26 (A0019) 16:06	07:20 14:48 (A0021) 15:05 (A0021)	08:23 15:17	14:09 (A0022) 14:21 (A0022)
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:22	17:24 (A0019) 16:04	07:22 14:48 (A0021) 15:06 (A0021)	08:24 15:16	14:11 (A0022) 14:21 (A0022)
7	04:10 21:58	05:05 21:04	06:11 19:44	07:14 18:20	17:35 (A0019) 16:01	07:24 14:47 (A0021) 15:05 (A0021)	08:26 15:15	14:11 (A0022) 14:20 (A0022)
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	17:36 (A0019) 15:59	07:26 14:48 (A0021) 15:06 (A0021)	08:27 15:15	14:13 (A0022) 14:19 (A0022)
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	17:35 (A0019) 17:26 (A0019)	07:29 14:49 (A0021) 15:06 (A0021)	08:29 15:14	14:15 (A0022) 14:19 (A0022)
10	04:13 21:55	05:11 20:57	19:55 (A0017) 20:02 (A0017)	06:17 19:35	07:21 18:12	07:31 17:35 (A0019) 15:55	08:30 15:14	
11	04:15 21:54	05:13 20:55	19:53 (A0017) 20:03 (A0017)	06:19 19:32	07:23 18:09	07:33 17:34 (A0019) 15:53	08:31 15:13	
12	04:16 21:53	05:15 20:52	19:52 (A0017) 20:04 (A0017)	06:21 19:30	07:25 18:06	07:36 17:33 (A0019) 15:51	08:33 15:13	
13	04:18 21:52	05:18 20:50	19:51 (A0017) 20:05 (A0017)	06:23 19:27	07:27 18:03	07:38 17:29 (A0019) 15:49	08:34 15:13	
14	04:19 21:50	05:20 20:47	19:50 (A0017) 20:05 (A0017)	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:12	
15	04:21 21:49	05:22 20:45	19:50 (A0017) 20:05 (A0017)	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:12	
16	04:23 21:47	05:24 20:42	19:50 (A0017) 20:04 (A0017)	06:30 19:18	07:34 17:55	07:45 15:43	08:37 15:12	
17	04:24 21:46	05:26 20:40	19:50 (A0017) 20:04 (A0017)	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:12	
18	04:26 21:44	05:28 20:37	19:51 (A0017) 20:03 (A0017)	06:34 19:13	07:39 17:50	07:49 15:39	14:07 (A0022) 15:13	08:39 15:13
19	04:28 21:43	05:30 20:35	19:51 (A0017) 20:02 (A0017)	06:36 19:10	07:41 17:48	07:51 15:38	14:05 (A0022) 15:13	08:40 15:13
20	04:29 21:41	05:32 20:32	19:53 (A0017) 19:59 (A0017)	06:38 19:07	07:43 17:45	07:53 15:36	14:04 (A0022) 15:13	08:40 15:13
21	04:31 21:39	05:35 20:30	06:40 19:04	18:08 (A0018) 18:15 (A0018)	07:45 17:42	07:56 15:34	14:04 (A0022) 15:13	08:41 15:13
22	04:33 21:38	05:37 20:27	06:42 19:02	18:06 (A0018) 18:16 (A0018)	07:48 17:40	07:58 15:33	14:03 (A0022) 15:14	08:42 15:14
23	04:35 21:36	05:39 20:24	06:44 18:59	18:04 (A0018) 18:17 (A0018)	07:50 17:37	08:00 15:31	14:03 (A0022) 15:14	08:42 15:14
24	04:37 21:34	05:41 20:22	06:47 18:56	18:03 (A0018) 18:17 (A0018)	07:52 17:35	08:02 15:30	14:03 (A0022) 15:15	08:43 15:15
25	04:39 21:32	05:43 20:19	06:49 18:53	18:03 (A0018) 18:16 (A0018)	06:54 16:32	08:04 15:28	14:04 (A0022) 15:16	08:43 15:16
26	04:41 21:30	05:45 20:16	06:51 18:50	18:03 (A0018) 18:15 (A0018)	06:57 16:30	08:06 15:27	14:04 (A0022) 15:16	08:43 15:16
27	04:42 21:28	05:47 20:14	06:53 18:47	18:03 (A0018) 18:14 (A0018)	06:59 16:27	08:08 15:25	14:04 (A0022) 15:17	08:43 15:17
28	04:44 21:26	05:50 20:11	06:55 18:45	18:04 (A0018) 18:11 (A0018)	07:01 16:25	08:10 15:24	14:04 (A0022) 15:18	08:43 15:18
29	04:46 21:24	05:52 20:08	06:57 18:42	18:04 (A0018) 18:03 (A0018)	07:03 16:22	08:12 15:23	14:05 (A0022) 15:19	08:43 15:19
30	04:48 21:22	05:54 20:06	06:59 18:39	18:04 (A0018) 18:03 (A0018)	07:06 16:20	08:14 15:22	14:06 (A0022) 15:20	08:43 15:20
31	04:50 21:20	05:56 20:03		07:08 16:17			14:21 (A0022) 15:21	08:43 15:21
Potential sun hours	538	474	386	321	241		207	
Total, worst case		130	87	98	387		96	
Sun reduction		0,35	0,31	0,26	0,17		0,13	
Oper. time red.		0,99	0,99	0,99	0,99		0,99	
Wind dir. red.		0,60	0,66	0,67	0,69		0,70	
Total reduction		0,21	0,21	0,18	0,12		0,09	
Total, real		28	18	17	46		9	

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:13>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (860) Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:16 15:20
2	08:43 15:24	08:02 16:25	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	07:13 16:13	08:17 15:19
3	08:42 15:25	08:00 16:28	06:51 17:33	06:25 19:42	05:06 20:49	04:08 21:48	04:05 22:01	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:03 20:51	04:07 21:50	04:06 22:01	04:58 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:17
5	08:41 15:28	07:55 16:37	06:45 17:38	06:19 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:49	04:59 20:55	04:05 21:52	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:03	08:24 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:04 21:53	04:09 21:58	05:05 21:04	06:11 19:43	07:14 18:20	07:24 16:01	08:26 15:15
8	08:39 15:33	07:49 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:16 18:17	07:26 15:59	08:27 15:15
9	08:38 15:35	07:46 16:42	06:35 17:47	06:08 19:56	04:52 21:02	04:02 21:56	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:11	07:31 15:55	08:30 15:13
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:31 15:13
12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:52	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 22:00	04:18 21:52	05:17 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:12
14	08:33 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:00	04:19 21:50	05:20 20:47	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:27 19:21	07:32 17:58	07:42 15:45	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:49 20:11	04:37 21:16	03:58 22:02	04:22 21:47	05:24 20:42	06:30 19:18	07:34 17:55	07:45 15:43	08:37 15:12
17	08:30 15:50	07:27 17:01	06:12 18:05	05:47 20:13	04:35 21:18	03:58 22:02	04:24 21:46	05:26 20:40	06:32 19:15	07:36 17:53	07:47 15:41	08:38 15:12
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:15	04:33 21:20	03:58 22:03	04:26 21:44	05:28 20:37	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:22 17:06	06:07 18:09	05:41 20:18	04:31 21:22	03:58 22:03	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:38	08:40 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:39	05:34 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:24	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:42 19:01	07:47 17:40	07:58 15:33	08:42 15:14
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	08:19 16:05	07:09 17:17	05:53 18:20	05:28 20:29	04:22 21:32	03:59 22:04	04:37 21:34	05:41 20:22	06:46 18:56	07:52 17:35	08:02 15:29	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:04	04:38 21:32	05:43 20:19	06:49 18:53	06:54 16:32	08:04 15:28	08:43 15:15
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:00 22:04	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:43 15:17
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:26	05:49 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:43 15:18
29	08:10 16:16	06:59 19:31	05:42 19:31	05:16 20:40	04:14 21:40	04:02 22:03	04:46 21:24	05:52 20:08	06:57 18:42	07:03 16:22	08:12 15:23	08:43 15:19
30	08:08 16:18	06:56 19:34	05:40 19:34	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21	06:53 19:36	05:38 19:36	05:11 20:44	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	07:08 16:17	07:08 16:17	08:16 15:21	08:43 15:21
Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:15>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (891)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April		May		June	
1	08:43	14:14 (A0022)	08:04	15:10 (A0021)	06:56	16:49 (A0019)	06:31	05:11	19:46 (A0017)	04:10	
	15:23	10	14:24 (A0022)	16:23	18	15:28 (A0021)	17:29	7	16:56 (A0019)	19:38	
2	08:43	14:14 (A0022)	08:02	15:10 (A0021)	06:54	16:47 (A0019)	06:28	05:08	19:46 (A0017)	04:09	
	15:24	11	14:25 (A0022)	16:26	19	15:29 (A0021)	17:31	11	16:58 (A0019)	19:40	
3	08:42	14:13 (A0022)	08:00	15:10 (A0021)	06:51	16:46 (A0019)	06:25	05:06	19:46 (A0017)	04:08	
	15:26	12	14:25 (A0022)	16:28	18	15:28 (A0021)	17:34	13	16:59 (A0019)	19:42	
4	08:42	14:14 (A0022)	07:57	15:11 (A0021)	06:48	16:45 (A0019)	06:22	05:04	19:47 (A0017)	04:07	
	15:27	13	14:27 (A0022)	16:30	18	15:29 (A0021)	17:36	14	16:59 (A0019)	19:45	
5	08:41	14:14 (A0022)	07:55	15:12 (A0021)	06:46	16:44 (A0019)	06:20	05:01	19:48 (A0017)	04:06	
	15:28	14	14:28 (A0022)	16:33	17	15:29 (A0021)	17:38	15	16:59 (A0019)	19:47	
6	08:41	14:14 (A0022)	07:53	15:12 (A0021)	06:43	16:45 (A0019)	06:17	04:59	19:50 (A0017)	04:05	
	15:30	14	14:28 (A0022)	16:35	16	15:28 (A0021)	17:40	14	16:59 (A0019)	19:49	
7	08:40	14:14 (A0022)	07:51	15:13 (A0021)	06:40	16:45 (A0019)	06:14	04:57	19:57 (A0017)	04:04	
	15:31	15	14:29 (A0022)	16:37	15	15:28 (A0021)	17:43	13	16:58 (A0019)	19:51	
8	08:39	14:14 (A0022)	07:49	15:14 (A0021)	06:37	16:46 (A0019)	06:11	04:54		04:03	
	15:33	16	14:30 (A0022)	16:40	12	15:26 (A0021)	17:45	11	16:57 (A0019)	19:53	
9	08:38	14:14 (A0022)	07:46	15:17 (A0021)	06:35	16:47 (A0019)	06:09	04:52		04:02	
	15:35	16	14:30 (A0022)	16:42	7	15:24 (A0021)	17:47	8	16:55 (A0019)	19:56	
10	08:38	14:14 (A0022)	07:44		06:32		06:06	04:50		04:01	
	15:37	17	14:31 (A0022)	16:45		17:49	19:58	21:04		21:57	
11	08:37	14:14 (A0022)	07:42		06:29		06:03	04:48		04:01	
	15:38	17	14:31 (A0022)	16:47		17:52	20:00	21:06		21:58	
12	08:36	14:15 (A0022)	07:39		06:26		06:00	04:45		04:00	
	15:40	17	14:32 (A0022)	16:49		17:54	20:02	21:08		21:59	
13	08:35	14:15 (A0022)	07:37		06:24		05:58	04:43		04:00	
	15:42	17	14:32 (A0022)	16:52		17:56	20:04	21:10		22:00	
14	08:33	14:16 (A0022)	07:35		06:21		05:55	04:41		03:59	
	15:44	17	14:33 (A0022)	16:54		17:58	20:07	21:12		22:00	
15	08:32	14:16 (A0022)	07:32		06:18		05:52	04:39		03:59	
	15:46	17	14:33 (A0022)	16:56		18:01	20:09	21:14		22:01	
16	08:31	14:16 (A0022)	07:30		06:15	17:23 (A0018)	05:50	04:37		03:59	
	15:48	17	14:33 (A0022)	16:59		18:03	8	17:31 (A0018)	20:11	21:16	22:02
17	08:30	14:17 (A0022)	07:27		06:13	17:21 (A0018)	05:47	04:35		03:59	
	15:50	17	14:34 (A0022)	17:01		18:05	12	17:33 (A0018)	20:13	21:18	22:02
18	08:28	14:18 (A0022)	07:25		06:10	17:20 (A0018)	05:44	04:33		03:58	
	15:52	15	14:33 (A0022)	17:03		18:07	13	17:33 (A0018)	20:15	21:20	22:03
19	08:27	14:18 (A0022)	07:22		06:07	17:19 (A0018)	05:42	04:31		03:58	
	15:54	15	14:33 (A0022)	17:06		18:09	14	17:33 (A0018)	20:18	21:22	22:03
20	08:25	14:19 (A0022)	07:20		06:04	17:19 (A0018)	05:39	04:29		03:58	
	15:56	13	14:32 (A0022)	17:08		18:12	14	17:33 (A0018)	20:20	21:24	22:04
21	08:24	14:20 (A0022)	07:17		06:01	17:19 (A0018)	05:36	04:27		03:58	
	15:58	12	14:32 (A0022)	17:10		18:14	13	17:32 (A0018)	20:22	21:26	22:04
22	08:22	14:23 (A0022)	07:15		05:59	17:20 (A0018)	05:34	04:26		03:59	
	16:01	9	14:32 (A0022)	17:13		18:16	11	17:31 (A0018)	20:24	21:28	22:04
23	08:20	14:27 (A0022)	07:12		05:56	17:21 (A0018)	05:31	04:24		03:59	
	16:03	2	14:29 (A0022)	17:15		18:18	8	17:29 (A0018)	20:27	21:30	22:04
24	08:19		07:09		05:53		05:28	04:22		03:59	
	16:05		17:17		18:20		20:29	21:32		22:04	
25	08:17		07:07		05:50		05:26	19:52 (A0017)	04:20	04:00	
	16:07		17:20		18:23		20:31	5	19:57 (A0017)	21:34	22:04
26	08:15	15:14 (A0021)	07:04		05:47		05:23	19:50 (A0017)	04:19	04:00	
	16:09	7	15:21 (A0021)	17:22		18:25	20:33	9	19:59 (A0017)	21:35	22:04
27	08:13	15:12 (A0021)	07:02		05:45		05:21	19:48 (A0017)	04:17	04:01	
	16:12	11	15:23 (A0021)	17:24		18:27	20:35	12	20:00 (A0017)	21:37	22:04
28	08:12	15:11 (A0021)	06:59		05:42		05:18	19:47 (A0017)	04:16	04:01	
	16:14	14	15:25 (A0021)	17:27		18:29	20:38	14	20:01 (A0017)	21:39	22:04
29	08:10	15:11 (A0021)			06:39		05:16	19:46 (A0017)	04:14	04:02	
	16:16	15	15:26 (A0021)		19:31		20:40	15	20:01 (A0017)	21:40	22:03
30	08:08	15:11 (A0021)			06:36		05:13	19:46 (A0017)	04:13	04:03	
	16:19	17	15:28 (A0021)		19:34		20:42	15	20:01 (A0017)	21:42	22:03
31	08:06	15:10 (A0021)			06:33				04:12		
	16:21	17	15:27 (A0021)		19:36				21:44		
Potential sun hours	228		262		366		429		515		539
Total, worst case		404		140		199		70		73	
Sun reduction		0,19		0,16		0,22		0,42		0,53	
Oper. time red.		0,99		0,99		0,99		0,99		0,99	
Wind dir. red.		0,69		0,68		0,67		0,60		0,60	
Total reduction		0,13		0,11		0,15		0,26		0,32	
Total, real		52		16		30		18		23	

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)



## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:15>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (891)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December	
1	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:16 15:21	13:57 (A0022) 14:14 (A0022)
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	08:17 15:20	13:57 (A0022) 14:14 (A0022)
3	04:05 22:01	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:19	13:58 (A0022) 14:14 (A0022)
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:18	13:58 (A0022) 14:14 (A0022)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17	13:59 (A0022) 14:14 (A0022)
6	04:08 21:59	05:03 21:07	06:09 19:55 (A0017)	07:12 18:22	07:22 16:04	08:24 15:16	14:00 (A0022) 14:14 (A0022)
7	04:10 21:58	05:05 21:04	06:11 19:59 (A0017)	07:14 18:20	07:24 16:01	08:26 15:15	14:00 (A0022) 14:14 (A0022)
8	04:11 21:57	05:07 21:02	06:13 19:57 (A0017)	07:17 18:17	07:26 15:59	08:27 15:15	14:01 (A0022) 14:14 (A0022)
9	04:12 21:56	05:09 21:00	06:15 19:56 (A0017)	07:19 18:14	07:29 15:57	08:29 15:14	14:02 (A0022) 14:14 (A0022)
10	04:13 21:55	05:11 20:57	06:17 19:55 (A0017)	07:21 18:12	07:31 15:55	08:30 15:14	14:03 (A0022) 14:14 (A0022)
11	04:15 21:54	05:13 20:55	06:19 19:55 (A0017)	07:23 18:09	07:33 15:53	08:31 15:13	14:04 (A0022) 14:14 (A0022)
12	04:16 21:53	05:15 20:52	06:21 19:54 (A0017)	07:25 18:06	07:36 15:51	08:33 15:13	14:05 (A0022) 14:14 (A0022)
13	04:18 21:52	05:18 20:50	06:23 19:54 (A0017)	07:27 18:03	07:38 15:49	08:34 15:13	14:05 (A0022) 14:13 (A0022)
14	04:19 21:50	05:20 20:48	06:25 19:55 (A0017)	07:30 18:01	07:40 15:47	08:35 15:12	14:07 (A0022) 14:14 (A0022)
15	04:21 21:49	05:22 20:45	06:28 19:55 (A0017)	07:32 17:58	07:42 15:45	08:36 15:12	14:08 (A0022) 14:13 (A0022)
16	04:23 21:47	05:24 20:42	06:30 19:56 (A0017)	07:34 17:55	07:45 15:43	08:37 15:12	14:09 (A0022) 14:13 (A0022)
17	04:24 21:46	05:26 20:40	06:32 19:57 (A0017)	07:36 17:53	07:47 15:41	08:38 15:12	14:11 (A0022) 14:12 (A0022)
18	04:26 21:44	05:28 20:37	06:34 20:00 (A0017)	07:39 17:50	07:49 15:39	08:39 15:13	
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13	
20	04:29 21:41	05:32 20:32	06:38 19:07	07:43 18:08 (A0018)	07:53 15:36	08:40 15:13	
21	04:31 21:39	05:35 20:30	06:40 19:04	07:45 18:17 (A0018)	07:56 15:34	08:41 15:13	
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 18:05 (A0018)	07:58 15:33	08:42 15:14	
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 18:04 (A0018)	08:00 15:31	08:42 15:14	
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 18:17 (A0018)	08:02 15:30	08:43 15:15	
25	04:39 21:32	05:43 20:19	06:49 18:53	07:54 18:03 (A0018)	08:04 15:28	08:43 15:16	
26	04:41 21:30	05:45 20:16	06:51 18:50	07:56 18:03 (A0018)	08:06 15:27	08:43 15:16	
27	04:42 21:28	05:47 20:14	06:53 18:47	07:59 18:13 (A0018)	08:08 15:25	08:43 15:17	14:14 (A0022) 14:17 (A0022)
28	04:44 21:26	05:50 20:11	06:55 18:45	08:01 18:06 (A0018)	08:10 15:24	08:43 15:18	14:14 (A0022) 14:19 (A0022)
29	04:46 21:24	05:52 20:08	06:57 18:42	08:03 16:22	08:12 15:23	08:43 15:19	14:14 (A0022) 14:20 (A0022)
30	04:48 21:22	05:54 20:06	06:59 18:39	08:06 16:20	08:14 15:22	08:43 15:20	14:14 (A0022) 14:22 (A0022)
31	04:50 21:20	05:56 20:03		08:08 16:17		08:43 15:21	14:13 (A0022) 14:22 (A0022)
Potential sun hours	538	474	386	321	241	207	
Total, worst case		145	94	107	392	220	
Sun reduction		0,35	0,31	0,26	0,17	0,13	
Oper. time red.		0,99	0,99	0,99	0,99	0,99	
Wind dir. red.		0,60	0,66	0,67	0,69	0,70	
Total reduction		0,21	0,21	0,18	0,12	0,09	
Total, real		31	19	19	47	20	

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:16>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (858)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:16 15:20
2	08:43 15:24	08:02 16:25	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	07:13 16:13	08:17 15:19
3	08:42 15:25	08:00 16:28	06:51 17:33	06:25 19:42	05:06 20:49	04:08 21:48	04:05 22:01	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:03 20:51	04:07 21:50	04:06 22:01	04:58 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:17
5	08:41 15:28	07:55 16:37	06:46 17:38	06:20 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:49	04:59 20:55	04:05 21:52	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:04	08:24 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:04 21:53	04:09 21:58	05:05 21:04	06:11 19:44	07:14 18:20	07:24 16:01	08:26 15:15
8	08:39 15:33	07:49 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:16 18:17	07:26 15:59	08:27 15:15
9	08:38 15:35	07:46 16:42	06:35 17:47	06:08 19:56	04:52 21:02	04:02 21:56	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:11	07:31 15:55	08:30 15:13
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:31 15:13
12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:52	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 22:00	04:18 21:52	05:17 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:12
14	08:33 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:00	04:19 21:50	05:20 20:47	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:27 19:21	07:32 17:58	07:42 15:45	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:49 20:11	04:37 21:16	03:59 22:02	04:22 21:47	05:24 20:42	06:30 19:18	07:34 17:55	07:45 15:43	08:37 15:12
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:58 22:02	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:12
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:15	04:33 21:20	03:58 22:03	04:26 21:44	05:28 20:37	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:22 17:06	06:07 18:09	05:41 20:18	04:31 21:22	03:58 22:03	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:38	08:40 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:24	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:42 19:01	07:48 17:40	07:58 15:33	08:42 15:14
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	08:19 16:05	07:09 17:17	05:53 18:20	05:28 20:29	04:22 21:32	03:59 22:04	04:37 21:34	05:41 20:22	06:46 18:56	07:52 17:35	08:02 15:29	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:04	04:38 21:32	05:43 20:19	06:49 18:53	07:54 16:32	08:04 15:28	08:43 15:15
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:00 22:04	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:43 15:17
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:26	05:49 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:43 15:18
29	08:10 16:16	06:59 17:31	05:42 18:31	05:16 20:40	04:14 21:41	04:02 22:03	04:46 21:24	05:52 20:08	06:57 18:42	07:03 16:22	08:12 15:23	08:43 15:19
30	08:08 16:18	06:56 17:34	05:40 18:34	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21	06:53 17:36	05:38 18:36	05:11 20:44	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	07:08 16:17	07:08 15:21	08:43 15:21	08:43 15:21
Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:17>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (847)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

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

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:17>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (924)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:16 15:20
2	08:43 15:24	08:02 16:25	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	07:13 16:13	08:17 15:19
3	08:42 15:25	08:00 16:28	06:51 17:33	06:25 19:42	05:06 20:49	04:08 21:48	04:05 22:01	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:03 20:51	04:07 21:50	04:06 22:01	04:58 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:17
5	08:41 15:28	07:55 16:37	06:45 17:38	06:19 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:49	04:59 20:55	04:05 21:52	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:03	08:24 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:04 21:53	04:09 21:58	05:05 21:04	06:11 19:43	07:14 18:20	07:24 16:01	08:26 15:15
8	08:39 15:33	07:49 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:16 18:17	07:26 15:59	08:27 15:15
9	08:38 15:35	07:46 16:42	06:35 17:47	06:08 19:56	04:52 21:02	04:02 21:56	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:11	07:31 15:55	08:30 15:13
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:31 15:13
12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:52	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 22:00	04:18 21:52	05:17 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:12
14	08:33 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:00	04:19 21:50	05:20 20:47	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:27 19:21	07:32 17:58	07:42 15:45	08:36 15:12
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19	08:27 15:54	07:22 17:06	06:07 18:09	05:41 20:18	04:31 21:22	03:58 22:03	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:38	08:40 15:13
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27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:00 22:04	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:43 15:17
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Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 1:6>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (836)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:16 15:20
2	08:43 15:24	08:02 16:25	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	07:13 16:13	08:17 15:19
3	08:42 15:25	08:00 16:28	06:51 17:33	06:25 19:42	05:06 20:49	04:08 21:48	04:05 22:01	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
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5	08:41 15:28	07:55 16:37	06:45 17:38	06:19 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	07:20 16:06	08:23 15:17
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12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:52	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 22:00	04:18 21:52	05:17 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:12
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16	08:31 15:48	07:30 16:59	06:15 18:03	05:49 20:11	04:37 21:16	03:58 22:02	04:22 21:47	05:24 20:42	06:30 19:18	07:34 17:55	07:45 15:43	08:37 15:12
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19	08:27 15:54	07:22 17:06	06:07 18:09	05:41 20:18	04:31 21:22	03:58 22:03	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:38	08:40 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
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22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:24	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:42 19:01	07:47 17:40	07:58 15:33	08:42 15:14
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Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 3:1>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (846)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:16 15:20
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20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:24	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:42 19:01	07:47 17:40	07:58 15:33	08:42 15:14
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	08:19 16:05	07:09 17:17	05:53 18:20	05:28 20:29	04:22 21:32	03:59 22:04	04:37 21:34	05:41 20:22	06:46 18:56	07:52 17:35	08:02 15:29	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:04	04:38 21:32	05:43 20:19	06:49 18:53	07:54 16:32	08:04 15:28	08:43 15:16
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:00 22:04	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:43 15:17
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:37	04:16 21:39	04:01 22:04	04:44 21:26	05:49 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:43 15:18
29	08:10 16:16	06:59 17:31	05:42 18:31	05:16 20:40	04:14 21:40	04:02 22:03	04:46 21:24	05:52 20:08	06:57 18:42	07:03 16:22	08:12 15:23	08:43 15:19
30	08:08 16:18	06:56 17:34	05:40 18:34	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21	06:53 17:36	05:38 18:36	05:11 20:44	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	07:08 16:17	07:08 15:21	08:43 15:21	08:43 15:21
Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HUSTOMTA 3:1>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (895)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:43	08:04	06:56	16:46 (A0021)	06:31	05:11	04:10	04:03	04:52	05:58	07:01	07:10	08:15		
	15:23	16:23	17:29	11	16:57 (A0021)	19:38	20:44	21:45	22:02	21:18	20:00	18:36	16:15	15:21	
2	08:43	08:02	06:54	16:45 (A0021)	06:28	05:08	04:09	04:04	04:54	06:00	07:04	07:13	08:17		
	15:24	16:26	17:31	13	16:58 (A0021)	19:40	20:46	21:47	22:02	21:16	19:57	18:33	16:13	15:20	
3	08:42	07:59	06:51	16:44 (A0021)	06:25	05:06	04:08	04:05	04:57	06:02	07:06	07:15	08:19		
	15:25	16:28	17:34	13	16:57 (A0021)	19:42	20:48	21:48	22:01	21:13	19:55	18:31	16:10	15:19	
4	08:42	07:57	06:48	16:44 (A0021)	06:22	05:04	04:07	04:06	04:59	06:04	07:08	07:17	08:21		
	15:27	16:30	17:36	13	16:57 (A0021)	19:45	20:51	21:49	22:01	21:11	19:52	18:28	16:08	15:18	
5	08:41	07:55	06:45	16:44 (A0021)	06:20	05:01	04:06	04:07	05:01	06:06	07:10	07:20	08:22		
	15:28	16:33	17:38	12	16:56 (A0021)	19:47	20:53	21:51	22:00	21:09	19:49	18:25	16:06	15:17	
6	08:41	07:53	06:43	16:46 (A0021)	06:17	04:59	04:05	04:08	05:03	06:09	07:12	07:22	08:24		
	15:30	16:35	17:40	9	16:55 (A0021)	19:49	20:55	21:52	21:59	21:07	19:46	18:22	16:04	15:16	
7	08:40	07:51	06:40	16:49 (A0021)	06:14	04:57	04:04	04:10	05:05	06:11	07:14	7	17:23 (A0021)	07:24	08:26
	15:31	16:37	17:43	3	16:52 (A0021)	19:51	20:57	21:53	21:58	21:04	19:43	18:20	17:30 (A0021)	16:01	15:15
8	08:39	07:49	06:37		06:11	04:54	04:03	04:11	05:07	06:13	07:16	17:20 (A0021)	07:26	08:27	
	15:33	16:40	17:45		19:53	20:59	21:55	21:57	21:02	19:41	18:17	11	17:31 (A0021)	15:59	15:15
9	08:38	07:46	06:35		06:09	04:52	04:02	04:12	05:09	06:15	07:19	17:20 (A0021)	07:29	08:29	
	15:35	16:42	17:47		19:56	21:01	21:56	21:56	21:00	19:38	18:14	12	17:32 (A0021)	15:57	15:14
10	08:37	07:44	06:32		06:06	04:50	04:01	04:13	05:11	06:17	07:21	17:19 (A0021)	07:31	08:30	
	15:37	16:44	17:49		19:58	21:04	21:57	21:55	20:57	19:35	18:11	13	17:32 (A0021)	15:55	15:14
11	08:37	07:42	06:29		06:03	04:47	04:01	04:15	05:13	06:19	07:23	17:18 (A0021)	07:33	08:31	
	15:38	16:47	17:52		20:00	21:06	21:58	21:54	20:55	19:32	18:09	13	17:31 (A0021)	15:53	15:13
12	08:35	07:39	06:26		06:00	04:45	04:00	04:16	05:15	06:21	07:25	17:18 (A0021)	07:36	08:33	
	15:40	16:49	17:54		20:02	21:08	21:59	21:53	20:52	19:30	18:06	12	17:30 (A0021)	15:51	15:13
13	08:34	07:37	06:24	16:10 (A0022)	05:58	04:43	04:00	04:18	05:18	06:23	07:27	17:19 (A0021)	07:38	08:34	
	15:42	16:52	5	16:15 (A0022)	20:04	21:10	21:59	21:51	20:50	19:27	18:03	11	17:30 (A0021)	15:49	15:13
14	08:33	07:34	06:21	16:08 (A0022)	05:55	04:41	03:59	04:19	05:20	06:25	07:30	17:20 (A0021)	07:40	08:35	
	15:44	16:54	10	16:18 (A0022)	20:07	21:12	22:00	21:50	20:47	19:24	18:01	8	17:28 (A0021)	15:47	15:12
15	08:32	07:32	06:18	16:07 (A0022)	05:52	04:39	03:59	04:21	05:22	06:27	07:32	17:19 (A0021)	07:42	08:36	
	15:46	16:56	12	16:19 (A0022)	20:09	21:14	22:01	21:49	20:45	19:21	17:58	17:20 (A0021)	07:45	15:12	
16	08:31	07:30	06:15	16:07 (A0022)	05:50	04:37	03:59	04:22	05:24	06:30	07:34	17:20 (A0021)	07:45	08:37	
	15:48	16:59	13	16:20 (A0022)	20:11	21:16	22:02	21:47	20:42	19:18	17:55	17:21 (A0021)	07:45	15:12	
17	08:29	07:27	06:13	16:06 (A0022)	05:47	04:35	03:58	04:24	05:26	06:32	07:36	17:22 (A0021)	07:47	08:38	
	15:50	17:01	14	16:20 (A0022)	20:13	21:18	22:02	21:46	20:40	19:16	17:53	17:23 (A0021)	07:47	15:12	
18	08:28	07:25	06:10	16:06 (A0022)	05:44	04:33	03:58	04:26	05:28	06:34	07:38	17:24 (A0021)	07:49	08:39	
	15:52	17:03	13	16:19 (A0022)	20:15	21:20	22:03	21:44	20:37	19:13	17:50	17:25 (A0021)	07:51	15:12	
19	08:27	07:22	06:07	16:07 (A0022)	05:41	04:31	03:58	04:28	05:30	06:36	07:41	17:26 (A0021)	07:51	08:40	
	15:54	17:06	13	16:20 (A0022)	20:18	21:22	22:03	21:43	20:35	19:10	17:47	17:27 (A0021)	07:51	15:13	
20	08:25	07:20	06:04	16:08 (A0022)	05:39	04:29	03:58	04:29	05:32	06:38	07:43	17:28 (A0021)	07:53	08:40	
	15:56	17:08	10	16:18 (A0022)	20:20	21:24	22:03	21:41	20:32	19:07	17:45	3	16:45 (A0022)	15:36	15:13
21	08:24	07:17	06:01	16:09 (A0022)	05:36	04:27	03:58	04:31	05:35	06:40	07:45	17:29 (A0021)	07:55	08:41	
	15:58	17:10	8	16:17 (A0022)	20:22	21:26	22:04	21:39	20:30	19:04	17:42	9	16:48 (A0022)	15:34	15:13
22	08:22	07:15	05:59		05:34	04:26	03:59	04:33	05:37	06:42	07:47	17:30 (A0021)	07:58	08:42	
	16:00	17:13			20:24	21:28	22:04	21:38	20:27	19:01	17:40	12	16:49 (A0022)	15:33	15:14
23	08:20	07:12	05:56		05:31	04:24	03:59	04:35	05:39	06:44	07:50	17:31 (A0021)	08:00	08:42	
	16:03	17:15			20:26	21:30	22:04	21:36	20:24	18:59	17:37	13	16:50 (A0022)	15:31	15:14
24	08:19	07:09	05:53		05:28	04:22	03:59	04:37	05:41	06:46	07:52	17:32 (A0021)	08:02	08:42	
	16:05	17:17			20:29	21:32	22:04	21:34	20:22	18:56	17:35	14	16:50 (A0022)	15:30	15:15
25	08:17	07:07	05:50		05:26	04:20	04:00	04:39	05:43	06:49	06:54	17:33 (A0022)	08:04	08:43	
	16:07	17:20			20:31	21:33	22:04	21:32	20:19	18:53	16:32	13	15:50 (A0022)	15:28	15:16
26	08:15	07:04	05:47		05:23	04:19	04:00	04:40	05:45	06:51	06:57	17:34 (A0022)	08:06	08:43	
	16:09	17:22			20:33	21:35	22:04	21:30	20:16	18:50	16:30	13	15:49 (A0022)	15:27	15:16
27	08:13	07:02	05:45	16:49 (A0021)	05:21	04:17	04:01	04:42	05:47	06:53	06:59	17:35 (A0022)	08:08	08:43	
	16:12	17:24	5	16:54 (A0021)	20:35	21:37	22:04	21:28	20:14	18:47	16:27	12	15:48 (A0022)	15:25	15:17
28	08:11	06:59	05:42	16:46 (A0021)	05:18	04:16	04:01	04:44	05:49	06:55	07:01	17:36 (A0022)	08:10	08:43	
	16:14	17:27	10	16:56 (A0021)	20:37	21:39	22:04	21:26	20:11	18:45	16:25	9	15:47 (A0022)	15:24	15:18
29	08:10		06:39		05:16	04:14	04:02	04:46	05:52	06:57	07:03	17:37 (A0022)	08:12	08:43	
	16:16		19:31		20:40	21:40	22:03	21:24	20:08	18:42	16:22	4	15:44 (A0022)	15:23	15:19
30	08:08		06:36		05:13	04:13	04:03	04:48	05:54	06:59	07:06		08:14	08:43	
	16:19		19:34		20:42	21:42	22:03	21:22	20:06	18:39	16:20		15:22	15:20	
31	08:06		06:33			04:11		04:50	05:56		07:08			08:43	
	16:21		19:36			21:44		21:20	20:03		16:17			15:21	
Potential sun hours	228	263	366	429	515	539	538	474	386	321	189	241	207		
Total, worst case		113	74								189				
Sun reduction		0,16	0,22								0,26				
Oper. time red.		0,99	0,99								0,99				
Wind dir. red.		0,69	0,67								0,68				
Total reduction		0,11	0,15								0,18				
Total, real		13	11								33				

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m Shadow receptor: Hyltestugan - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (804)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:22	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:46	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:11 16:15	08:16 15:20
2	08:43 15:24	08:02 16:25	06:54 17:31	06:28 19:40	05:08 20:47	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	07:13 16:13	08:18 15:19
3	08:43 15:25	08:00 16:28	06:51 17:33	06:25 19:42	05:06 20:49	04:07 21:49	04:05 22:02	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	08:42 15:26	07:58 16:30	06:48 17:36	06:22 19:45	05:03 20:51	04:06 21:50	04:06 22:01	04:58 21:12	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:17
5	08:42 15:28	07:55 16:37	06:46 17:38	06:19 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:00 21:09	06:06 19:49	07:10 18:25	07:20 16:06	08:23 15:16
6	08:41 15:29	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:04 21:53	04:08 22:00	05:02 21:07	06:08 19:46	07:12 18:22	07:22 16:03	08:25 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:03 21:54	04:09 21:59	05:05 21:05	06:11 19:44	07:14 18:20	07:24 16:01	08:26 15:15
8	08:40 15:33	07:49 16:40	06:37 17:45	06:11 19:54	04:54 21:00	04:02 21:55	04:10 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:14
9	08:39 15:34	07:47 16:42	06:35 17:47	06:08 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:49 21:04	04:01 21:57	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:11	07:31 15:55	08:30 15:13
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:00 21:58	04:14 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:34 15:53	08:32 15:13
12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:12
13	08:35 15:42	07:37 16:51	06:24 17:56	05:57 20:05	04:43 21:10	03:59 22:00	04:17 21:52	05:17 20:50	06:23 19:27	07:28 18:03	07:38 15:49	08:34 15:12
14	08:34 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:01	04:19 21:51	05:19 20:48	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:58 22:01	04:20 21:49	05:22 20:45	06:27 19:21	07:32 17:58	07:43 15:45	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:49 20:11	04:37 21:17	03:58 22:02	04:22 21:48	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	08:37 15:12
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:19	03:58 22:03	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:12
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:16	04:33 21:21	03:58 22:03	04:25 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:22 17:06	06:07 18:09	05:41 20:18	04:31 21:23	03:58 22:04	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:37	08:40 15:12
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:40	05:34 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:33 20:24	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:42 19:01	07:48 17:40	07:58 15:32	08:42 15:13
23	08:21 16:02	07:12 17:15	05:56 18:18	05:31 20:27	04:23 21:30	03:58 22:05	04:34 21:36	05:39 20:25	06:44 18:59	07:50 17:37	08:00 15:31	08:43 15:14
24	08:19 16:05	07:10 17:17	05:53 18:20	05:28 20:29	04:22 21:32	03:59 22:05	04:36 21:34	05:41 20:22	06:46 18:56	07:52 17:34	08:02 15:29	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:05	04:38 21:32	05:43 20:19	06:49 18:53	07:54 16:32	08:04 15:28	08:43 15:15
26	08:16 16:09	07:04 17:22	05:47 18:25	05:23 20:33	04:18 21:36	03:59 22:05	04:40 21:31	05:45 20:17	06:51 18:50	06:57 16:29	08:06 15:26	08:44 15:16
27	08:14 16:11	07:02 17:24	05:45 18:27	05:21 20:36	04:17 21:37	04:00 22:04	04:42 21:29	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:44 15:17
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:15 21:39	04:01 22:04	04:44 21:27	05:49 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:44 15:18
29	08:10 16:16	06:59 17:31	05:42 18:31	05:16 20:40	04:14 21:41	04:01 22:04	04:46 21:25	05:51 20:08	06:57 18:42	07:04 16:22	08:12 15:22	08:44 15:19
30	08:08 16:18	06:56 17:34	05:40 18:34	05:13 20:42	04:12 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:21	08:44 15:20
31	08:06 16:21	06:53 17:36	05:38 18:36	05:11 20:44	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	07:08 16:17	07:08 15:21	08:16 15:21	08:44 15:21
Potential sun hours	227	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HÅRSTORP 1:13>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (837)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

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

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HÄSLEÅS 1:11>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (888)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONÖBERG]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

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

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HÄSLEÅS 1:12>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (850) Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:24	06:57 17:29	06:31 19:38	05:11 20:44	04:11 21:45
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:09 21:47
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48
4	08:42 15:27	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:02 20:53	04:06 21:51
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	04:59 20:55	04:05 21:52
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:52	04:57 20:57	04:04 21:54
8	08:39 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:03 21:55
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 19:56	04:52 21:02	04:03 21:56
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57
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12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:02	04:46 21:08	04:01 21:59
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:44 21:10	04:00 22:00
14	08:34 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:00
15	08:32 15:46	07:32 16:57	06:18 18:01	05:53 20:09	04:39 21:14	03:59 22:01
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:16	03:59 22:02
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:14	04:35 21:18	03:59 22:02
18	08:28 15:52	07:25 17:04	06:10 18:08	05:45 20:16	04:33 21:20	03:59 22:03
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:32 21:22	03:59 22:03
20	08:25 15:57	07:20 17:08	06:05 18:12	05:39 20:20	04:30 21:24	03:59 22:04
21	08:24 15:59	07:17 17:11	06:02 18:14	05:37 20:22	04:28 21:26	03:59 22:04
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:25	04:26 21:28	03:59 22:04
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:04
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:23 21:32	04:00 22:04
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:04
26	08:15 16:10	07:04 17:22	05:48 18:25	05:24 20:33	04:19 21:36	04:00 22:04
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:36	04:18 21:37	04:01 22:04
28	08:12 16:14	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04
29	08:10 16:17		06:39 19:32	05:16 20:40	04:15 21:41	04:02 22:04
30	08:08 16:19		06:37 19:34	05:14 20:42	04:13 21:42	04:03 22:03
31	08:06 16:21		06:34 19:36		04:12 21:44	
Potential sun hours	228	263	366	429	515	538
Total, worst case					224	353
Sun reduction					0,53	0,43
Oper. time red.					0,99	0,99
Wind dir. red.					0,68	0,69
Total reduction					0,36	0,29
Total, real					80	103

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HÄSLEÅS 1:12>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (850)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

July		August		September		October		November		December	
1	04:04	04:53 (A0009)	04:53	05:46 (A0014)	05:58	07:02	07:11	08:16			
	22:03	14 05:07 (A0009)	21:18	17 06:03 (A0014)	20:00	18:37	16:15	15:21			
2	04:05	04:54 (A0009)	04:55	05:46 (A0014)	06:01	07:04	07:13	08:18			
	22:02	13 05:07 (A0009)	21:16	17 06:03 (A0014)	19:58	18:34	16:13	15:20			
3	04:06	04:55 (A0009)	04:57	05:45 (A0014)	06:03	07:06	07:15	08:19			
	22:02	12 05:07 (A0009)	21:14	18 06:03 (A0014)	19:55	18:31	16:11	15:19			
4	04:07	04:55 (A0009)	04:59	05:45 (A0014)	06:05	07:08	07:18	08:21			
	22:01	11 05:06 (A0009)	21:12	18 06:03 (A0014)	19:52	18:28	16:09	15:18			
5	04:08	04:56 (A0009)	05:01	05:46 (A0014)	06:07	07:10	07:20	08:23			
	22:00	9 05:05 (A0009)	21:09	17 06:03 (A0014)	19:49	18:26	16:06	15:17			
6	04:09	04:57 (A0009)	05:03	05:46 (A0014)	06:09	07:12	07:22	08:24			
	21:59	7 05:04 (A0009)	21:07	17 06:03 (A0014)	19:47	18:23	16:04	15:16			
7	04:10	04:59 (A0009)	05:05	05:46 (A0014)	06:11	07:15	07:24	08:26			
	21:58	5 05:04 (A0009)	21:05	17 06:03 (A0014)	19:44	18:20	16:02	15:16			
8	04:11		05:07	05:46 (A0014)	06:13	07:17	07:27	08:27			
	21:57		21:02	15 06:01 (A0014)	19:41	18:17	16:00	15:15			
9	04:13		05:09	05:47 (A0014)	06:15	07:19	07:29	08:29			
	21:56		21:00	13 06:00 (A0014)	19:38	18:15	15:57	15:15			
10	04:14		05:12	05:49 (A0014)	06:17	07:21	07:31	08:30			
	21:55		20:58	9 05:58 (A0014)	19:35	18:12	15:55	15:14			
11	04:15		05:14	05:52 (A0014)	06:19	07:23	07:34	08:32			
	21:54		20:55	3 05:55 (A0014)	19:33	18:09	15:53	15:14			
12	04:17		05:16		06:22	07:26	07:36	08:33			
	21:53		20:53		19:30	18:06	15:51	15:13			
13	04:18		05:18		06:24	07:28	07:38	08:34			
	21:52		20:50		19:27	18:04	15:49	15:13			
14	04:20		05:20		06:26	07:30	07:40	08:35			
	21:50		20:48		19:24	18:01	15:47	15:13			
15	04:21		05:22		06:28	07:32	07:43	08:36			
	21:49		20:45		19:21	17:58	15:45	15:13			
16	04:23		05:24		06:30	07:34	07:45	08:37			
	21:48		20:43		19:19	17:56	15:43	15:13			
17	04:25		05:26		06:32	07:37	07:47	08:38			
	21:46		20:40		19:16	17:53	15:42	15:13			
18	04:26		05:29		06:34	07:39	07:49	08:39			
	21:44		20:38		19:13	17:50	15:40	15:13			
19	04:28		05:31		06:36	07:41	07:51	08:40			
	21:43		20:35		19:10	17:48	15:38	15:13			
20	04:30		05:33		06:38	07:43	07:54	08:41			
	21:41		20:32		19:07	17:45	15:36	15:13			
21	04:32		05:35		06:41	07:46	07:56	08:41			
	21:40		20:30		19:05	17:43	15:35	15:14			
22	04:33		05:37		06:43	07:48	07:58	08:42			
	21:38		20:27		19:02	17:40	15:33	15:14			
23	04:35		05:39		06:45	07:50	08:00	08:42			
	21:36		20:25		18:59	17:38	15:32	15:15			
24	04:37		05:41		06:47	07:52	08:02	08:43			
	21:34		20:22		18:56	17:35	15:30	15:15			
25	04:39		05:44		06:49	06:55	08:04	08:43			
	21:32		20:19		18:53	16:33	15:29	15:16			
26	04:41		05:46		06:51	06:57	08:06	08:43			
	21:30		20:17		18:51	16:30	15:27	15:17			
27	04:43	05:50 (A0014)	05:48		06:53	06:59	08:08	08:43			
	21:28	8 05:58 (A0014)	20:14		18:48	16:28	15:26	15:18			
28	04:45	05:49 (A0014)	05:50		06:55	07:01	08:10	08:44			
	21:26	11 06:00 (A0014)	20:11		18:45	16:25	15:25	15:19			
29	04:47	05:48 (A0014)	05:52		06:57	07:04	08:12	08:44			
	21:24	13 06:01 (A0014)	20:09		18:42	16:23	15:23	15:20			
30	04:49	05:47 (A0014)	05:54		07:00	07:06	08:14	08:44			
	21:22	15 06:02 (A0014)	20:06		18:39	16:20	15:22	15:21			
31	04:51	05:46 (A0014)	05:56			07:08		08:43			
	21:20	16 06:02 (A0014)	20:03			16:18		15:22			
Potential sun hours	538		474		386	321	241	207			
Total, worst case	134		161								
Sun reduction	0,38		0,35								
Oper. time red.	0,99		0,99								
Wind dir. red.	0,69		0,68								
Total reduction	0,26		0,24								
Total, real	35		39								

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

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



## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HÄSSLEÅS 1:13>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (815)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

		January	February	March	April	May	June		July	August	September	October	November	December
1		08:43	08:04	06:56	06:31	05:11	04:11		04:04	04:53	05:58	07:02	07:11	08:16
		15:23	16:24	17:29	19:38	20:44	21:45		22:03	21:18	20:00	18:37	16:15	15:21
2		08:43	08:02	06:54	06:28	05:09	04:09		04:05	04:55	06:00	07:04	07:13	08:17
		15:25	16:26	17:32	19:40	20:47	21:47		22:02	21:16	19:58	18:34	16:13	15:20
3		08:42	08:00	06:51	06:25	05:06	04:08		04:06	04:57	06:03	07:06	07:15	08:19
		15:26	16:28	17:34	19:43	20:49	21:48		22:01	21:14	19:55	18:31	16:11	15:19
4		08:42	07:58	06:48	06:23	05:04	04:07		04:07	04:59	06:05	07:08	07:17	08:21
		15:27	16:31	17:36	19:45	20:51	21:50		22:01	21:11	19:52	18:28	16:08	15:18
5		08:41	07:55	06:46	06:20	05:02	04:06		04:08	05:01	06:07	07:10	07:20	08:23
		15:29	16:33	17:38	19:47	20:53	21:51		22:00	21:09	19:49	18:26	16:06	15:17
6		08:41	07:53	06:43	06:17	04:59	04:05		04:09	05:03	06:09	07:12	07:22	08:24
		15:30	16:35	17:41	19:49	20:55	21:52		21:59	21:07	19:47	18:23	16:04	15:16
7		08:40	07:51	06:40	06:14	04:57	04:04		04:10	05:05	06:11	07:15	07:24	08:26
		15:32	16:38	17:43	19:51	20:57	21:54		21:58	21:05	19:44	18:20	16:02	15:16
8		08:39	07:49	06:38	06:12	04:55	04:03		04:11	05:07	06:13	07:17	07:27	08:27
		15:34	16:40	17:45	19:54	21:00	21:55		21:57	21:02	19:41	18:17	16:00	15:15
9		08:39	07:46	06:35	06:09	04:52	04:03		04:13	05:09	06:15	07:19	07:29	08:29
		15:35	16:42	17:47	19:56	21:02	21:56		21:56	21:00	19:38	18:15	15:57	15:15
10		08:38	07:44	06:32	06:06	04:50	04:02		04:14	05:12	06:17	07:21	07:31	08:30
		15:37	16:45	17:50	19:58	21:04	21:57		21:55	20:57	19:35	18:12	15:55	15:14
11		08:37	07:42	06:29	06:03	04:48	04:01		04:15	05:14	06:19	07:23	07:33	08:32
		15:39	16:47	17:52	20:00	21:06	21:58		21:54	20:55	19:33	18:09	15:53	15:14
12		08:36	07:40	06:27	06:01	04:46	04:01	04:39 (A0019)	04:17	05:16	06:22	07:25	07:36	08:33
		15:41	16:50	17:54	20:02	21:08	21:59	1	04:40 (A0019)	21:53	20:53	19:30	18:06	15:51
13		08:35	07:37	06:24	05:58	04:44	04:00	04:39 (A0019)	04:18	05:18	06:24	07:28	07:38	08:34
		15:42	16:52	17:56	20:05	21:10	22:00	2	04:41 (A0019)	21:52	20:50	19:27	18:04	15:49
14		08:33	07:35	06:21	05:55	04:41	04:00	04:39 (A0019)	04:20	05:20	06:26	07:30	07:40	08:35
		15:44	16:54	17:59	20:07	21:12	22:00	3	04:42 (A0019)	21:50	20:48	19:24	18:01	15:47
15		08:32	07:32	06:18	05:53	04:39	03:59	04:39 (A0019)	04:21	05:22	06:28	07:32	07:43	08:36
		15:46	16:57	18:01	20:09	21:14	22:01	4	04:43 (A0019)	21:49	20:45	19:21	17:58	15:45
16		08:31	07:30	06:16	05:50	04:37	03:59	04:38 (A0019)	04:23	05:24	06:30	07:34	07:45	08:37
		15:48	16:59	18:03	20:11	21:16	22:02	5	04:43 (A0019)	21:47	20:43	19:19	17:56	15:43
17		08:30	07:27	06:13	05:47	04:35	03:59	04:38 (A0019)	04:25	05:26	06:32	07:37	07:47	08:38
		15:50	17:01	18:05	20:13	21:18	22:02	5	04:43 (A0019)	21:46	20:40	19:16	17:53	15:42
18		08:28	07:25	06:10	05:45	04:33	03:59	04:38 (A0019)	04:26	05:29	06:34	07:39	07:49	08:39
		15:52	17:04	18:08	20:16	21:20	22:03	5	04:43 (A0019)	21:44	20:38	19:13	17:50	15:40
19		08:27	07:22	06:07	05:42	04:31	03:59	04:38 (A0019)	04:28	05:31	06:36	07:41	07:51	08:40
		15:54	17:06	18:10	20:18	21:22	22:03	6	04:44 (A0019)	21:43	20:35	19:10	17:48	15:38
20		08:25	07:20	06:04	05:39	04:30	03:59	04:39 (A0019)	04:30	05:33	06:38	07:43	07:54	08:40
		15:57	17:08	18:12	20:20	21:24	22:04	6	04:45 (A0019)	21:41	20:32	19:07	17:45	15:36
21		08:24	07:17	06:02	05:37	04:28	03:59	04:39 (A0019)	04:32	05:35	06:40	07:45	07:56	08:41
		15:59	17:11	18:14	20:22	21:26	22:04	6	04:45 (A0019)	21:39	20:30	19:05	17:43	15:35
22		08:22	07:15	05:59	05:34	04:26	03:59	04:39 (A0019)	04:33	05:37	06:43	07:48	07:58	08:42
		16:01	17:13	18:16	20:24	21:28	22:04	6	04:45 (A0019)	21:38	20:27	19:02	17:40	15:33
23		08:21	07:12	05:56	05:31	04:24	03:59	04:39 (A0019)	04:35	05:39	06:45	07:50	08:00	08:42
		16:03	17:15	18:19	20:27	21:30	22:04	6	04:45 (A0019)	21:36	20:25	18:59	17:38	15:31
24		08:19	07:10	05:53	05:29	04:22	04:00	04:40 (A0019)	04:37	05:41	06:47	07:52	08:02	08:43
		16:05	17:18	18:21	20:29	21:32	22:04	6	04:46 (A0019)	21:34	20:22	18:56	17:35	15:30
25		08:17	07:07	05:51	05:26	04:21	04:00	04:40 (A0019)	04:39	05:43	06:49	06:55	08:04	08:43
		16:08	17:20	18:23	20:31	21:34	22:04	5	04:45 (A0019)	21:32	20:19	18:53	16:32	15:29
26		08:15	07:04	05:48	05:24	04:19	04:00	04:41 (A0019)	04:41	05:46	06:51	06:57	08:06	08:43
		16:10	17:22	18:25	20:33	21:35	22:04	5	04:46 (A0019)	21:30	20:17	18:51	16:30	15:27
27		08:14	07:02	05:45	05:21	04:18	04:01	04:41 (A0019)	04:43	05:48	06:53	06:59	08:08	08:43
		16:12	17:25	18:27	20:36	21:37	22:04	4	04:45 (A0019)	21:28	20:14	18:48	16:27	15:26
28		08:12	06:59	05:42	05:19	04:16	04:02	04:42 (A0019)	04:45	05:50	06:55	07:01	08:10	08:43
		16:14	17:27	18:30	20:38	21:39	22:04	4	04:46 (A0019)	21:26	20:11	18:45	16:25	15:24
29		08:10		06:39	05:16	04:15	04:02	04:42 (A0019)	04:47	05:52	06:57	07:04	08:12	08:43
		16:17		19:32	20:40	21:41	22:03	3	04:45 (A0019)	21:24	20:08	18:42	16:23	15:23
30		08:08		06:37	05:14	04:13	04:03	04:43 (A0019)	04:49	05:54	07:00	07:06	08:14	08:43
		16:19		19:34	20:42	21:42	22:03	2	04:45 (A0019)	21:22	20:06	18:39	16:20	15:22
31		08:06		06:34		04:12			04:51	05:56		07:08		08:43
		16:21		19:36		21:44			21:20	20:03		16:18		15:22
Potential sun hours		228	263	366	429	515	538		538	474	386	321	241	207
Total, worst case								84						
Sun reduction								0,43						
Oper. time red.								0,99						
Wind dir. red.								0,69						
Total reduction								0,29						
Total, real								24						

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HASSLEAS 1:4>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (851)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:40	05:09 20:47	04:09 21:47	04:05 22:02	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48	04:06 22:01	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:58 16:31	06:48 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:11	06:05 19:52	07:08 18:28	07:17 16:08	08:21 15:18
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:49	07:10 18:26	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:16
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:54	04:10 21:58	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:16
8	08:39 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 16:00	08:27 15:15
9	08:39 15:35	07:47 16:43	06:35 17:47	06:09 19:56	04:52 21:02	04:03 21:56	04:13 21:56	05:09 21:00	06:15 19:38	07:19 18:15	07:29 15:57	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:12 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:37 15:39	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:02	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:33 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:00	04:20 21:50	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	08:32 15:46	07:32 16:57	06:18 18:01	05:53 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:16	03:59 22:02	04:23 21:47	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:43	08:37 15:13
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:25 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:28 15:52	07:25 17:04	06:10 18:08	05:45 20:16	04:33 21:20	03:59 22:03	04:26 21:44	05:29 20:38	06:34 19:13	07:39 17:50	07:49 15:40	08:39 15:13
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:22	03:59 22:03	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
20	08:25 15:57	07:20 17:08	06:04 18:12	05:39 20:20	04:30 21:24	03:59 22:04	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	08:24 15:59	07:17 17:11	06:02 18:14	05:37 20:22	04:28 21:26	03:59 22:04	04:32 21:39	05:35 20:30	06:40 19:05	07:46 17:43	07:56 15:35	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:23 21:32	04:00 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:04	04:39 21:32	05:43 20:19	06:49 18:53	06:55 16:32	08:04 15:29	08:43 15:16
26	08:15 16:10	07:04 17:22	05:48 18:25	05:24 20:33	04:19 21:35	04:00 22:04	04:41 21:30	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:36	04:18 21:37	04:01 22:04	04:43 21:28	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:43 15:18
28	08:12 16:14	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:25	08:43 15:19
29	08:10 16:17	06:59 19:32	05:42 20:40	05:16 21:41	04:15 22:03	04:02 21:24	04:47 20:09	05:52 18:42	06:57 16:23	07:04 15:23	08:12 15:20	08:44 15:20
30	08:08 16:19	06:57 19:34	05:41 20:42	05:14 21:42	04:13 22:03	04:03 21:22	04:49 21:22	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:43 15:21
31	08:06 16:21	06:54 19:36	05:40 20:42	05:12 21:44	04:11 22:03	04:01 21:20	04:51 20:03	05:56 16:18	07:08 15:22	07:08 15:22	08:16 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: HASSLEAS 1:6>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (852)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:56 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:40	05:09 20:46	04:09 21:47	04:05 22:02	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48	04:06 22:01	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:58 16:31	06:48 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:11	06:05 19:52	07:08 18:28	07:17 16:08	08:21 15:18
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:54	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:16
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:16
8	08:39 15:34	07:49 16:45	06:38 17:45	06:12 19:54	04:55 21:00	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 16:00	08:27 15:15
9	08:39 15:35	07:46 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:03 21:56	04:13 21:56	05:09 21:00	06:15 19:38	07:19 18:15	07:29 15:57	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:12 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:37 15:39	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:19 19:33	07:23 18:09	07:33 15:53	08:31 15:14
12	08:36 15:41	07:39 16:50	06:27 17:54	06:01 20:02	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:33 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:41 21:12	04:00 22:00	04:20 21:50	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	08:32 15:46	07:32 16:57	06:18 18:01	05:53 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:16	03:59 22:02	04:23 21:47	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:43	08:37 15:13
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:25 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:28 15:52	07:25 17:04	06:10 18:08	05:45 20:16	04:33 21:20	03:59 22:03	04:26 21:44	05:29 20:38	06:34 19:13	07:39 17:50	07:49 15:40	08:39 15:13
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:22	03:59 22:03	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
20	08:25 15:57	07:20 17:08	06:04 18:12	05:39 20:20	04:30 21:24	03:59 22:04	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:24 15:59	07:17 17:11	06:02 18:14	05:37 20:22	04:28 21:26	03:59 22:04	04:32 21:39	05:35 20:30	06:40 19:05	07:45 17:43	07:56 15:35	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:31	08:42 15:15
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:22 21:32	04:00 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	08:17 16:08	07:07 17:20	05:50 18:23	05:26 20:31	04:21 21:34	04:00 22:04	04:39 21:32	05:43 20:19	06:49 18:53	06:55 16:32	08:04 15:29	08:43 15:16
26	08:15 16:10	07:04 17:22	05:48 18:25	05:24 20:33	04:19 21:35	04:00 22:04	04:41 21:30	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:35	04:18 21:37	04:01 22:04	04:43 21:28	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:26	08:43 15:18
28	08:12 16:14	06:59 17:27	05:42 18:29	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:43 15:19
29	08:10 16:17	06:59 19:32	05:42 20:40	05:16 21:41	04:15 22:03	04:02 21:24	04:47 20:08	05:52 18:42	06:57 16:23	07:04 15:23	08:12 15:20	08:43 15:20
30	08:08 16:19	06:57 19:34	05:41 20:42	05:14 21:42	04:13 22:03	04:03 21:22	04:49 21:22	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:43 15:21
31	08:06 16:21	06:54 19:36	05:40 20:42	05:12 21:44	04:11 22:04	04:01 21:20	04:51 20:03	05:56 16:18	07:08 15:22	07:08 15:22	08:14 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m Shadow receptor: INGATORPS-BJÖRKEBERG 1:2>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (859)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBERG]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	16:25 (A0022) 16:36 (A0022)	06:31 19:38	05:11 20:44
2	08:43 15:24	08:02 16:26	06:54 17:31	16:27 (A0022) 16:34 (A0022)	06:28 19:40	05:08 20:46
3	08:42 15:25	07:59 16:28	06:51 17:34		06:25 19:42	05:06 20:48
4	08:42 15:27	07:57 16:30	06:48 17:36		06:22 19:45	05:04 20:51
5	08:41 15:28	07:55 16:33	06:45 17:38		06:20 19:47	05:01 20:53
6	08:41 15:30	07:53 16:35	06:43 17:40		06:17 19:49	04:59 20:55
7	08:40 15:31	07:51 16:37	06:40 17:43		06:14 19:51	04:57 20:57
8	08:39 15:33	07:49 16:40	06:37 17:45	17:06 (A0021) 17:11 (A0021)	06:11 19:53	04:54 20:59
9	08:38 15:35	07:46 16:42	06:35 17:47	17:03 (A0021) 17:13 (A0021)	06:09 19:56	04:52 21:01
10	08:37 15:37	07:44 16:44	06:32 17:49	17:02 (A0021) 17:14 (A0021)	06:06 19:58	04:50 21:04
11	08:36 15:38	07:42 16:47	06:29 17:52	17:02 (A0021) 17:15 (A0021)	06:03 20:00	04:48 21:06
12	08:35 15:40	07:39 16:49	06:26 17:54	17:01 (A0021) 17:15 (A0021)	06:00 20:02	04:45 21:08
13	08:34 15:42	07:37 16:52	06:24 17:56	17:01 (A0021) 17:14 (A0021)	05:58 20:04	04:43 21:10
14	08:33 15:44	07:34 16:54	06:21 17:58	17:01 (A0021) 17:13 (A0021)	05:55 20:07	04:41 21:12
15	08:32 15:46	07:32 16:56	06:18 18:01	17:02 (A0021) 17:11 (A0021)	05:52 20:09	04:39 21:14
16	08:31 15:48	07:30 16:59	06:15 18:03	17:05 (A0021) 17:08 (A0021)	05:50 20:11	04:37 21:16
17	08:29 15:50	07:27 17:01	06:13 18:05		05:47 20:13	04:35 21:18
18	08:28 15:52	07:25 17:03	06:10 18:07		05:44 20:15	04:33 21:20
19	08:27 15:54	07:22 17:06	06:07 18:09		05:42 20:18	04:31 21:22
20	08:25 15:56	07:20 17:08	06:04 18:12		05:39 20:20	04:29 21:24
21	08:24 15:58	07:17 17:10	06:01 18:14		05:36 20:22	04:27 21:26
22	08:22 16:00	07:15 17:13	16:28 (A0022) 16:34 (A0022)	05:59 18:16	05:34 20:24	04:26 21:28
23	08:20 16:03	07:12 17:15	16:26 (A0022) 16:36 (A0022)	05:56 18:18	05:31 20:26	04:24 21:30
24	08:19 16:05	07:09 17:17	16:24 (A0022) 16:37 (A0022)	05:53 18:20	05:28 20:29	04:22 21:32
25	08:17 16:07	07:07 17:20	16:24 (A0022) 16:38 (A0022)	05:50 18:23	05:26 20:31	04:20 21:33
26	08:15 16:09	07:04 17:22	16:24 (A0022) 16:38 (A0022)	05:47 18:25	05:23 20:33	04:19 21:35
27	08:13 16:12	07:02 17:24	16:23 (A0022) 16:37 (A0022)	05:45 18:27	05:21 20:35	04:17 21:37
28	08:11 16:14	06:59 17:27	16:24 (A0022) 16:36 (A0022)	05:42 18:29	05:18 20:37	04:16 21:39
29	08:10 16:16		06:39 19:31		05:16 20:40	04:14 21:40
30	08:08 16:19		06:36 19:34		05:13 20:42	04:13 21:42
31	08:06 16:21		06:33 19:36			04:12 21:44
Potential sun hours	228	263	366	429	515	539
Total, worst case		83	109			
Sun reduction		0,16	0,22			
Oper. time red.		0,99	0,99			
Wind dir. red.		0,69	0,66			
Total reduction		0,11	0,15			
Total, real		9	16			

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m Shadow receptor: INGATORPS-BJÖRKEBERG 1:2>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (859)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	July	August	September	October	November	December
1	04:03 22:02	04:52 21:18	05:58 20:00	07:01 18:36	17:40 (A0021) 17:54 (A0021)	07:10 16:15
2	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	17:40 (A0021) 17:53 (A0021)	07:13 16:13
3	04:05 22:01	04:57 21:13	06:02 19:55	07:06 18:31	17:40 (A0021) 17:52 (A0021)	07:15 16:10
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	17:40 (A0021) 17:51 (A0021)	07:17 16:08
5	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	17:42 (A0021) 17:50 (A0021)	07:19 16:06
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:22		07:22 16:04
7	04:10 21:58	05:05 21:04	06:11 19:43	07:14 18:20		07:24 16:01
8	04:11 21:57	05:07 21:02	06:13 19:41	07:16 18:17		07:26 15:59
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14		07:29 15:57
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:11		07:31 15:55
11	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	17:02 (A0022) 17:05 (A0022)	07:33 15:53
12	04:16 21:53	05:15 20:52	06:21 19:30	07:25 18:06	16:59 (A0022) 17:08 (A0022)	07:36 15:51
13	04:18 21:51	05:18 20:50	06:23 19:27	07:27 18:03	16:58 (A0022) 17:09 (A0022)	07:38 15:49
14	04:19 21:50	05:20 20:47	06:25 19:24	07:30 18:01	16:56 (A0022) 17:10 (A0022)	07:40 15:47
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	16:55 (A0022) 17:09 (A0022)	07:42 15:45
16	04:23 21:47	05:24 20:42	06:30 19:18	07:34 17:55	16:56 (A0022) 17:10 (A0022)	07:45 15:43
17	04:24 21:46	05:26 20:40	06:32 19:15	07:36 17:53	16:56 (A0022) 17:09 (A0022)	07:47 15:41
18	04:26 21:44	05:28 20:37	06:34 19:13	07:38 17:50	16:57 (A0022) 17:08 (A0022)	07:49 15:39
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:47	16:57 (A0022) 17:06 (A0022)	07:51 15:38
20	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	17:00 (A0022) 17:03 (A0022)	07:53 15:36
21	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42		07:55 15:34
22	04:33 21:38	05:37 20:27	06:42 19:01	07:47 17:40		07:58 15:33
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37		08:00 15:31
24	04:37 21:34	05:41 20:22	06:46 18:56	07:52 17:35		08:02 15:30
25	04:39 21:32	05:43 20:19	06:49 18:53	06:54 16:32		08:04 15:28
26	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30		08:06 15:27
27	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27		08:08 15:25
28	04:44 21:26	05:49 20:11	06:55 18:45	17:44 (A0021) 17:52 (A0021)	07:01 16:25	08:10 15:24
29	04:46 21:24	05:52 20:08	06:57 18:42	17:42 (A0021) 17:53 (A0021)	07:03 16:22	08:12 15:23
30	04:48 21:22	05:54 20:05	06:59 18:39	17:41 (A0021) 17:54 (A0021)	07:06 16:20	08:14 15:22
31	04:50 21:20	05:56 20:03		07:08 16:17		08:43 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case			32	159		
Sun reduction			0,31	0,26		
Oper. time red.			0,99	0,99		
Wind dir. red.			0,65	0,68		
Total reduction			0,20	0,17		
Total, real			6	28		

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m Shadow receptor: INGATORPS-BJÖRKEBERG 1:3>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (905)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

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

609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23 21	14:58 (A0022) 15:19 (A0022) 17:29	16:04 (A0021) 16:19 (A0021) 19:38	05:11 20:44	04:10 21:45
2	08:43 15:24	08:02 16:26 21	14:58 (A0022) 15:19 (A0022) 17:31	16:07 (A0021) 16:16 (A0021) 19:40	19:01 (A0018) 19:09 (A0018) 20:46	04:09 21:47
3	08:42 15:26	08:00 16:28 21	14:58 (A0022) 15:19 (A0022) 17:34	06:25 19:42 11	18:59 (A0018) 19:10 (A0018) 20:49	04:08 21:48
4	08:42 15:27	07:57 16:30 21	14:58 (A0022) 15:19 (A0022) 17:36	06:22 19:45 13	18:58 (A0018) 19:11 (A0018) 20:51	04:07 21:50
5	08:41 15:28	07:55 16:33 20	14:59 (A0022) 15:19 (A0022) 17:38	06:20 19:47 13	18:58 (A0018) 19:11 (A0018) 20:53	04:06 21:51
6	08:41 15:30	07:53 16:35 19	14:59 (A0022) 15:18 (A0022) 17:40	06:17 19:49 14	18:57 (A0018) 19:11 (A0018) 20:55	04:05 21:52
7	08:40 15:32	07:51 16:37 17	15:01 (A0022) 15:18 (A0022) 17:43	06:14 19:51 13	18:57 (A0018) 19:10 (A0018) 20:57	04:04 21:53
8	08:39 15:33	07:49 16:40 14	15:02 (A0022) 15:16 (A0022) 17:45	06:11 19:53 12	18:58 (A0018) 19:10 (A0018) 20:59	04:03 21:55
9	08:38 15:35	07:46 16:42 11	15:04 (A0022) 15:15 (A0022) 17:47	06:09 19:56 9	18:59 (A0018) 19:08 (A0018) 21:02	04:02 21:56
10	08:38 15:37	07:44 16:45 5	15:07 (A0022) 15:12 (A0022) 17:49	06:06 19:58 4	19:01 (A0018) 19:05 (A0018) 21:04	04:01 21:57
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58
12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59
13	08:34 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 21:59
14	08:33 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	20:32 (A0017) 20:36 (A0017) 22:00
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	4 20:31 (A0017) 7 20:38 (A0017) 22:01
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	10 20:29 (A0017) 10 20:39 (A0017) 22:02
17	08:30 15:50	07:27 17:01 9	16:07 (A0021) 16:16 (A0021) 18:05	05:47 20:13	04:35 21:18	12 20:29 (A0017) 12 20:41 (A0017) 22:02
18	08:28 15:52	07:25 17:03 14	16:04 (A0021) 16:18 (A0021) 18:07	05:44 20:15	04:33 21:20	13 20:29 (A0017) 13 20:42 (A0017) 22:03
19	08:27 15:54	07:22 17:06 16	16:04 (A0021) 16:20 (A0021) 18:09	05:42 20:18	04:31 21:22	14 20:28 (A0017) 14 20:42 (A0017) 22:03
20	08:25 15:56	07:20 17:08 19	16:02 (A0021) 16:21 (A0021) 18:12	05:39 20:20	04:29 21:24	14 20:28 (A0017) 14 20:42 (A0017) 22:03
21	08:24 15:58	07:17 17:10 20	16:01 (A0021) 16:21 (A0021) 18:14	05:36 20:22	04:27 21:26	14 20:29 (A0017) 14 20:43 (A0017) 22:04
22	08:22 16:01	07:15 17:13 22	16:01 (A0021) 16:23 (A0021) 18:16	05:34 20:24	04:26 21:28	14 20:28 (A0017) 14 20:42 (A0017) 22:04
23	08:20 16:03	07:12 17:15 21	16:01 (A0021) 16:22 (A0021) 18:18	05:31 20:26	04:24 21:30	14 20:29 (A0017) 14 20:43 (A0017) 22:04
24	08:19 16:05	07:09 17:17 22	16:00 (A0021) 16:22 (A0021) 18:20	05:28 20:29	04:22 21:32	13 20:29 (A0017) 13 20:42 (A0017) 22:04
25	08:17 16:07	07:07 17:20 22	16:01 (A0021) 16:23 (A0021) 18:23	05:26 20:31	04:20 21:34	12 20:30 (A0017) 12 20:42 (A0017) 22:04
26	08:15 16:09	07:04 17:22 21	16:01 (A0021) 16:22 (A0021) 18:25	05:23 20:33	04:19 21:35	11 20:31 (A0017) 11 20:42 (A0017) 22:04
27	08:13 16:12	07:02 17:24 19	16:02 (A0021) 16:21 (A0021) 18:27	05:21 20:35	04:17 21:37	10 20:31 (A0017) 10 20:41 (A0017) 22:04
28	08:12 16:14	06:59 17:27 17	16:02 (A0021) 16:19 (A0021) 18:29	05:18 20:38	04:16 21:39	8 20:32 (A0017) 8 20:40 (A0017) 22:04
29	08:10 16:16	06:57 17:29 19	16:19 (A0021) 16:17 (A0021) 18:31	05:16 20:40	04:14 21:40	5 20:34 (A0017) 5 20:39 (A0017) 22:03
30	08:08 16:19	06:55 17:31 20	16:17 (A0021) 16:15 (A0021) 18:33	05:13 20:42	04:13 21:42	22:03
31	08:06 16:21	06:53 17:33 21	16:15 (A0021) 16:13 (A0021) 18:35		04:12 21:44	
Potential sun hours	228	263	366	429	515	539
Total, worst case	115	392	138	97	175	
Sun reduction	0,19	0,16	0,22	0,42	0,53	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,69	0,69	0,66	0,64	0,59	
Total reduction	0,13	0,11	0,15	0,27	0,32	
Total, real	15	44	21	27	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)



## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m Shadow receptor: INGATORPS-BJÖRKEBERG 1:3>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (905)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

July		August		September		October		November		December	
1	04:03	04:52	05:58			07:01		07:10		14:36 (A0022)	08:16
	22:02	21:18	20:00			18:36		16:15	6	14:42 (A0022)	15:21
2	04:04	04:55	06:00		19:00 (A0018)	07:04		07:13		14:33 (A0022)	08:17
	22:02	21:16	19:57	4	19:04 (A0018)	18:34		16:13	12	14:45 (A0022)	15:20
3	04:05	04:57	06:02		18:57 (A0018)	07:06		07:15		14:31 (A0022)	08:19
	22:01	21:13	19:55	9	19:06 (A0018)	18:31		16:10	15	14:46 (A0022)	15:19
4	04:06	04:59	06:04		18:55 (A0018)	07:08		07:17		14:30 (A0022)	08:21
	22:01	21:11	19:52	12	19:07 (A0018)	18:28		16:08	18	14:48 (A0022)	15:18
5	04:07	05:01	06:07		18:54 (A0018)	07:10		07:20		14:29 (A0022)	08:22
	22:00	21:09	19:49	13	19:07 (A0018)	18:25		16:06	19	14:48 (A0022)	15:17
6	04:08	05:03	06:09		18:53 (A0018)	07:12		07:22		14:29 (A0022)	08:24
	21:59	21:07	19:46	14	19:07 (A0018)	18:22		16:04	20	14:49 (A0022)	15:16
7	04:10	05:05	06:11		18:53 (A0018)	07:14		07:24		14:28 (A0022)	08:26
	21:58	21:04	19:44	14	19:07 (A0018)	18:20		16:01	21	14:49 (A0022)	15:15
8	04:11	05:07	06:13		18:53 (A0018)	07:17		07:26		14:28 (A0022)	08:27
	21:57	21:02	19:41	13	19:06 (A0018)	18:17		15:59	21	14:49 (A0022)	15:15
9	04:12	05:09	06:15		18:53 (A0018)	07:19		07:29		14:29 (A0022)	08:29
	21:56	21:00	19:38	12	19:05 (A0018)	18:14		15:57	21	14:50 (A0022)	15:14
10	04:14	05:11	06:17		18:54 (A0018)	07:21		07:31		14:28 (A0022)	08:30
	21:55	20:57	19:35	9	19:03 (A0018)	18:12		15:55	21	14:49 (A0022)	15:14
11	04:15	05:13	06:19		07:23		16:43 (A0021)	07:33		14:29 (A0022)	08:31
	21:54	20:55	19:32		18:09	4	16:47 (A0021)	15:53	21	14:50 (A0022)	15:13
12	04:16	05:15	06:21		07:25		16:39 (A0021)	07:36		14:29 (A0022)	08:33
	21:53	20:52	19:30		18:06	12	16:51 (A0021)	15:51	20	14:49 (A0022)	15:13
13	04:18	05:18	06:23		07:27		16:37 (A0021)	07:38		14:30 (A0022)	08:34
	21:51	20:50	19:27		18:03	15	16:52 (A0021)	15:49	19	14:49 (A0022)	15:13
14	04:19	05:20	06:25		07:30		16:35 (A0021)	07:40		14:31 (A0022)	08:35
	21:50	20:47 (A0017)	19:24		18:01	18	16:53 (A0021)	15:47	17	14:48 (A0022)	15:13
15	04:21	05:22	06:28		07:32		16:33 (A0021)	07:42		14:32 (A0022)	08:36
	21:49	20:48 (A0017)	19:21		17:58	20	16:53 (A0021)	15:45	15	14:47 (A0022)	15:12
16	04:23	05:24	06:30		18:17 (A0019)	07:34		16:33 (A0021)	07:45	14:33 (A0022)	08:37
	21:47	20:50 (A0017)	19:18	7	18:24 (A0019)	17:55	21	16:54 (A0021)	15:43	14:46 (A0022)	15:12
17	04:24	05:26	06:32		18:15 (A0019)	07:36		16:32 (A0021)	07:47	14:35 (A0022)	08:38
	21:46	20:50 (A0017)	19:16	11	18:26 (A0019)	17:53	22	16:54 (A0021)	15:41	14:44 (A0022)	15:12
18	04:26	05:28	06:34		18:13 (A0019)	07:39		16:32 (A0021)	07:49		08:39
	21:44	20:52 (A0017)	19:13	13	18:26 (A0019)	17:50	22	16:54 (A0021)	15:39		15:13
19	04:28	05:30	06:36		18:12 (A0019)	07:41		16:32 (A0021)	07:51		08:40
	21:43	20:52 (A0017)	19:10	15	18:27 (A0019)	17:48	21	16:53 (A0021)	15:38		15:13
20	04:29	05:33	06:38		18:11 (A0019)	07:43		16:32 (A0021)	07:53		08:40
	21:41	20:52 (A0017)	19:07	15	18:26 (A0019)	17:45	21	16:53 (A0021)	15:36		15:13
21	04:31	05:35	06:40		18:12 (A0019)	07:45		16:33 (A0021)	07:56		08:41
	21:39	20:53 (A0017)	19:04	15	18:27 (A0019)	17:42	19	16:52 (A0021)	15:34		15:13
22	04:33	05:37	06:42		18:12 (A0019)	07:48		16:33 (A0021)	07:58		08:42
	21:38	20:53 (A0017)	19:02	14	18:26 (A0019)	17:40	18	16:51 (A0021)	15:33		15:14
23	04:35	05:39	06:44		18:12 (A0019)	07:50		16:34 (A0021)	08:00		08:42
	21:36	20:53 (A0017)	18:59	13	18:25 (A0019)	17:37	16	16:50 (A0021)	15:31		15:14
24	04:37	05:41	06:47		18:13 (A0019)	07:52		16:35 (A0021)	08:02		08:42
	21:34	20:53 (A0017)	18:56	10	18:23 (A0019)	17:35	13	16:48 (A0021)	15:30		15:15
25	04:39	05:43	06:49		18:15 (A0019)	06:54		15:38 (A0021)	08:04		08:43
	21:32	20:52 (A0017)	18:53	4	18:19 (A0019)	16:32	8	15:46 (A0021)	15:28		15:16
26	04:41	05:45	06:51			06:57		08:06			08:43
	21:30	20:52 (A0017)	18:50			16:30		15:27			15:16
27	04:42	05:47	06:53			06:59		08:08			08:43
	21:28	20:51 (A0017)	18:47			16:27		15:25			15:17
28	04:44	05:50	06:55			07:01		08:10			08:43
	21:26	20:50 (A0017)	18:45			16:25		15:24			15:18
29	04:46	05:52	06:57			07:03		08:12			08:43
	21:24	20:47 (A0017)	18:42			16:22		15:23			15:19
30	04:48	05:54	06:59			07:06		08:14			08:43
	21:22	20:45 (A0017)	18:39			16:20		15:22			15:20
31	04:50	05:56				07:08					08:43
	21:20	20:03				16:17					15:21
Potential sun hours	538	474	386			321		241			207
Total, worst case					217		250		288		
Sun reduction	0,38				0,31		0,26		0,17		
Oper. time red.	0,99				0,99		0,99		0,99		
Wind dir. red.	0,59				0,65		0,69		0,69		
Total reduction	0,23				0,20		0,18		0,12		
Total, real	40				44		45		34		

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m Shadow receptor: INGATORPS-BJÖRKEBERG 1:4>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (857)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	15:07 (A0022) 17:29	16:11 (A0021) 19:38	19:01 (A0018) 20:44	04:10 21:45
2	08:43 15:24	08:02 16:26	15:07 (A0022) 17:31	16:14 (A0021) 19:40	18:59 (A0018) 20:46	04:09 21:47
3	08:42 15:26	08:00 16:28	15:06 (A0022) 17:34	16:25 19:42	18:58 (A0018) 20:49	04:08 21:48
4	08:42 15:27	07:57 16:30	15:07 (A0022) 17:36	16:22 19:45	18:57 (A0018) 20:51	04:07 21:50
5	08:41 15:28	07:55 16:33	15:08 (A0022) 17:38	16:20 19:47	18:58 (A0018) 20:53	04:06 21:51
6	08:41 15:30	07:53 16:35	15:08 (A0022) 17:40	16:17 19:49	18:58 (A0018) 20:55	04:05 21:52
7	08:40 15:32	07:51 16:37	15:09 (A0022) 17:43	16:14 19:51	18:58 (A0018) 20:57	04:04 21:53
8	08:39 15:33	07:49 16:40	15:10 (A0022) 17:45	16:11 19:53	19:00 (A0018) 20:59	04:03 21:55
9	08:38 15:35	07:46 16:42	15:12 (A0022) 17:47	16:09 19:56	19:07 (A0018) 21:02	04:02 21:56
10	08:38 15:37	07:44 16:45	15:14 (A0022) 17:49	16:06 19:58	21:04	04:01 21:57
11	08:37 15:38	07:42 16:47	16:29 17:52	16:03 20:00	20:28 (A0017) 21:06	04:01 21:58
12	08:36 15:40	07:39 16:49	16:26 17:54	16:00 20:02	20:27 (A0017) 21:08	04:00 21:59
13	08:34 15:42	07:37 16:52	16:24 17:56	15:58 20:04	20:26 (A0017) 21:10	04:00 21:59
14	08:33 15:44	07:35 16:54	16:21 17:58	15:55 20:07	20:25 (A0017) 21:12	03:59 22:00
15	08:32 15:46	07:32 16:56	16:18 18:01	15:52 20:09	20:36 (A0017) 21:14	03:59 22:01
16	08:31 15:48	07:30 16:59	16:15 18:03	15:50 20:11	20:38 (A0017) 21:16	03:59 22:02
17	08:30 15:50	07:27 17:01	16:14 (A0021) 18:05	15:47 20:13	20:38 (A0017) 21:18	03:59 22:02
18	08:28 15:52	07:25 17:03	16:11 (A0021) 18:07	17:32 (A0019) 20:15	20:25 (A0017) 21:20	03:58 22:03
19	08:27 15:54	07:22 17:06	16:10 (A0021) 18:09	17:29 (A0019) 20:18	20:39 (A0017) 21:22	03:58 22:03
20	08:25 15:56	07:20 17:08	16:09 (A0021) 18:12	17:28 (A0019) 20:20	20:25 (A0017) 21:24	03:58 22:03
21	08:24 15:58	07:17 17:10	16:08 (A0021) 18:14	17:27 (A0019) 20:22	20:27 (A0017) 21:26	03:58 22:04
22	08:22 16:01	07:15 17:13	16:08 (A0021) 18:16	17:27 (A0019) 20:24	20:27 (A0017) 21:28	03:59 22:04
23	08:20 16:03	07:12 17:15	16:07 (A0021) 18:18	17:27 (A0019) 20:26	20:29 (A0017) 21:30	03:59 22:04
24	08:19 16:05	07:09 17:17	16:07 (A0021) 18:20	17:27 (A0019) 20:29	20:30 (A0017) 21:32	03:59 22:04
25	08:17 16:07	07:07 17:20	16:08 (A0021) 18:23	17:28 (A0019) 20:31	20:33 (A0017) 21:34	04:00 22:04
26	08:15 16:09	15:10 (A0022) 17:22	16:08 (A0021) 18:25	17:29 (A0019) 20:33	04:19 21:35	04:00 22:04
27	08:13 16:12	15:09 (A0022) 17:24	16:08 (A0021) 18:27	17:36 (A0019) 20:35	04:17 21:37	04:01 22:04
28	08:12 16:14	15:08 (A0022) 17:27	16:26 (A0021) 18:29	17:39 (A0019) 20:38	04:16 21:39	04:01 22:04
29	08:10 16:16	15:08 (A0022) 17:29	16:24 (A0021) 18:31	17:42 (A0019) 20:40	04:14 21:40	04:02 22:03
30	08:08 16:19	15:08 (A0022) 17:34	16:36 19:34	17:44 (A0019) 20:42	04:13 21:42	04:03 22:03
31	08:06 16:21	15:06 (A0022) 17:36	16:33 19:36	19:03 (A0018) 21:44	04:12 21:44	04:03 22:03
Potential sun hours	228	263	366	429	515	539
Total, worst case	90	372	125	88	136	
Sun reduction	0,19	0,16	0,22	0,42	0,53	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,68	0,69	0,66	0,64	0,59	
Total reduction	0,13	0,11	0,15	0,27	0,32	
Total, real	12	42	19	24	43	

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m Shadow receptor: INGATORPS-BJÖRKEBERG 1:4>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (857)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

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

609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July	August	September	October	November	December		
1	04:03 22:02	04:52 21:18	20:37 (A0017) 20:40 (A0017)	05:58 20:00	07:01 18:36	07:10 16:15	14:43 (A0022) 14:51 (A0022)	08:16 15:21
2	04:04 22:02	04:55 21:16	20:39 (A0017) 20:40 (A0017)	06:00 19:57	07:04 18:34	07:13 16:13	14:41 (A0022) 14:54 (A0022)	08:17 15:20
3	04:05 22:01	04:57 21:13	06:02 19:55	07:06 18:31	07:15 16:10	13 16	14:39 (A0022) 14:55 (A0022)	08:19 15:19
4	04:06 22:01	04:59 21:11	06:04 19:52	18:58 (A0018) 19:04 (A0018)	07:08 18:28	07:17 16:08	14:39 (A0022) 14:56 (A0022)	08:21 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	18:55 (A0018) 19:05 (A0018)	07:10 18:25	07:20 16:06	14:37 (A0022) 14:56 (A0022)	08:22 15:17
6	04:08 21:59	05:03 21:07	06:09 19:46	18:54 (A0018) 19:06 (A0018)	07:12 18:22	07:22 16:04	14:38 (A0022) 14:57 (A0022)	08:24 15:16
7	04:10 21:58	05:05 21:04	06:11 19:44	18:53 (A0018) 19:06 (A0018)	07:14 18:20	07:24 16:01	14:37 (A0022) 14:57 (A0022)	08:26 15:15
8	04:11 21:57	05:07 21:02	06:13 19:41	18:52 (A0018) 19:06 (A0018)	07:17 18:17	07:26 15:59	14:37 (A0022) 14:57 (A0022)	08:27 15:15
9	04:12 21:56	05:09 21:00	06:15 19:38	18:52 (A0018) 19:05 (A0018)	07:19 18:14	07:29 15:57	14:38 (A0022) 14:58 (A0022)	08:29 15:14
10	04:14 21:55	05:11 20:57	06:17 19:35	18:52 (A0018) 19:04 (A0018)	07:21 18:12	07:31 15:55	14:37 (A0022) 14:57 (A0022)	08:30 15:14
11	04:15 21:54	05:13 20:55	06:19 19:32	18:53 (A0018) 19:01 (A0018)	07:23 18:09	07:33 15:53	14:38 (A0022) 14:57 (A0022)	08:31 15:13
12	04:16 21:53	05:15 20:52	06:21 19:30	18:55 (A0018) 18:59 (A0018)	07:25 18:06	16:46 (A0021) 16:56 (A0021)	14:38 (A0022) 14:56 (A0022)	08:33 15:13
13	04:18 21:51	05:18 20:50	06:23 19:27	18:06 18:03	10 14	16:43 (A0021) 16:57 (A0021)	14:40 (A0022) 14:56 (A0022)	08:34 15:13
14	04:19 21:50	05:20 20:47	06:25 19:24	18:03 18:01	14 17	16:41 (A0021) 16:58 (A0021)	14:40 (A0022) 14:55 (A0022)	08:35 15:12
15	04:21 21:49	05:22 20:45	06:28 19:21	18:01 17:58	17 18	16:40 (A0021) 16:58 (A0021)	14:42 (A0022) 14:54 (A0022)	08:36 15:12
16	04:23 21:47	05:24 20:42	06:30 19:18	17:58 17:55	18 20	16:39 (A0021) 16:59 (A0021)	14:43 (A0022) 14:52 (A0022)	08:37 15:12
17	04:24 21:46	05:26 20:40	06:32 19:16	18:18 (A0019) 18:24 (A0019)	20 21	16:59 (A0021) 16:38 (A0021)	14:43 (A0022) 14:40 (A0022)	08:38 15:12
18	04:26 21:44	05:28 20:37	06:34 19:13	18:16 (A0019) 18:26 (A0019)	21 10	16:39 (A0021) 17:00 (A0021)	14:40 (A0022) 14:42 (A0022)	08:39 15:13
19	04:28 21:43	05:30 20:35	06:36 19:10	18:14 (A0019) 18:27 (A0019)	21 13	16:38 (A0021) 16:59 (A0021)	14:42 (A0022) 14:43 (A0022)	08:40 15:13
20	04:29 21:41	20:40 (A0017) 20:45 (A0017)	05:33 20:32	18:13 (A0019) 18:27 (A0019)	21 14	16:38 (A0021) 16:58 (A0021)	14:43 (A0022) 14:43 (A0022)	08:40 15:13
21	04:31 21:39	20:38 (A0017) 20:47 (A0017)	05:35 20:30	18:13 (A0019) 18:28 (A0019)	20 15	16:39 (A0021) 16:58 (A0021)	14:43 (A0022) 14:43 (A0022)	08:41 15:13
22	04:33 21:38	20:37 (A0017) 20:47 (A0017)	05:37 20:27	19:04 18:12 (A0019)	19 15	16:39 (A0021) 16:56 (A0021)	14:43 (A0022) 14:43 (A0022)	08:42 15:14
23	04:35 21:36	20:37 (A0017) 20:48 (A0017)	05:39 20:24	19:02 18:26 (A0019)	17 14	16:41 (A0021) 16:55 (A0021)	14:43 (A0022) 14:43 (A0022)	08:42 15:14
24	04:37 21:34	20:36 (A0017) 20:49 (A0017)	05:41 20:22	18:13 (A0019) 18:25 (A0019)	14 11	16:42 (A0021) 16:53 (A0021)	14:43 (A0022) 14:43 (A0022)	08:42 15:15
25	04:39 21:32	20:35 (A0017) 20:48 (A0017)	05:43 20:19	18:14 (A0019) 18:53	11 8	15:46 (A0021) 16:32	14:43 (A0022) 14:43 (A0022)	08:43 15:16
26	04:41 21:30	20:35 (A0017) 20:49 (A0017)	05:45 20:16	18:22 (A0019) 18:50	4 13	15:50 (A0021) 16:30	14:43 (A0022) 14:43 (A0022)	08:43 15:16
27	04:42 21:28	20:35 (A0017) 20:49 (A0017)	05:47 20:14	18:51 18:47	13 12	16:30 16:27	14:43 (A0022) 14:43 (A0022)	08:43 15:17
28	04:44 21:26	20:36 (A0017) 20:49 (A0017)	05:50 20:11	18:47 18:45	12 13	16:27 16:25	14:43 (A0022) 14:43 (A0022)	08:43 15:18
29	04:46 21:24	20:35 (A0017) 20:47 (A0017)	05:52 20:08	18:45 18:42	13 12	16:25 16:22	14:43 (A0022) 14:43 (A0022)	08:43 15:19
30	04:48 21:22	20:36 (A0017) 20:45 (A0017)	05:54 20:06	18:42 18:39	12 9	16:22 16:20	14:43 (A0022) 14:43 (A0022)	08:43 15:20
31	04:50 21:20	20:36 (A0017) 20:44 (A0017)	05:56 20:03	18:39 18:39	9 8	16:20 16:17	14:43 (A0022) 14:43 (A0022)	08:43 15:21
Potential sun hours	538	474	386	321	241	207		
Total, worst case	131	6	199	227	261			
Sun reduction	0,38	0,35	0,31	0,26	0,17			
Oper. time red.	0,99	0,99	0,99	0,99	0,99			
Wind dir. red.	0,59	0,59	0,65	0,69	0,68			
Total reduction	0,23	0,21	0,20	0,18	0,12			
Total, real	30	1	41	41	31			

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m Shadow receptor: INGATORPS-GRIMMESTORP 2:4&gt;1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (822)

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:43	08:04	06:56	06:31	05:11	04:10	04:03	04:52	05:58	07:01	17:45 (A0021)	07:10	08:15			
	15:23	16:23	17:29	19:38	20:44	21:45	22:02	21:18	20:00	18:36	8	17:53 (A0021)	16:15	15:21		
2	08:43	08:02	06:54	06:28	05:08	04:09	04:04	04:54	06:00	07:04		17:43 (A0021)	07:13	08:17		
	15:24	16:26	17:31	19:40	20:46	21:47	22:02	21:16	19:57	18:33	11	17:54 (A0021)	16:13	15:20		
3	08:42	07:59	06:51	06:25	05:06	04:08	04:05	04:57	06:02	07:06		17:42 (A0021)	07:15	08:19		
	15:25	16:28	17:34	19:42	20:48	21:48	22:01	21:13	19:55	18:31	12	17:54 (A0021)	16:10	15:19		
4	08:42	07:57	06:48	06:22	05:04	04:07	04:06	04:59	06:04	07:08		17:41 (A0021)	07:17	08:21		
	15:27	16:30	17:36	19:45	20:51	21:49	22:01	21:11	19:52	18:28	13	17:54 (A0021)	16:08	15:18		
5	08:41	07:55	06:45	06:20	05:01	04:06	04:07	05:01	06:06	07:10		17:42 (A0021)	07:19	08:22		
	15:28	16:33	17:38	19:47	20:53	21:51	22:00	21:09	19:49	18:25	12	17:54 (A0021)	16:06	15:17		
6	08:41	07:53	06:43		17:08 (A0021)	06:17	04:59	04:05	04:08	05:03	06:09	07:12	17:41 (A0021)	07:22	08:24	
	15:30	16:35	17:40	3	17:11 (A0021)	19:49	20:55	21:52	21:59	21:07	19:46	18:22	10	17:51 (A0021)	16:04	15:16
7	08:40	07:51	06:40		17:06 (A0021)	06:14	04:57	04:04	04:10	05:05	06:11	07:14	17:42 (A0021)	07:24	08:26	
	15:31	16:37	17:43	7	17:13 (A0021)	19:51	20:57	21:53	21:58	21:04	19:43	18:20	6	17:48 (A0021)	16:01	15:15
8	08:39	07:49	06:37		17:05 (A0021)	06:11	04:54	04:03	04:11	05:07	06:13	07:16	17:44 (A0021)	07:26	08:27	
	15:33	16:40	17:45	10	17:15 (A0021)	19:53	20:59	21:54	21:57	21:02	19:41	18:17	1	17:45 (A0021)	15:59	15:15
9	08:38	07:46	06:35		17:04 (A0021)	06:09	04:52	04:02	04:12	05:09	06:15	07:19		07:29	08:29	
	15:35	16:42	17:47	13	17:17 (A0021)	19:56	21:01	21:56	21:56	21:00	19:38	18:14		15:57	15:14	
10	08:37	07:44	06:32		17:03 (A0021)	06:06	04:50	04:01	04:13	05:11	06:17	07:21		07:31	08:30	
	15:37	16:44	17:49	13	17:16 (A0021)	19:58	21:04	21:57	21:55	20:57	19:35	18:11		15:55	15:14	
11	08:36	07:42	06:29		17:05 (A0021)	06:03	04:48	04:01	04:15	05:13	06:19	07:23		07:33	08:31	
	15:38	16:47	17:52	11	17:16 (A0021)	20:00	21:06	21:58	21:54	20:55	19:32	18:09		15:53	15:13	
12	08:35	07:39	06:26		17:05 (A0021)	06:00	04:45	04:00	04:16	05:15	06:21	07:25		07:36	08:33	
	15:40	16:49	17:54	10	17:15 (A0021)	20:02	21:08	21:59	21:53	20:52	19:30	18:06		15:51	15:13	
13	08:34	07:37	06:24		17:07 (A0021)	05:58	04:43	04:00	04:18	05:18	06:23	07:27		07:38	08:34	
	15:42	16:52	17:56	5	17:12 (A0021)	20:04	21:10	21:59	21:51	20:50	19:27	18:03		15:49	15:13	
14	08:33	07:34	06:21		05:55	04:41	03:59	04:19	05:20	06:25	07:30		17:03 (A0022)	07:40	08:35	
	15:44	16:54	17:58		20:07	21:12	22:00	21:50	20:47	19:24	18:01	7	17:10 (A0022)	15:47	15:12	
15	08:32	07:32	06:18		05:52	04:39	03:59	04:21	05:22	06:27	07:32		17:01 (A0022)	07:42	08:36	
	15:46	16:56	18:01		20:09	21:14	22:01	21:49	20:45	19:21	17:58	10	17:11 (A0022)	15:45	15:12	
16	08:31	07:30	06:15		05:50	04:37	03:59	04:22	05:24	06:30	07:34		17:00 (A0022)	07:45	08:37	
	15:48	16:59	18:03		20:11	21:16	22:02	21:47	20:42	19:18	17:55	13	17:13 (A0022)	15:43	15:12	
17	08:29	07:27	06:13		05:47	04:35	03:58	04:24	05:26	06:32	07:36		16:59 (A0022)	07:47	08:38	
	15:50	17:01	18:05		20:13	21:18	22:02	21:46	20:40	19:15	17:53	13	17:12 (A0022)	15:41	15:12	
18	08:28	07:25	06:10		05:44	04:33	03:58	04:26	05:28	06:34	07:38		16:59 (A0022)	07:49	08:39	
	15:52	17:03	18:07		20:15	21:20	22:03	21:44	20:37	19:13	17:50	14	17:13 (A0022)	15:39	15:12	
19	08:27	07:22	06:07		05:41	04:31	03:58	04:28	05:30	06:36	07:41		16:59 (A0022)	07:51	08:40	
	15:54	17:06	18:09		20:18	21:22	22:03	21:43	20:35	19:10	17:47	13	17:12 (A0022)	15:38	15:13	
20	08:25	07:20	06:04		05:39	04:29	03:58	04:29	05:32	06:38	07:43		16:59 (A0022)	07:53	08:40	
	15:56	17:08	18:12	5	16:36 (A0022)	20:20	21:24	22:03	21:41	20:32	19:07	17:45	12	17:11 (A0022)	15:36	15:13
21	08:24	07:17	06:01		16:29 (A0022)	05:36	04:27	03:58	04:31	05:35	06:40	07:45		17:01 (A0022)	07:55	08:41
	15:58	17:10	18:14	10	16:39 (A0022)	20:22	21:26	22:04	21:39	20:30	19:04	17:42	8	17:09 (A0022)	15:34	15:13
22	08:22	07:15	05:59		16:29 (A0022)	05:34	04:26	03:59	04:33	05:37	06:42	07:47		17:02 (A0022)	07:58	08:41
	16:00	17:13	18:16	12	16:41 (A0022)	20:24	21:28	22:04	21:38	20:27	19:01	17:40	4	17:06 (A0022)	15:33	15:14
23	08:20	07:12	05:56		16:28 (A0022)	05:31	04:24	03:59	04:35	05:39	06:44	07:50			08:00	08:42
	16:03	17:15	18:18	13	16:41 (A0022)	20:26	21:30	22:04	21:36	20:24	18:59	17:37			15:31	15:14
24	08:19	07:09	05:53		16:27 (A0022)	05:28	04:22	03:59	04:37	05:41	06:46	07:52			08:02	08:42
	16:05	17:17	18:20	14	16:41 (A0022)	20:29	21:32	22:04	21:34	20:22	18:56	17:35			15:30	15:15
25	08:17	07:07	05:50		16:27 (A0022)	05:26	04:20	04:00	04:39	05:43	06:49	06:54			08:04	08:43
	16:07	17:20	18:23	13	16:40 (A0022)	20:31	21:33	22:04	21:32	20:19	18:53	16:32			15:28	15:16
26	08:15	07:04	05:47		16:29 (A0022)	05:23	04:19	04:00	04:40	05:45	06:51	06:57			08:06	08:43
	16:09	17:22	18:25	11	16:40 (A0022)	20:33	21:35	22:04	21:30	20:16	18:50	16:30			15:27	15:16
27	08:13	07:01	05:45		16:29 (A0022)	05:21	04:17	04:01	04:42	05:47	06:53	06:59			08:08	08:43
	16:12	17:24	18:27	10	16:39 (A0022)	20:35	21:37	22:04	21:28	20:14	18:47	16:27			15:25	15:17
28	08:11	06:59	05:42		16:32 (A0022)	05:18	04:16	04:01	04:44	05:49	06:55	07:01			08:10	08:43
	16:14	17:27	18:29	4	16:36 (A0022)	20:37	21:39	22:04	21:26	20:11	18:45	16:25			15:24	15:18
29	08:10		06:39			05:16	04:14	04:02	04:46	05:52	06:57	07:03			08:12	08:43
	16:16		19:31			20:40	21:40	22:03	21:24	20:08	18:42	16:22			15:23	15:19
30	08:08		06:36			05:13	04:13	04:03	04:48	05:54	06:59	07:06			08:14	08:43
	16:19		19:34			20:42	21:42	22:03	21:22	20:05	18:39	16:20			15:22	15:20
31	08:06		06:33				04:11		04:50	05:56		07:08			08:43	08:43
	16:21		19:36				21:44		21:20	20:03		16:17			15:21	15:21
Potential sun hours	228	263	366	429	515	539	538	474	386	321			241	207		
Total, worst case		92	72								167					
Sun reduction		0,16	0,22								0,26					
Oper. time red.		0,99	0,99								0,99					
Wind dir. red.		0,69	0,66								0,67					
Total reduction		0,11	0,14								0,17					
Total, real		10	10								29					

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: JUSTORP 1:2>2 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (835)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:16 15:20
2	08:43 15:24	08:02 16:25	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	07:13 16:13	08:17 15:19
3	08:42 15:25	08:00 16:28	06:51 17:34	06:25 19:42	05:06 20:49	04:08 21:48	04:05 22:02	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:03 20:51	04:07 21:50	04:06 22:01	04:58 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:17
5	08:41 15:28	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:49	04:59 20:55	04:04 21:52	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:04	08:24 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:04 21:54	04:09 21:58	05:05 21:04	06:11 19:44	07:14 18:20	07:24 16:01	08:26 15:15
8	08:39 15:33	07:49 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:27 15:14
9	08:39 15:35	07:46 16:42	06:35 17:47	06:08 19:56	04:52 21:02	04:02 21:56	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:11	07:31 15:55	08:30 15:13
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:32 15:13
12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 22:00	04:18 21:52	05:17 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:12
14	08:33 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:00	04:19 21:50	05:20 20:48	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:27 19:21	07:32 17:58	07:42 15:45	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:49 20:11	04:37 21:16	03:58 22:02	04:22 21:47	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	08:37 15:12
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:58 22:02	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:12
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:15	04:33 21:20	03:58 22:03	04:26 21:44	05:28 20:37	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:22 17:06	06:07 18:09	05:41 20:18	04:31 21:22	03:58 22:03	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:38	08:40 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:41 15:13
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:24	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:42 19:01	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	08:19 16:05	07:09 17:17	05:53 18:20	05:28 20:29	04:22 21:32	03:59 22:04	04:36 21:34	05:41 20:22	06:46 18:56	07:52 17:35	08:02 15:29	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:04	04:38 21:32	05:43 20:19	06:49 18:53	07:54 16:32	08:04 15:28	08:43 15:15
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:00 22:04	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:43 15:17
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:26	05:49 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:44 15:18
29	08:10 16:16	06:59 17:31	05:42 18:31	05:16 20:40	04:14 21:41	04:02 22:04	04:46 21:24	05:52 20:08	06:57 18:42	07:04 16:22	08:12 15:23	08:44 15:19
30	08:08 16:18	06:56 17:34	05:40 18:34	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21	06:53 17:36	05:38 18:36	05:11 20:44	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	07:08 16:17	07:08 15:21	08:43 15:21	08:43 15:21
Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: JUSTORP 1:5>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (875)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:16 15:20
2	08:43 15:24	08:02 16:25	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	07:13 16:13	08:17 15:19
3	08:42 15:25	08:00 16:28	06:51 17:34	06:25 19:42	05:06 20:49	04:08 21:48	04:05 22:02	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:03 20:51	04:07 21:50	04:06 22:01	04:58 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:17
5	08:41 15:28	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:49	04:59 20:55	04:04 21:52	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:04	08:24 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:04 21:54	04:09 21:58	05:05 21:04	06:11 19:44	07:14 18:20	07:24 16:01	08:26 15:15
8	08:39 15:33	07:49 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:27 15:14
9	08:39 15:35	07:46 16:42	06:35 17:47	06:08 19:56	04:52 21:02	04:02 21:56	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:11	07:31 15:55	08:30 15:13
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:32 15:13
12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 22:00	04:18 21:52	05:17 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:12
14	08:33 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:00	04:19 21:50	05:20 20:48	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:27 19:21	07:32 17:58	07:42 15:45	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:49 20:11	04:37 21:16	03:58 22:02	04:22 21:47	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	08:37 15:12
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:58 22:02	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:12
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:15	04:33 21:20	03:58 22:03	04:26 21:44	05:28 20:37	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:22 17:06	06:07 18:09	05:41 20:18	04:31 21:22	03:58 22:03	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:38	08:40 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:41 15:13
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
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23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	08:19 16:05	07:09 17:17	05:53 18:20	05:28 20:29	04:22 21:32	03:59 22:04	04:36 21:34	05:41 20:22	06:46 18:56	07:52 17:35	08:02 15:29	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:04	04:38 21:32	05:43 20:19	06:49 18:53	07:54 16:32	08:04 15:28	08:43 15:15
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:00 22:04	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:43 15:17
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29	08:10 16:16	06:59 17:31	05:42 18:31	05:16 20:40	04:14 21:41	04:02 22:04	04:46 21:24	05:52 20:08	06:57 18:42	07:04 16:22	08:12 15:23	08:44 15:19
30	08:08 16:18	06:56 17:34	05:40 18:34	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21	06:53 17:36	05:38 18:36	05:11 20:44	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	07:08 16:17	07:08 15:21	08:43 15:21	08:43 15:21
Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: JUSTORP 1:5>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (894)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
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2	08:43 15:24	08:02 16:25	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:57	07:04 18:33	07:13 16:13	08:17 15:19
3	08:42 15:25	08:00 16:28	06:51 17:34	06:25 19:42	05:06 20:49	04:08 21:48	04:05 22:02	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:03 20:51	04:07 21:50	04:06 22:01	04:58 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:17
5	08:41 15:28	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:01 21:09	06:06 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:49	04:59 20:55	04:04 21:52	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:04	08:24 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:04 21:54	04:09 21:58	05:05 21:04	06:11 19:44	07:14 18:20	07:24 16:01	08:26 15:15
8	08:39 15:33	07:49 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:27 15:15
9	08:39 15:35	07:46 16:42	06:35 17:47	06:08 19:56	04:52 21:02	04:02 21:56	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:11	07:31 15:55	08:30 15:13
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:32 15:13
12	08:36 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 22:00	04:18 21:52	05:17 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:12
14	08:33 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:00	04:19 21:50	05:20 20:48	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:49 20:11	04:37 21:16	03:58 22:02	04:22 21:47	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	08:37 15:12
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:58 22:02	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:12
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:15	04:33 21:20	03:58 22:03	04:26 21:44	05:28 20:37	06:34 19:13	07:39 17:50	07:49 15:39	08:39 15:12
19	08:27 15:54	07:22 17:06	06:07 18:09	05:41 20:18	04:31 21:22	03:58 22:03	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:47	07:51 15:38	08:40 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:41 15:13
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:24	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:42 19:01	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	08:19 16:05	07:09 17:17	05:53 18:20	05:28 20:29	04:22 21:32	03:59 22:04	04:36 21:34	05:41 20:22	06:46 18:56	07:52 17:35	08:02 15:29	08:43 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:04	04:38 21:32	05:43 20:19	06:49 18:53	07:54 16:32	08:04 15:28	08:43 15:15
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	08:14 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:00 22:04	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:43 15:17
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:26	05:49 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:44 15:18
29	08:10 16:16	06:59 17:31	05:42 18:31	05:16 20:40	04:14 21:41	04:02 22:04	04:46 21:24	05:52 20:08	06:57 18:42	07:04 16:22	08:12 15:23	08:44 15:19
30	08:08 16:18	06:56 17:34	05:40 18:34	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21	06:53 17:36	05:38 18:36	05:11 20:44	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	07:08 16:17	07:08 15:21	08:43 15:21	08:43 15:21
Potential sun hours	228	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: Jonsberg - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (803)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:43		09:26 (2)	08:04	06:56	06:31	05:11	04:10	04:03	04:52	05:58	07:01	07:11										08:16	08:58 (2)
2	15:23	9	09:58 (4)	16:23	17:29	19:38	20:44	21:46	22:03	21:18	20:00	18:36	16:15										15:20	19 09:17 (2)
	08:43		09:26 (2)	08:02	06:54	06:28	05:08	04:09	04:04	04:54	06:00	07:04	07:13										08:18	09:00 (2)
3	15:24	8	09:58 (4)	16:25	17:31	19:40	20:47	21:47	22:02	21:16	19:58	18:34	16:13										15:19	17 09:17 (2)
	08:43		09:25 (2)	08:00	06:51	06:25	05:06	04:07	04:05	04:56	06:02	07:06	07:15										08:20	09:02 (2)
4	15:25	5	09:30 (2)	16:28	17:34	19:43	20:49	21:49	22:02	21:14	19:55	18:31	16:10										15:18	15 09:17 (2)
	08:42		09:24 (2)	07:58	06:48	06:22	05:03	04:06	04:06	04:58	06:04	07:08	07:18										08:21	09:04 (2)
5	15:27	7	09:31 (2)	16:30	17:36	19:45	20:51	21:50	22:01	21:12	19:52	18:28	16:08										15:17	14 09:18 (2)
	08:42		09:23 (2)	07:56	06:46	06:20	05:01	04:05	04:07	05:00	06:06	07:10	07:20										08:23	09:06 (2)
6	15:28	8	09:31 (2)	16:32	17:38	19:47	20:53	21:51	22:00	21:09	19:49	18:25	16:06										15:16	12 09:18 (2)
	08:41		09:22 (2)	07:53	06:43	06:17	04:59	04:04	04:08	05:03	06:09	07:12	07:22										08:25	09:08 (2)
7	15:30	10	09:32 (2)	16:35	17:40	19:49	20:55	21:53	22:00	21:07	19:46	18:22	16:03										15:16	10 09:18 (2)
	08:40		09:21 (2)	07:51	06:40	06:14	04:56	04:03	04:09	05:05	06:11	07:14	07:24										08:26	09:10 (2)
8	15:31	12	09:33 (2)	16:37	17:43	19:51	20:58	21:54	21:59	21:05	19:44	18:20	16:01										15:15	8 09:18 (2)
	08:40		09:20 (2)	07:49	06:37	06:11	04:54	04:03	04:10	05:07	06:13	07:17	07:27										08:28	09:12 (2)
9	15:33	13	09:33 (2)	16:40	17:45	19:54	21:00	21:55	21:58	21:02	19:41	18:17	15:59										15:14	7 09:19 (2)
	08:39		09:19 (2)	07:47	06:35	06:08	04:52	04:02	04:12	05:09	06:15	07:19	07:29										08:29	09:13 (2)
10	15:34	15	09:34 (2)	16:42	17:47	19:56	21:02	21:56	21:57	21:00	19:38	18:14	15:57										15:14	5 09:18 (2)
	08:38		09:18 (2)	07:44	06:32	06:06	04:49	04:01	04:13	05:11	06:17	07:21	07:31										08:30	09:15 (2)
11	15:36	17	09:35 (2)	16:44	17:49	19:58	21:04	21:57	21:56	20:58	19:35	18:11	15:55										15:13	9 09:47 (4)
	08:37		09:16 (2)	07:42	06:29	06:03	04:47	04:00	04:14	05:13	06:19	07:23	07:34										08:32	09:16 (2)
12	15:38	19	09:35 (2)	16:47	17:52	20:00	21:06	21:58	21:54	20:55	19:32	18:09	15:53										15:13	9 09:48 (4)
	08:36		09:16 (2)	07:40	06:26	06:00	04:45	04:00	04:16	05:15	06:21	07:25	07:36										08:33	09:18 (2)
13	15:40	20	09:36 (2)	16:49	17:54	20:02	21:08	21:59	21:53	20:53	19:30	18:06	15:51										15:13	8 09:49 (4)
	08:35		09:17 (2)	07:37	06:24	05:58	04:43	03:59	04:17	05:17	06:23	07:28	07:38										08:34	09:41 (4)
14	15:42	20	09:37 (2)	16:51	17:56	20:05	21:10	22:00	21:52	20:50	19:27	18:03	15:49										15:12	9 09:50 (4)
	08:34		09:17 (2)	07:35	06:21	05:55	04:41	03:59	04:19	05:19	06:25	07:30	07:40										08:35	09:41 (4)
15	15:44	20	09:37 (2)	16:54	17:58	20:07	21:12	22:01	21:51	20:48	19:24	18:01	15:47										15:12	10 09:51 (4)
	08:33		09:11 (3)	07:32	06:18	05:52	04:39	03:59	04:21	05:22	06:28	07:32	07:43										08:37	09:41 (4)
16	15:46	21	09:38 (2)	16:56	18:01	20:09	21:14	22:02	21:49	20:45	19:21	17:58	15:45										15:12	10 09:51 (4)
	08:31		09:09 (3)	07:30	06:15	05:49	04:37	03:58	04:22	05:24	06:30	07:34	07:45										08:38	09:42 (4)
17	15:48	23	09:38 (2)	16:59	18:03	20:11	21:17	22:02	21:48	20:43	19:18	17:55	15:43										15:12	11 09:53 (4)
	08:30		09:07 (3)	07:27	06:13	05:47	04:35	03:58	04:24	05:26	06:32	07:36	07:47										08:38	09:43 (4)
18	15:50	25	09:38 (2)	17:01	18:05	20:13	21:19	22:03	21:46	20:40	19:16	17:53	15:41										15:12	11 09:54 (4)
	08:29		09:05 (3)	07:25	06:10	05:44	04:33	03:58	04:25	05:28	06:34	07:39	07:49										08:39	09:42 (4)
19	15:52	27	09:37 (2)	17:03	18:07	20:16	21:21	22:03	21:45	20:38	19:13	17:50	15:39										15:12	11 09:53 (4)
	08:27		09:04 (3)	07:22	06:07	05:41	04:31	03:58	04:27	05:30	06:36	07:41	07:52										08:35 (3)	08:40 09:43 (4)
20	15:54	28	09:38 (2)	17:06	18:09	20:18	21:23	22:04	21:43	20:35	19:10	17:47	15:37										15:12	11 09:54 (4)
	08:26		09:02 (3)	07:20	06:04	05:39	04:29	03:58	04:29	05:32	06:38	07:43	07:54										08:36 (3)	08:41 09:43 (4)
21	15:56	30	09:38 (2)	17:08	18:12	20:20	21:25	22:04	21:41	20:32	19:07	17:45	15:36										15:13	12 09:55 (4)
	08:24		09:00 (3)	07:17	06:01	05:36	04:27	03:58	04:31	05:34	06:40	07:45	07:56										08:35 (3)	08:41 09:43 (4)
22	15:58	30	09:37 (2)	17:10	18:14	20:22	21:26	22:04	21:40	20:30	19:04	17:42	15:34										15:13	12 09:55 (4)
	08:22		09:01 (3)	07:15	05:59	05:33	04:25	03:58	04:33	05:37	06:42	07:48	07:58										08:38 (3)	08:42 09:44 (4)
23	16:00	27	09:37 (2)	17:13	18:16	20:24	21:28	22:05	21:38	20:27	19:02	17:40	15:32										15:13	12 09:56 (4)
	08:21		09:02 (3)	07:12	05:56	05:31	04:23	03:58	04:34	05:39	06:44	07:50	08:00										08:40 (3)	08:43 09:44 (4)
24	16:02	24	09:36 (2)	17:15	18:18	20:27	21:30	22:05	21:36	20:25	18:59	17:37	15:31										15:14	12 09:56 (4)
	08:19		09:03 (3)	07:10	05:53	05:28	04:22	03:59	04:36	05:41	06:47	07:52	08:02										08:43 (3)	08:43 09:46 (4)
25	16:05	18	09:34 (2)	17:17	18:21	20:29	21:32	22:05	21:34	20:22	18:56	17:35	15:29										15:15	11 09:57 (4)
	08:17		09:04 (3)	07:07	05:50	05:26	04:20	03:59	04:38	05:43	06:49	06:55	08:04										08:45 (3)	08:43 09:46 (4)
26	16:07	9	09:31 (2)	17:20	18:23	20:31	21:34	22:05	21:32	20:19	18:53	16:32	15:28										15:15	11 09:57 (4)
	08:16			07:04	05:47	05:23	04:18	04:00	04:40	05:45	06:51	06:57	08:06										08:47 (3)	08:44 09:47 (4)
27	16:09			17:22	18:25	20:33	21:36	22:05	21:31	20:17	18:50	16:30	15:26										15:16	10 09:57 (4)
	08:14			07:02	05:45	05:21	04:17	04:00	04:42	05:47	06:53	06:59	08:08										08:50 (3)	08:44 09:47 (4)
28	16:11			17:24	18:27	20:36	21:38	22:04	21:29	20:14	18:47	16:27	15:25										15:17	11 09:58 (4)
	08:12			06:59	05:42	05:18	04:15	04:01	04:44	05:49	06:55	07:01	08:10										08:57 (2)	08:44 09:48 (4)
29	16:14			17:27	18:29	20:38	21:39	22:04	21:27	20:11	18:45	16:25	15:24										15:18	10 09:58 (4)
	08:10				06:39	05:16	04:14	04:01	04:46	05:52	06:57	07:04	08:12										08:57 (2)	08:44 09:49 (4)
30	16:16				19:32	20:40	21:41	22:04	21:25	20:08	18:42	16:22	15:23										15:19	10 09:59 (4)
	08:08				06:36	05:13	04:12	04:02	04:48	05:54	06:59	07:06	08:14										08:57 (2)	08:44 09:49 (4)
31	16:18				19:34	20:42	21:43	22:03	21:22	20:06	18:39	16:20	15:21										15:20	9 09:58 (4)
	08:06				06:33		04:11		04:50	05:56		07:08											08:44	09:50 (4)
	16:21				19:36		21:44		21:20			16:17											15:21	8 09:58 (4)
Potential sun hours	227		262	366	429	515	539	538	474	386	321	241	207											
Total, worst case	445												323					</						

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:11>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (909)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April		May		June	
1	08:43 15:23	08:04 16:24		06:57 17:29	21	07:58 (A0023) 08:19 (A0023)	06:31 19:38	07:34 (A0004) 08:03 (A0004)	05:11 20:45		04:11 21:46
2	08:43 15:25	08:02 16:26		06:54 17:32	18	07:59 (A0023) 08:17 (A0023)	06:28 19:41	07:33 (A0004) 08:03 (A0004)	05:09 20:47		04:09 21:47
3	08:43 15:26	08:00 16:28		06:51 17:34	16	08:00 (A0023) 08:16 (A0023)	06:26 19:43	07:34 (A0004) 08:03 (A0004)	05:06 20:49		04:08 21:49
4	08:42 15:27	07:58 16:31		06:49 17:36	12	08:02 (A0023) 08:14 (A0023)	06:23 19:45	07:34 (A0004) 08:02 (A0004)	05:04 20:51	05:44 (A0011) 05:47 (A0011)	04:07 21:50
5	08:42 15:29	07:56 16:33		06:46 17:39	3	08:06 (A0023) 08:09 (A0023)	06:20 19:47	07:33 (A0004) 08:01 (A0004)	05:02 20:53	05:40 (A0011) 05:49 (A0011)	04:06 21:51
6	08:41 15:30	07:53 16:35		06:43 17:41			06:17 19:49	07:34 (A0004) 07:59 (A0004)	04:59 20:55	05:39 (A0011) 05:50 (A0011)	04:05 21:53
7	08:40 15:32	07:51 16:38		06:40 17:43	7	07:08 (A0009) 07:15 (A0009)	06:14 19:52	06:44 (A0012) 07:59 (A0004)	04:57 20:58	05:38 (A0011) 05:51 (A0011)	04:04 21:54
8	08:40 15:34	07:49 16:40		06:38 17:45	10	07:06 (A0009) 07:16 (A0009)	06:12 19:54	06:41 (A0012) 07:57 (A0004)	04:55 21:00	05:37 (A0011) 05:52 (A0011)	04:03 21:55
9	08:39 15:35	07:47 16:43		06:35 17:48	12	07:06 (A0009) 07:18 (A0009)	06:09 19:56	06:40 (A0012) 07:54 (A0004)	04:52 21:02	05:37 (A0011) 05:52 (A0011)	04:03 21:56
10	08:38 15:37	07:44 16:45		06:32 17:50	13	07:05 (A0009) 07:18 (A0009)	06:06 19:58	06:39 (A0012) 07:52 (A0004)	04:50 21:04	05:36 (A0011) 05:52 (A0011)	04:02 21:57
11	08:37 15:39	07:42 16:47		06:30 17:52	13	07:04 (A0009) 07:17 (A0009)	06:03 20:00	06:39 (A0012) 07:46 (A0004)	04:48 21:06	05:36 (A0011) 05:52 (A0011)	04:01 21:58
12	08:36 15:41	07:40 16:50		06:27 17:54	12	07:04 (A0009) 07:16 (A0009)	06:01 20:03	06:38 (A0007) 06:51 (A0012)	04:46 21:08	05:36 (A0011) 05:52 (A0011)	04:01 21:59
13	08:35 15:42	07:37 16:52		06:24 17:57	18	06:55 (A0008) 07:15 (A0009)	05:58 20:05	06:35 (A0007) 06:51 (A0012)	04:44 21:10	05:36 (A0011) 05:52 (A0011)	04:00 22:00
14	08:34 15:44	07:35 16:54		06:21 17:59	17	06:54 (A0008) 07:13 (A0009)	05:55 20:07	06:32 (A0007) 06:50 (A0012)	04:41 21:12	05:36 (A0011) 05:51 (A0011)	04:00 22:01
15	08:33 15:46	07:32 16:57		06:19 18:01	14	06:52 (A0008) 07:06 (A0008)	05:53 20:09	06:31 (A0007) 06:47 (A0007)	04:39 21:15	05:37 (A0011) 05:50 (A0011)	03:59 22:01
16	08:31 15:48	07:30 16:59		06:16 18:03	15	06:51 (A0008) 07:06 (A0008)	05:50 20:11	06:30 (A0007) 06:48 (A0007)	04:37 21:17	05:38 (A0011) 05:50 (A0011)	03:59 22:02
17	08:30 15:50	07:28 17:01		06:13 18:05	16	06:50 (A0008) 07:06 (A0008)	05:47 20:14	06:29 (A0007) 06:48 (A0007)	04:35 21:19	05:39 (A0011) 05:49 (A0011)	03:59 22:03
18	08:29 15:52	07:25 17:04	08:09 (A0023)	06:10 18:08	17	06:49 (A0008) 07:06 (A0008)	05:45 20:16	06:29 (A0007) 06:48 (A0007)	04:33 21:21	05:40 (A0011) 05:47 (A0011)	03:59 22:03
19	08:27 15:54	07:23 17:06	08:04 (A0023)	06:07 18:10	16	06:49 (A0008) 07:05 (A0008)	05:42 20:18	06:29 (A0007) 06:47 (A0007)	04:31 21:23		03:59 22:04
20	08:26 15:57	07:20 17:09	08:02 (A0023)	06:05 18:12	15	06:50 (A0008) 07:05 (A0008)	05:39 20:20	06:29 (A0007) 06:47 (A0007)	04:30 21:25		03:59 22:04
21	08:24 15:59	07:18 17:11	08:01 (A0023)	06:02 18:14	12	06:51 (A0008) 07:03 (A0008)	05:37 20:22	06:29 (A0007) 06:46 (A0007)	04:28 21:26		03:59 22:04
22	08:22 16:01	07:15 17:13	07:59 (A0023)	05:59 18:16	8	06:52 (A0008) 07:00 (A0008)	05:34 20:25	06:30 (A0007) 06:45 (A0007)	04:26 21:28		03:59 22:04
23	08:21 16:03	07:12 17:16	07:58 (A0023)	05:56 18:19			05:31 20:27	06:30 (A0007) 06:43 (A0007)	04:24 21:30		03:59 22:05
24	08:19 16:05	07:10 17:18	08:20 (A0023)	05:53 18:21	12	06:45 (A0004) 06:57 (A0004)	05:29 20:29	06:32 (A0007) 06:42 (A0007)	04:22 21:32		04:00 22:05
25	08:17 16:08	07:07 17:20	07:58 (A0023)	05:51 18:23	17	06:43 (A0004) 07:00 (A0004)	05:26 20:31		04:21 21:34		04:00 22:05
26	08:16 16:10	07:05 17:22	08:21 (A0023)	05:48 18:25	21	06:41 (A0004) 07:02 (A0004)	05:24 20:33		04:19 21:36		04:00 22:04
27	08:14 16:12	07:02 17:25	07:57 (A0023)	05:45 18:27	23	06:39 (A0004) 07:02 (A0004)	05:21 20:36		04:18 21:37		04:01 22:04
28	08:12 16:14	06:59 17:27	08:20 (A0023)	05:42 18:30	26	06:37 (A0004) 07:03 (A0004)	05:19 20:38		04:16 21:39		04:02 22:04
29	08:10 16:17		07:58 (A0023)	05:39 19:32	27	07:36 (A0004) 08:03 (A0004)	05:16 20:40		04:15 21:41		04:02 22:04
30	08:08 16:19			06:37 19:34	28	07:36 (A0004) 08:04 (A0004)	05:14 20:42		04:13 21:42		04:03 22:03
31	08:06 16:21			06:34 19:36	29	07:35 (A0004) 08:04 (A0004)			04:12 21:44		04:03 22:03
Potential sun hours	228	263		366			429		515		539
Total, worst case		205		468			513		187		355
Sun reduction		0,16		0,22			0,42		0,53		0,43
Oper. time red.		0,99		0,99			0,99		0,99		0,99
Wind dir. red.		0,59		0,61			0,64		0,68		0,69
Total reduction		0,09		0,13			0,27		0,35		0,29
Total, real		19		62			137		66		102

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:11>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (909)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

July		August		September		October		November		December	
1	04:04	04:58 (A0006)	04:53	05:46 (A0011)	05:58	06:38 (A0012)	07:02	07:38 (A0008)	07:11	08:16	
2	22:03	05:11 (A0006)	21:18	06:02 (A0011)	20:00	07:45 (A0004)	18:37	07:55 (A0009)	16:15	15:21	
3	04:05	04:59 (A0006)	04:55	05:46 (A0011)	06:01	06:37 (A0012)	07:04	07:43 (A0009)	07:13	08:18	
4	22:02	05:11 (A0006)	21:16	06:03 (A0011)	19:58	07:50 (A0004)	18:34	07:55 (A0009)	16:13	15:20	
5	04:06	04:58 (A0006)	04:57	05:47 (A0011)	06:03	06:38 (A0012)	07:06	07:43 (A0009)	07:15	08:20	
6	22:02	05:11 (A0006)	21:14	06:03 (A0011)	19:55	07:52 (A0004)	18:31	07:56 (A0009)	16:11	15:19	
7	04:07	04:59 (A0006)	04:59	05:47 (A0011)	06:05	06:38 (A0012)	07:08	07:43 (A0009)	07:18	08:21	
8	22:01	05:10 (A0006)	21:12	06:02 (A0011)	19:52	07:54 (A0004)	18:28	07:55 (A0009)	16:09	15:18	
9	04:08	05:00 (A0006)	05:01	05:47 (A0011)	06:07	06:40 (A0012)	07:10	07:43 (A0009)	07:20	08:23	
10	22:00	05:10 (A0006)	21:09	06:02 (A0011)	19:49	07:55 (A0004)	18:26	07:54 (A0009)	16:06	15:17	
11	04:09	05:01 (A0006)	05:03	05:48 (A0011)	06:09	07:30 (A0004)	07:13	07:43 (A0009)	07:22	08:25	
12	21:59	05:10 (A0006)	21:07	06:01 (A0011)	19:47	07:55 (A0004)	18:23	07:52 (A0009)	16:04	15:16	
13	04:10	05:02 (A0006)	05:05	05:49 (A0011)	06:11	07:29 (A0004)	07:15	07:46 (A0009)	07:25	08:26	
14	21:59	05:10 (A0006)	21:05	06:00 (A0011)	19:44	07:56 (A0004)	18:20	07:51 (A0009)	16:02	15:16	
15	04:11	05:04 (A0006)	05:07	05:50 (A0011)	06:13	07:28 (A0004)	07:17		07:27	08:28	
16	21:58	05:09 (A0006)	21:02	05:58 (A0011)	19:41	07:56 (A0004)	18:17		16:00	15:15	
17	04:13		05:09		06:15	07:27 (A0004)	07:19	08:38 (A0023)	07:29	08:29	
18	21:57		21:00		19:38	07:56 (A0004)	18:15	08:47 (A0023)	15:57	15:15	
19	04:14		05:12		06:17	07:27 (A0004)	07:21	08:35 (A0023)	07:31	08:30	
20	21:56		20:58		19:36	07:56 (A0004)	18:12	08:49 (A0023)	15:55	15:14	
21	04:15		05:14		06:20	07:26 (A0004)	07:23	08:34 (A0023)	07:34	08:32	
22	21:54		20:55		19:33	07:56 (A0004)	18:09	08:51 (A0023)	15:53	15:14	
23	04:17		05:16		06:22	07:26 (A0004)	07:26	08:32 (A0023)	07:36	08:33	
24	21:53		20:53		19:30	07:55 (A0004)	18:07	08:52 (A0023)	15:51	15:13	
25	04:18		05:18		06:24	07:26 (A0004)	07:28	08:31 (A0023)	07:38	08:34	
26	21:52		20:50		19:27	07:54 (A0004)	18:04	08:52 (A0023)	15:49	15:13	
27	04:20		05:20		06:26	07:26 (A0004)	07:30	08:31 (A0023)	07:40	08:35	
28	21:51		20:48		19:24	07:54 (A0004)	18:01	08:53 (A0023)	15:47	15:13	
29	04:21		05:22		06:28	07:27 (A0004)	07:32	08:30 (A0023)	07:43	08:36	
30	21:49		20:45		19:22	07:53 (A0004)	17:58	08:53 (A0023)	15:45	15:13	
31	04:23		05:24		06:30	07:28 (A0004)	07:34	08:29 (A0023)	07:45	08:37	
32	21:48		20:43		19:19	07:52 (A0004)	17:56	08:53 (A0023)	15:43	15:13	
33	04:25		05:26		06:32	07:29 (A0004)	07:37	08:30 (A0023)	07:47	08:38	
34	21:46		20:40		19:16	07:50 (A0004)	17:53	08:53 (A0023)	15:42	15:13	
35	04:26		05:29	06:41 (A0007)	06:34	07:30 (A0004)	07:39	08:30 (A0023)	07:49	08:39	
36	21:45		20:38	06:45 (A0007)	19:13	07:48 (A0004)	17:51	08:52 (A0023)	15:40	15:13	
37	04:28		05:31	06:38 (A0007)	06:36	07:32 (A0004)	07:41	08:30 (A0023)	07:52	08:40	
38	21:43		20:35	06:48 (A0007)	19:10	07:46 (A0004)	17:48	08:51 (A0023)	15:38	15:13	
39	04:30		05:33	06:36 (A0007)	06:38	07:37 (A0004)	07:43	08:31 (A0023)	07:54	08:41	
40	21:41		20:33	06:49 (A0007)	19:08	07:40 (A0004)	17:45	08:51 (A0023)	15:36	15:13	
41	04:32		05:35	06:35 (A0007)	06:41	07:39 (A0008)	07:46	08:31 (A0023)	07:56	08:41	
42	21:40		20:30	06:50 (A0007)	19:05	07:45 (A0008)	17:43	08:49 (A0023)	15:35	15:14	
43	04:33		05:37	06:34 (A0007)	06:43	07:36 (A0008)	07:48	08:33 (A0023)	07:58	08:42	
44	21:38		20:27	06:51 (A0007)	19:02	07:47 (A0008)	17:40	08:48 (A0023)	15:33	15:14	
45	04:35		05:39	06:33 (A0007)	06:45	07:34 (A0008)	07:50	08:35 (A0023)	08:00	08:42	
46	21:36		20:25	06:51 (A0007)	18:59	07:48 (A0008)	17:38	08:45 (A0023)	15:32	15:15	
47	04:37		05:41	06:32 (A0007)	06:47	07:33 (A0008)	07:52		08:02	08:43	
48	21:34		20:22	06:51 (A0007)	18:56	07:49 (A0008)	17:35		15:30	15:15	
49	04:39	05:53 (A0011)	05:44	06:32 (A0007)	06:49	07:32 (A0008)	06:55		08:04	08:43	
50	21:32	05:57 (A0011)	20:19	06:51 (A0007)	18:53	07:49 (A0008)	16:33		15:29	15:16	
51	04:41	05:50 (A0011)	05:46	06:32 (A0007)	06:51	07:32 (A0008)	06:57		08:06	08:43	
52	21:31	05:58 (A0011)	20:17	06:51 (A0007)	18:51	07:48 (A0008)	16:30		15:27	15:17	
53	04:43	05:49 (A0011)	05:48	06:32 (A0007)	06:53	07:32 (A0008)	06:59		08:08	08:44	
54	21:29	06:00 (A0011)	20:14	06:50 (A0007)	18:48	07:48 (A0008)	16:28		15:26	15:18	
55	04:45	05:48 (A0011)	05:50	06:33 (A0007)	06:55	07:33 (A0008)	07:02		08:10	08:44	
56	21:27	06:01 (A0011)	20:11	06:49 (A0007)	18:45	07:47 (A0008)	16:25		15:24	15:19	
57	04:47	05:48 (A0011)	05:52	06:33 (A0007)	06:58	07:33 (A0008)	07:04		08:12	08:44	
58	21:25	06:02 (A0011)	20:09	06:51 (A0012)	18:42	07:46 (A0008)	16:23		15:23	15:20	
59	04:49	05:47 (A0011)	05:54	06:35 (A0007)	07:00	07:34 (A0008)	07:06		08:14	08:44	
60	21:22	06:03 (A0011)	20:06	06:51 (A0012)	18:39	07:54 (A0009)	16:20		15:22	15:21	
61	04:51	05:46 (A0011)	05:56	06:38 (A0007)			07:08			08:44	
62	21:20	06:02 (A0011)	20:03	06:51 (A0012)			16:18			15:22	
63	Potential sun hours	538	474		386		321		241	207	
64	Total, worst case	163	326		634		354				
65	Sun reduction	0,38	0,35		0,31		0,26				
66	Oper. time red.	0,99	0,99		0,99		0,99				
67	Wind dir. red.	0,69	0,67		0,63		0,59				
68	Total reduction	0,26	0,23		0,19		0,15				
69	Total, real	42	75		121		53				

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:17>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (823)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April		May		June	
1	08:43	08:04	08:52 (A0023)	06:57		06:31	07:08 (A0011)	05:11	05:40 (A0005)	04:11	
	15:23	16:24	11 09:03 (A0023)	17:29		19:38	07:55 (A0003)	20:45	10 05:50 (A0005)	21:46	
2	08:43	08:02	08:54 (A0023)	06:54		06:28	07:08 (A0011)	05:09	05:38 (A0005)	04:09	
	15:25	16:26	8 09:02 (A0023)	17:32		19:41	07:54 (A0003)	20:47	12 05:50 (A0005)	21:47	
3	08:43	08:00		06:51		06:26	07:10 (A0011)	05:06	05:37 (A0005)	04:08	
	15:26	16:28		17:34		19:43	07:54 (A0003)	20:49	14 05:51 (A0005)	21:49	
4	08:42	07:58		06:49		06:23	07:26 (A0003)	05:04	05:37 (A0005)	04:07	
	15:27	16:31		17:36		19:45	07:53 (A0003)	20:51	14 05:51 (A0005)	21:50	
5	08:42	07:56		06:46		06:20	07:26 (A0003)	05:02	05:36 (A0005)	04:06	
	15:29	16:33		17:39		19:47	07:52 (A0003)	20:53	14 05:50 (A0005)	21:51	
6	08:41	07:53		06:43		07:10 (A0007)	06:17	07:27 (A0003)	04:59	05:37 (A0005)	04:05
	15:30	16:35		17:41	7 07:17 (A0007)	19:49	23 07:50 (A0003)	20:55	13 05:50 (A0005)	21:53	
7	08:40	07:51		06:41		07:07 (A0007)	06:14	07:28 (A0003)	04:57	05:37 (A0005)	04:04
	15:32	16:38		17:43	11 07:18 (A0007)	19:52	22 07:50 (A0003)	20:58	13 05:50 (A0005)	21:54	
8	08:40	07:49	08:22 (A0004)	06:38		07:05 (A0007)	06:12	07:29 (A0003)	04:55	05:38 (A0005)	04:03
	15:33	16:40	8 08:30 (A0004)	17:45	14 07:19 (A0007)	19:54	18 07:47 (A0003)	21:00	11 05:49 (A0005)	21:55	
9	08:39	07:47	08:19 (A0004)	06:35		07:05 (A0007)	06:09	07:31 (A0003)	04:52	05:39 (A0005)	04:03
	15:35	16:43	12 08:31 (A0004)	17:48	15 07:20 (A0007)	19:56	13 07:44 (A0003)	21:02	9 05:48 (A0005)	21:56	
10	08:38	07:44	08:19 (A0004)	06:32		07:04 (A0007)	06:06	07:35 (A0003)	04:50	05:40 (A0005)	04:02
	15:37	16:45	14 08:33 (A0004)	17:50	15 07:19 (A0007)	19:58	6 07:41 (A0003)	21:04	6 05:46 (A0005)	21:57	6 05:11 (A0002)
11	08:37	07:42	08:17 (A0004)	06:30		07:04 (A0007)	06:03			04:48	05:11 (A0002)
	15:39	16:47	17 08:34 (A0004)	17:52	15 07:19 (A0007)	20:00				21:06	21:58 8 05:19 (A0002)
12	08:36	07:40	08:17 (A0004)	06:27		07:04 (A0007)	06:01			04:46	04:01 05:09 (A0002)
	15:41	16:50	18 08:35 (A0004)	17:54	14 07:18 (A0007)	20:03				21:08	21:59 11 05:20 (A0002)
13	08:35	07:37	08:16 (A0004)	06:24		07:05 (A0007)	05:58	06:30 (A0006)	04:44		04:00 05:09 (A0002)
	15:42	16:52	19 08:35 (A0004)	17:57	11 07:16 (A0007)	20:05	9 06:39 (A0006)	21:10			22:00 12 05:21 (A0002)
14	08:34	07:35	08:16 (A0004)	06:21		07:07 (A0007)	05:55	06:28 (A0006)	04:41		04:00 05:09 (A0002)
	15:44	16:54	19 08:35 (A0004)	17:59	7 07:14 (A0007)	20:07	12 06:40 (A0006)	21:13			22:01 13 05:22 (A0002)
15	08:33	07:33	08:16 (A0004)	06:19		05:53	06:26 (A0006)	04:39			03:59 05:09 (A0002)
	15:46	16:57	19 08:35 (A0004)	18:01		20:09	14 06:40 (A0006)	21:15			22:01 14 05:23 (A0002)
16	08:31	07:30	08:16 (A0004)	06:16		05:50	06:26 (A0006)	04:37			03:59 05:08 (A0002)
	15:48	16:59	18 08:34 (A0004)	18:03		20:11	15 06:41 (A0006)	21:17			22:02 14 05:22 (A0002)
17	08:30	07:28	08:17 (A0004)	06:13		05:47	06:25 (A0006)	04:35			03:59 05:08 (A0002)
	15:50	17:01	17 08:34 (A0004)	18:05		20:14	16 06:41 (A0006)	21:19			22:03 15 05:23 (A0002)
18	08:29	07:25	08:18 (A0004)	06:10		05:45	06:25 (A0006)	04:33			03:59 05:08 (A0002)
	15:52	17:04	15 08:33 (A0004)	18:08		20:16	16 06:41 (A0006)	21:21			22:03 15 05:23 (A0002)
19	08:27	07:23	08:19 (A0004)	06:07		05:42	06:25 (A0006)	04:31			03:59 05:08 (A0002)
	15:54	17:06	12 08:31 (A0004)	18:10		20:18	15 06:40 (A0006)	21:23			22:04 16 05:24 (A0002)
20	08:26	07:20	08:21 (A0004)	06:05		05:39	06:26 (A0006)	04:30			03:59 05:09 (A0002)
	15:57	17:09	8 08:29 (A0004)	18:12		20:20	14 06:40 (A0006)	21:25			22:04 16 05:25 (A0002)
21	08:24	07:18		06:02		05:37	06:26 (A0006)	04:28			03:59 05:09 (A0002)
	15:59	17:11		18:14		20:22	12 06:38 (A0006)	21:27			22:04 16 05:25 (A0002)
22	08:23	07:15		05:59		05:34	06:28 (A0006)	04:26			03:59 05:09 (A0002)
	16:01	17:13		18:16		20:25	8 06:36 (A0006)	21:28			22:04 16 05:25 (A0002)
23	08:21	07:12		05:56		06:42 (A0003)	05:31	04:24			03:59 05:09 (A0002)
	16:03	17:16		18:19	4 06:46 (A0003)	20:27		21:30			22:05 16 05:25 (A0002)
24	08:19	07:10		05:53		06:37 (A0003)	05:29	04:22			04:00 05:10 (A0002)
	16:05	17:18		18:21	13 06:50 (A0003)	20:29		21:32			22:05 16 05:26 (A0002)
25	08:17	07:07		05:51		06:35 (A0003)	05:26	04:21			04:00 05:10 (A0002)
	16:08	17:20		18:23	18 06:53 (A0003)	20:31		21:34			22:05 15 05:25 (A0002)
26	08:16	07:05		05:48		06:16 (A0011)	05:24	04:19			04:00 05:11 (A0002)
	16:10	17:22		18:25	25 06:54 (A0003)	20:34		21:36			22:05 15 05:26 (A0002)
27	08:14	07:02		05:45		06:12 (A0011)	05:21	04:18			04:01 05:11 (A0002)
	16:12	17:25		18:27	33 06:55 (A0003)	20:36		21:38			22:04 14 05:25 (A0002)
28	08:12	06:59		05:42		06:10 (A0011)	05:19	04:16			04:02 05:12 (A0002)
	16:14	17:27		18:30	38 06:55 (A0003)	20:38		21:39			22:04 13 05:25 (A0002)
29	08:10			06:39		07:09 (A0011)	05:16	04:15			04:02 05:12 (A0002)
	16:17			19:32	40 07:55 (A0003)	20:40	1 05:46 (A0005)	21:41			22:04 12 05:24 (A0002)
30	08:08			06:37		07:09 (A0011)	05:14	04:13			04:03 05:13 (A0002)
	16:19			19:34	42 07:56 (A0003)	20:42	6 05:48 (A0005)	21:43			22:03 11 05:24 (A0002)
31	08:06			06:34		07:08 (A0011)		04:12			
	16:21			19:36	44 07:56 (A0003)			21:44			
Potential sun hours	228	262		366		429		515		539	
Total, worst case	118	215		366		392		116		284	
Sun reduction	0,19	0,16		0,22		0,42		0,53		0,43	
Oper. time red.	0,99	0,99		0,99		0,99		0,99		0,99	
Wind dir. red.	0,55	0,58		0,62		0,64		0,68		0,69	
Total reduction	0,10	0,09		0,13		0,27		0,35		0,29	
Total, real	12	20		49		104		41		81	

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:17>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (823)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	04:04		05:14 (A0002)	04:53		05:58		07:02		07:44 (A0007)	07:11		07:48 (A0004)	08:16				
	22:03	10	05:24 (A0002)	21:18		20:01		18:37	12	07:56 (A0007)	16:15	15	08:03 (A0004)	15:21				
2	04:05		05:16 (A0002)	04:55		06:01		07:33 (A0003)	07:04	07:42 (A0007)	07:13		07:49 (A0004)	08:18				
	22:02	7	05:23 (A0002)	21:16		19:58	6	07:39 (A0003)	18:34	07:57 (A0007)	16:13	12	08:01 (A0004)	15:20				
3	04:06		05:18 (A0002)	04:57		06:03		07:29 (A0003)	07:06	07:43 (A0007)	07:15		07:52 (A0004)	08:20				
	22:02	2	05:20 (A0002)	21:14	7	05:57 (A0005)	19:55	13	07:42 (A0003)	18:31	15	07:58 (A0007)	16:11	7	07:59 (A0004)	15:19		
4	04:07			04:59		05:49 (A0005)	06:05		07:26 (A0003)	07:08		07:42 (A0007)	07:18		08:21			
	22:01			21:12	9	05:58 (A0005)	19:52	18	07:44 (A0003)	18:28	15	07:57 (A0007)	16:09		15:18			
5	04:08			05:01		05:48 (A0005)	06:07		07:24 (A0003)	07:10		07:42 (A0007)	07:20		08:23			
	22:00			21:09	11	05:59 (A0005)	19:50	22	07:46 (A0003)	18:26	14	07:56 (A0007)	16:06		15:17			
6	04:09			05:03		05:47 (A0005)	06:09		07:23 (A0003)	07:13		07:42 (A0007)	07:22		08:25			
	22:00			21:07	13	06:00 (A0005)	19:47	24	07:47 (A0003)	18:23	13	07:55 (A0007)	16:04		15:16			
7	04:10			05:05		05:47 (A0005)	06:11		07:22 (A0003)	07:15		07:45 (A0007)	07:25		08:26			
	21:59			21:05	14	06:01 (A0005)	19:44	25	07:47 (A0003)	18:20	9	07:54 (A0007)	16:02		15:16			
8	04:11			05:07		05:46 (A0005)	06:13		07:21 (A0003)	07:17		07:47 (A0007)	07:27		08:28			
	21:58			21:02	14	06:00 (A0005)	19:41	27	07:48 (A0003)	18:17	4	07:51 (A0007)	16:00		15:15			
9	04:12			05:09		05:46 (A0005)	06:15		07:04 (A0011)	07:19			07:29		08:25 (A0023)	08:29		
	21:57			21:00	14	06:00 (A0005)	19:38	36	07:48 (A0003)	18:15			15:57	8	08:33 (A0023)	15:14		
10	04:14			05:12		05:46 (A0005)	06:17		07:02 (A0011)	07:21			07:31		08:24 (A0023)	08:31		
	21:56			20:58	13	05:59 (A0005)	19:36	40	07:48 (A0003)	18:12			15:55	11	08:35 (A0023)	15:14		
11	04:15			05:14		05:47 (A0005)	06:20		07:01 (A0011)	07:23			07:34		08:23 (A0023)	08:32		
	21:54			20:55	12	05:59 (A0005)	19:33	41	07:47 (A0003)	18:09			15:53	12	08:35 (A0023)	15:14		
12	04:17			05:16		05:49 (A0005)	06:22		07:00 (A0011)	07:26			07:36		08:23 (A0023)	08:33		
	21:53			20:53	9	05:58 (A0005)	19:30	43	07:47 (A0003)	18:07			15:51	14	08:37 (A0023)	15:13		
13	04:18			05:18		05:51 (A0005)	06:24		06:59 (A0011)	07:28			07:38		08:22 (A0023)	08:34		
	21:52			20:50	5	05:56 (A0005)	19:27	43	07:46 (A0003)	18:04			15:49	15	08:37 (A0023)	15:13		
14	04:20			05:20			06:26		06:59 (A0011)	07:30			07:41		08:22 (A0023)	08:35		
	21:51			20:48			19:24	42	07:46 (A0003)	18:01			15:47	15	08:37 (A0023)	15:13		
15	04:21			05:22			06:28		07:01 (A0011)	07:32			07:43		08:22 (A0023)	08:37		
	21:49			20:45			19:22	39	07:46 (A0003)	17:58			15:45	15	08:37 (A0023)	15:13		
16	04:23			05:24			06:30		07:01 (A0011)	07:35			07:45		08:23 (A0023)	08:38		
	21:48			20:43			19:19	34	07:44 (A0003)	17:56			15:43	15	08:38 (A0023)	15:13		
17	04:25			05:26			06:32		07:04 (A0011)	07:37			07:47		08:25 (A0023)	08:38		
	21:46			20:40			19:16	26	07:43 (A0003)	17:53			15:42	12	08:37 (A0023)	15:13		
18	04:26			05:29			06:34		07:22 (A0003)	07:39			07:49		08:28 (A0023)	08:39		
	21:45			20:38			19:13	19	07:41 (A0003)	17:51			15:40	9	08:37 (A0023)	15:13		
19	04:28			05:31			06:36		07:24 (A0003)	07:41			07:52		08:30 (A0023)	08:40		
	21:43			20:35			19:10	14	07:38 (A0003)	17:48			15:38	6	08:36 (A0023)	15:13		
20	04:30			05:33		06:36 (A0006)	06:38		07:27 (A0003)	07:43			07:54		08:33 (A0023)	08:41		
	21:41			20:33	2	06:38 (A0006)	19:08		07:34 (A0003)	17:45			15:36	3	08:36 (A0023)	15:13		
21	04:31			05:35		06:32 (A0006)	06:41	7		07:46			07:56		08:41			
	21:40			20:30	9	06:41 (A0006)	19:05			17:43			15:35		15:14			
22	04:33			05:37		06:31 (A0006)	06:43			07:48		08:51 (A0004)	07:58		08:42			
	21:38			20:27	12	06:43 (A0006)	19:02			17:40	10	09:01 (A0004)	15:33		15:14			
23	04:35			05:39		06:29 (A0006)	06:45			07:50		08:48 (A0004)	08:00		08:43			
	21:36			20:25	14	06:43 (A0006)	18:59			17:38	14	09:02 (A0004)	15:31		15:15			
24	04:37			05:41		06:29 (A0006)	06:47			07:52		08:48 (A0004)	08:02		08:43			
	21:34			20:22	15	06:44 (A0006)	18:56			17:35	16	09:04 (A0004)	15:30		15:15			
25	04:39			05:44		06:28 (A0006)	06:49			06:55		07:46 (A0004)	08:04		08:43			
	21:33			20:19	16	06:44 (A0006)	18:53			16:33	18	08:04 (A0004)	15:29		15:16			
26	04:41			05:46		06:28 (A0006)	06:51			06:57		07:45 (A0004)	08:06		08:44			
	21:31			20:17	16	06:44 (A0006)	18:51			16:30	19	08:04 (A0004)	15:27		15:17			
27	04:43			05:48		06:28 (A0006)	06:53			06:59		07:46 (A0004)	08:08		08:44			
	21:29			20:14	15	06:43 (A0006)	18:48			16:28	18	08:04 (A0004)	15:26		15:18			
28	04:45			05:50		06:28 (A0006)	06:55			07:02		07:45 (A0004)	08:10		08:44			
	21:27			20:11	14	06:42 (A0006)	18:45			16:25	19	08:04 (A0004)	15:24		15:19			
29	04:47			05:52		06:29 (A0006)	06:58		07:49 (A0007)	07:04		07:46 (A0004)	08:12		08:44			
	21:25			20:09	12	06:41 (A0006)	18:42	4	07:53 (A0007)	16:23	18	08:04 (A0004)	15:23		15:20			
30	04:49			05:54		06:30 (A0006)	07:00		07:45 (A0007)	07:06		07:46 (A0004)	08:14		08:44			
	21:23			20:06	9	06:39 (A0006)	18:40	10		16:20	17	08:03 (A0004)	15:22		15:21			
31	04:51			05:56						07:08		07:47 (A0004)			08:44			
	21:20			20:03						16:18	16	08:03 (A0004)			15:22			
Potential sun hours	538			474			386		321		241		207					
Total, worst case		19			255			533		262		169						
Sun reduction		0,38			0,35			0,31		0,26		0,17						
Oper. time red.		0,99			0,99			0,99		0,99		0,99						
Wind dir. red.		0,69			0,67			0,63		0,59		0,56						
Total reduction		0,26			0,23			0,19		0,15		0,09						
Total, real		5			59			103		39		16						

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

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



Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:18>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (811)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

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

609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:24	08:39 (A0023) 08:55 (A0023)	06:57 17:29	06:31 19:38	05:11 20:45
2	08:43 15:25	08:02 16:26	08:40 (A0023) 08:56 (A0023)	06:54 17:32	06:28 19:41	06:17 (A0006) 20:47
3	08:43 15:26	08:00 16:28	08:40 (A0023) 08:56 (A0023)	06:51 17:34	06:26 19:43	06:15 (A0006) 20:49
4	08:42 15:27	07:58 16:31	08:40 (A0023) 08:56 (A0023)	06:49 17:36	06:56 (A0011) 19:45	05:06 20:51
5	08:42 15:29	07:56 16:33	08:41 (A0023) 08:56 (A0023)	06:46 17:39	06:52 (A0011) 19:47	05:02 20:53
6	08:41 15:30	07:53 16:35	08:42 (A0023) 08:56 (A0023)	06:43 17:41	06:51 (A0011) 19:49	04:59 20:55
7	08:40 15:32	07:51 16:38	08:42 (A0023) 08:54 (A0023)	06:41 17:43	06:51 (A0011) 19:52	05:27 (A0005) 20:58
8	08:40 15:33	07:49 16:40	08:44 (A0023) 08:53 (A0023)	06:38 17:45	06:51 (A0011) 19:54	05:30 (A0005) 21:00
9	08:39 15:35	07:47 16:43	08:47 (A0023) 08:49 (A0023)	06:35 17:48	06:50 (A0011) 19:56	05:32 (A0005) 21:02
10	08:38 15:37	07:44 16:45	08:47 (A0023) 08:49 (A0023)	06:32 17:50	06:52 (A0011) 19:58	05:34 (A0005) 21:04
11	08:37 15:39	07:42 16:47	08:47 (A0023) 08:49 (A0023)	06:30 17:52	06:53 (A0011) 20:00	05:34 (A0005) 21:06
12	08:36 15:41	07:40 16:50	08:47 (A0023) 08:49 (A0023)	06:27 17:54	06:54 (A0003) 20:03	05:34 (A0005) 21:08
13	08:35 15:42	07:37 16:52	08:47 (A0023) 08:49 (A0023)	06:24 17:57	06:54 (A0003) 20:03	05:34 (A0005) 21:10
14	08:34 15:44	07:35 16:54	08:47 (A0023) 08:49 (A0023)	06:21 17:59	06:54 (A0003) 20:03	05:34 (A0005) 21:10
15	08:33 15:46	07:33 16:57	08:47 (A0023) 08:49 (A0023)	06:19 18:01	06:54 (A0003) 20:03	05:34 (A0005) 21:10
16	08:31 15:48	07:30 16:59	08:47 (A0023) 08:49 (A0023)	06:16 18:03	06:54 (A0003) 20:03	05:34 (A0005) 21:10
17	08:30 15:50	07:28 17:01	08:47 (A0023) 08:49 (A0023)	06:13 18:05	06:54 (A0003) 20:03	05:34 (A0005) 21:10
18	08:29 15:52	07:25 17:04	08:47 (A0023) 08:49 (A0023)	06:10 18:08	06:54 (A0003) 20:03	05:34 (A0005) 21:10
19	08:27 15:54	07:23 17:06	08:47 (A0023) 08:49 (A0023)	06:07 18:10	06:54 (A0003) 20:03	05:34 (A0005) 21:10
20	08:26 15:57	07:20 17:09	08:47 (A0023) 08:49 (A0023)	06:05 18:12	06:54 (A0003) 20:03	05:34 (A0005) 21:10
21	08:24 15:59	07:18 17:11	08:47 (A0023) 08:49 (A0023)	06:02 18:14	06:54 (A0003) 20:03	05:34 (A0005) 21:10
22	08:23 16:01	07:15 17:13	08:47 (A0023) 08:49 (A0023)	05:59 18:16	06:54 (A0003) 20:03	05:34 (A0005) 21:10
23	08:21 16:03	07:12 17:16	08:47 (A0023) 08:49 (A0023)	05:56 18:19	06:54 (A0003) 20:03	05:34 (A0005) 21:10
24	08:19 16:05	07:10 17:18	08:47 (A0023) 08:49 (A0023)	05:53 18:21	06:54 (A0003) 20:03	05:34 (A0005) 21:10
25	08:17 16:08	07:07 17:20	08:47 (A0023) 08:49 (A0023)	05:51 18:23	06:54 (A0003) 20:03	05:34 (A0005) 21:10
26	08:16 16:10	07:05 17:22	08:47 (A0023) 08:49 (A0023)	05:48 18:25	06:54 (A0003) 20:03	05:34 (A0005) 21:10
27	08:14 16:12	07:02 17:25	08:47 (A0023) 08:49 (A0023)	05:45 18:27	06:54 (A0003) 20:03	05:34 (A0005) 21:10
28	08:12 16:14	06:59 17:27	08:47 (A0023) 08:49 (A0023)	05:42 18:30	06:54 (A0003) 20:03	05:34 (A0005) 21:10
29	08:10 16:17	06:57 17:29	08:47 (A0023) 08:49 (A0023)	05:39 18:33	06:54 (A0003) 20:03	05:34 (A0005) 21:10
30	08:08 16:19	06:55 17:31	08:47 (A0023) 08:49 (A0023)	05:36 18:36	06:54 (A0003) 20:03	05:34 (A0005) 21:10
31	08:06 16:21	06:53 17:33	08:47 (A0023) 08:49 (A0023)	05:33 18:39	06:54 (A0003) 20:03	05:34 (A0005) 21:10
Potential sun hours	228	262	366	429	515	539
Total, worst case	44	403	117	701	162	
Sun reduction	0,19	0,16	0,22	0,42	0,53	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,56	0,58	0,61	0,65	0,69	
Total reduction	0,10	0,09	0,13	0,27	0,35	
Total, real	4	37	16	190	57	

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

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

Project:

bruzaholm

Licensed user:

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Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:18>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (811)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:04 22:03	04:53 21:18	05:31 (A0005) 05:45 (A0005)	05:58 20:01	06:52 (A0011) 07:19 (A0003)	07:02 18:37
2	04:05 22:02	04:55 21:16	05:32 (A0005) 05:45 (A0005)	06:01 19:58	06:50 (A0011) 07:17 (A0003)	07:04 18:34
3	04:06 22:02	04:57 21:14	05:33 (A0005) 05:44 (A0005)	06:03 19:55	06:48 (A0011) 07:15 (A0003)	07:06 18:31
4	04:07 22:01	04:59 21:12	05:34 (A0005) 05:43 (A0005)	06:05 19:52	06:48 (A0011) 07:12 (A0003)	07:08 18:28
5	04:08 22:00	05:01 21:09	05:36 (A0005) 05:42 (A0005)	06:07 19:50	06:47 (A0011) 07:08 (A0003)	07:10 18:26
6	04:09 22:00	05:03 21:07	06:09 19:47	06:47 (A0011) 07:01 (A0011)	07:13 18:23	07:15 16:04
7	04:10 21:59	05:05 21:05	06:11 19:44	06:47 (A0011) 07:00 (A0011)	07:15 18:20	07:25 16:02
8	04:11 21:58	05:07 21:02	06:13 19:41	06:47 (A0011) 06:59 (A0011)	07:17 18:17	07:27 16:00
9	04:12 21:57	05:09 21:00	06:15 19:38	06:49 (A0011) 06:57 (A0011)	07:19 18:15	07:29 15:57
10	04:14 21:56	05:12 20:58	06:17 19:36	07:21 18:12	07:31 15:55	08:11 (A0023) 08:27 (A0023)
11	04:15 21:54	05:14 20:55	06:20 19:33	07:23 18:09	07:34 (A0004) 15:53	08:15 (A0023) 08:26 (A0023)
12	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:07	07:36 15:51	08:13 (A0023) 08:26 (A0023)
13	04:18 21:52	05:18 20:50	06:24 (A0006) 06:27 (A0006)	07:28 18:04	13 08:38 (A0004) 08:44 (A0004)	08:15 (A0023) 08:24 (A0023)
14	04:20 21:51	05:20 20:48	06:26 19:24	07:30 18:01	6 08:44 (A0004) 08:18 (A0008)	9 08:24 (A0023) 08:18 (A0023)
15	04:21 21:49	05:22 20:45	06:28 (A0006) 06:29 (A0006)	07:32 17:58	17 08:48 (A0004) 08:15 (A0008)	6 08:24 (A0023) 08:13 (A0023)
16	04:23 21:48	05:24 20:43	06:30 19:19	07:35 17:56	25 08:49 (A0004) 08:14 (A0008)	08:15 (A0023) 08:10 (A0023)
17	04:25 21:46	05:26 20:40	06:32 19:16	07:37 17:53	29 08:49 (A0004) 08:14 (A0008)	15:43 15:42
18	04:26 21:45	05:29 20:38	06:34 19:13	07:39 17:51	32 08:51 (A0004) 08:13 (A0008)	15:42 08:39
19	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	33 08:51 (A0004) 08:13 (A0008)	15:40 08:40
20	04:30 21:41	05:33 20:33	06:38 19:08	07:43 17:45	32 08:50 (A0004) 08:15 (A0008)	15:38 08:41
21	04:32 21:40	05:35 20:30	06:41 19:05	07:46 17:43	30 08:51 (A0004) 08:17 (A0008)	15:36 08:41
22	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	27 08:50 (A0004) 08:20 (A0008)	15:34 08:42
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	21 08:50 (A0004) 08:32 (A0004)	15:33 08:43
24	04:37 21:34	05:41 20:22	06:54 (A0003) 07:23 (A0003)	12 07:44 (A0007) 07:30 (A0007)	16 08:48 (A0004) 08:33 (A0004)	15:15 08:43
25	04:39 21:33	05:43 (A0005) 05:34 (A0005)	06:49 18:53	14 07:44 (A0007) 07:29 (A0007)	15 08:48 (A0004) 07:35 (A0004)	15:15 08:43
26	04:41 21:31	05:46 (A0005) 05:33 (A0005)	06:51 18:51	16 07:45 (A0007) 07:30 (A0007)	10 07:45 (A0004) 07:38 (A0004)	15:16 08:44
27	04:43 21:29	05:48 (A0005) 05:44 (A0005)	06:53 18:48	15 07:45 (A0007) 07:29 (A0007)	3 07:41 (A0004) 08:08	15:17 08:44
28	04:45 21:27	05:50 20:11	06:55 18:45	16 07:45 (A0007) 07:29 (A0007)	15 07:45 (A0004) 07:30 (A0007)	15:18 08:44
29	04:47 21:25	05:52 (A0005) 05:46 (A0005)	06:58 18:42	15 07:44 (A0007) 07:22 (A0003)	15 07:45 (A0004) 07:30 (A0007)	15:19 08:44
30	04:49 21:23	05:54 (A0005) 05:46 (A0005)	07:00 18:40	12 07:42 (A0007) 07:31 (A0007)	15 07:45 (A0004) 08:14	15:20 08:44
31	04:51 21:20	05:56 (A0005) 05:45 (A0005)	06:54 (A0003) 07:20 (A0003)	10 07:41 (A0007) 07:08	15 07:45 (A0004) 16:18	15:21 08:44
Potential sun hours	538	474	386	321	241	207
Total, worst case	92	607	290	299	166	
Sun reduction	0,38	0,35	0,31	0,26	0,17	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,69	0,66	0,64	0,59	0,56	
Total reduction	0,26	0,23	0,19	0,15	0,09	
Total, real	24	138	56	45	16	

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:19>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (897)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	08:43 15:23	08:04 16:24	06:57 17:29	07:48 (A0023) 19:38	06:31 27 07:56 (A0004)	05:11 20:45	04:11 12 05:11 (A0006)
2	08:43 15:25	08:02 16:26	06:54 17:32	07:48 (A0023) 19:41	06:28 26 07:55 (A0004)	05:09 20:47	04:58 (A0006) 13 05:11 (A0006)
3	08:43 15:26	08:00 16:28	06:51 17:34	07:48 (A0023) 19:43	06:26 26 07:55 (A0004)	05:06 20:49	04:58 (A0006) 14 05:12 (A0006)
4	08:42 15:27	07:58 16:31	06:49 17:36	07:49 (A0023) 19:45	06:23 25 07:54 (A0004)	05:04 20:51	04:58 (A0006) 14 05:12 (A0006)
5	08:42 15:29	07:56 16:33	06:46 17:39	07:50 (A0023) 19:47	06:20 24 07:53 (A0004)	05:02 20:53	04:58 (A0006) 14 05:12 (A0006)
6	08:41 15:30	07:53 16:35	06:43 17:41	07:52 (A0023) 19:49	06:17 21 07:51 (A0004)	04:59 20:55	04:58 (A0006) 15 05:13 (A0006)
7	08:40 15:32	07:51 16:38	06:41 17:43	08:02 (A0023) 19:52	06:14 27 07:50 (A0004)	04:57 20:58	04:58 (A0006) 15 05:13 (A0006)
8	08:40 15:34	07:49 16:40	06:38 17:45	06:12 27 07:48 (A0004)	04:55 21:00	05:55 (A0011) 21:55	04:58 (A0006) 15 05:13 (A0006)
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 23 07:45 (A0004)	04:52 21:02	05:40 (A0011) 21:56	04:58 (A0006) 16 05:14 (A0006)
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 13 06:53 (A0012)	04:50 21:04	05:40 (A0011) 21:57	04:58 (A0006) 16 05:14 (A0006)
11	08:37 15:39	07:42 16:47	06:30 17:52	06:03 13 06:52 (A0012)	04:48 21:06	05:41 (A0011) 21:58	04:59 (A0006) 15 05:14 (A0006)
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 16 06:51 (A0012)	04:46 21:08	05:41 (A0011) 21:59	04:58 (A0006) 16 05:14 (A0006)
13	08:35 15:42	07:37 16:52	06:24 17:57	05:58 16 06:50 (A0012)	04:44 21:10	05:42 (A0011) 22:00	04:59 (A0006) 16 05:15 (A0006)
14	08:34 15:44	07:35 16:54	06:21 17:59	06:52 (A0008) 8 07:00 (A0008)	05:55 16 06:48 (A0007)	04:42 21:12	04:59 (A0006) 16 05:15 (A0006)
15	08:33 15:46	07:33 16:57	06:19 18:01	05:53 11 07:01 (A0008)	04:39 17 06:48 (A0007)	8 05:51 (A0011) 22:01	05:00 (A0006) 15 05:15 (A0006)
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 14 07:02 (A0008)	04:37 17 06:48 (A0007)	04:37 22:02	04:59 (A0006) 16 05:15 (A0006)
17	08:30 15:50	07:28 17:01	06:13 18:05	05:47 15 07:02 (A0008)	04:35 18 06:48 (A0007)	04:35 22:03	04:59 (A0006) 16 05:15 (A0006)
18	08:29 15:52	07:25 17:04	06:10 18:08	05:45 16 07:02 (A0008)	04:33 17 06:48 (A0007)	04:33 22:03	04:59 (A0006) 16 05:15 (A0006)
19	08:27 15:54	07:23 17:06	06:07 18:10	05:42 15 07:01 (A0008)	04:31 17 06:47 (A0007)	04:31 22:04	05:00 (A0006) 15 05:15 (A0006)
20	08:26 15:57	07:20 17:09	06:05 18:12	05:39 14 07:01 (A0008)	04:30 15 06:46 (A0007)	04:30 22:04	05:01 (A0006) 15 05:16 (A0006)
21	08:24 15:59	07:18 17:11	06:02 18:14	05:37 13 07:00 (A0008)	04:28 12 06:44 (A0007)	04:28 22:04	05:01 (A0006) 16 05:17 (A0006)
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 9 06:57 (A0008)	04:26 10 06:43 (A0007)	04:26 22:04	05:01 (A0006) 15 05:16 (A0006)
23	08:21 16:03	07:12 17:16	05:56 18:19	05:31 2 06:51 (A0008)	04:24 21:30	04:24 22:05	05:01 (A0006) 15 05:16 (A0006)
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 6 06:48 (A0004)	04:22 21:32	04:22 22:05	05:02 (A0006) 15 05:17 (A0006)
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 14 06:53 (A0004)	04:21 21:34	04:21 22:05	05:01 (A0006) 16 05:17 (A0006)
26	08:16 16:10	07:05 17:22	05:48 18:25	05:24 18 06:54 (A0004)	04:19 21:36	04:19 22:04	05:02 (A0006) 16 05:18 (A0006)
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 21 06:55 (A0004)	04:18 21:37	04:18 22:04	05:02 (A0006) 16 05:18 (A0006)
28	08:12 16:14	06:59 17:27	05:42 18:30	05:19 23 06:55 (A0004)	04:16 21:39	05:03 (A0006) 2 05:05 (A0006)	05:02 (A0006) 16 05:18 (A0006)
29	08:10 16:17		06:39 19:32	05:16 25 07:56 (A0004)	04:15 21:41	05:01 (A0006) 6 05:07 (A0006)	05:02 (A0006) 16 05:18 (A0006)
30	08:08 16:19		06:37 19:34	05:14 26 07:57 (A0004)	04:13 21:42	05:00 (A0006) 9 05:09 (A0006)	05:02 (A0006) 16 05:18 (A0006)
31	08:06 16:21		06:34 19:36	05:14 26 07:56 (A0004)	04:12 21:44	04:59 (A0006) 11 05:10 (A0006)	05:02 (A0006) 16 05:18 (A0006)
Potential sun hours	228	263	366	429	515	539	457
Total, worst case		129	379	423	185		457
Sun reduction		0,16	0,22	0,42	0,53		0,43
Oper. time red.		0,99	0,99	0,99	0,99		0,99
Wind dir. red.		0,60	0,62	0,64	0,68		0,69
Total reduction		0,09	0,13	0,27	0,35		0,29
Total, real		12	51	113	66		132

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:19>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (897)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

July		August		September		October		November		December	
1	04:04	05:03 (A0006)	04:53	05:51 (A0011)	05:58	06:38 (A0007)	07:02	07:11	08:16		
2	22:03	16 05:19 (A0006)	21:18	13 06:04 (A0011)	20:00	13 06:51 (A0012)	18:37	16:15	15:21		
3	04:05	05:03 (A0006)	04:55	05:51 (A0011)	06:01	06:38 (A0012)	07:04	07:13	08:18		
4	22:02	16 05:19 (A0006)	21:16	14 06:05 (A0011)	19:58	13 06:51 (A0012)	18:34	16:13	15:20		
5	04:06	05:04 (A0006)	04:57	05:50 (A0011)	06:03	06:38 (A0012)	07:06	07:15	08:20		
6	22:02	15 05:19 (A0006)	21:14	15 06:05 (A0011)	19:55	23 07:43 (A0004)	18:31	16:11	15:19		
7	04:07	05:03 (A0006)	04:59	05:50 (A0011)	06:05	06:38 (A0012)	07:08	07:18	08:21		
8	22:01	15 05:18 (A0006)	21:12	16 06:06 (A0011)	19:52	27 07:45 (A0004)	18:28	16:09	15:18		
9	04:08	05:03 (A0006)	05:01	05:50 (A0011)	06:07	06:39 (A0012)	07:10	07:20	08:23		
10	22:00	16 05:19 (A0006)	21:09	16 06:06 (A0011)	19:49	27 07:46 (A0004)	18:26	16:06	15:17		
11	04:09	05:04 (A0006)	05:03	05:50 (A0011)	06:09	07:26 (A0004)	07:13	07:22	08:25		
12	21:59	15 05:19 (A0006)	21:07	16 06:06 (A0011)	19:47	21 07:47 (A0004)	18:23	16:04	15:16		
13	04:10	05:05 (A0006)	05:05	05:51 (A0011)	06:11	07:25 (A0004)	07:15	08:30 (A0023)	07:25	08:26	
14	21:59	15 05:20 (A0006)	21:05	14 06:05 (A0011)	19:44	23 07:48 (A0004)	18:20	7 08:37 (A0023)	16:02	15:16	
15	04:11	05:05 (A0006)	05:07	05:50 (A0011)	06:13	07:24 (A0004)	07:17	08:26 (A0023)	07:27	08:28	
16	21:58	14 05:19 (A0006)	21:02	14 06:04 (A0011)	19:41	24 07:48 (A0004)	18:17	13 08:39 (A0023)	16:00	15:15	
17	04:13	05:05 (A0006)	05:09	05:51 (A0011)	06:15	07:23 (A0004)	07:19	08:24 (A0023)	07:29	08:29	
18	21:57	14 05:19 (A0006)	21:00	12 06:03 (A0011)	19:38	26 07:49 (A0004)	18:15	16 08:40 (A0023)	15:57	15:15	
19	04:14	05:06 (A0006)	05:12	05:53 (A0011)	06:17	07:22 (A0004)	07:21	08:23 (A0023)	07:31	08:30	
20	21:56	13 05:19 (A0006)	20:58	8 06:01 (A0011)	19:36	26 07:48 (A0004)	18:12	18 08:41 (A0023)	15:55	15:14	
21	04:15	05:06 (A0006)	05:14	05:55 (A0011)	06:20	07:22 (A0004)	07:23	08:22 (A0023)	07:34	08:32	
22	21:54	12 05:18 (A0006)	20:55	3 05:58 (A0011)	19:33	26 07:48 (A0004)	18:09	20 08:42 (A0023)	15:53	15:14	
23	04:17	05:07 (A0006)	05:16		06:22	07:21 (A0004)	07:26	08:21 (A0023)	07:36	08:33	
24	21:53	12 05:19 (A0006)	20:53		19:30	27 07:48 (A0004)	18:07	21 08:42 (A0023)	15:51	15:13	
25	04:18	05:08 (A0006)	05:18		06:24	07:21 (A0004)	07:28	08:21 (A0023)	07:38	08:34	
26	21:52	10 05:18 (A0006)	20:50		19:27	26 07:47 (A0004)	18:04	21 08:42 (A0023)	15:49	15:13	
27	04:20	05:09 (A0006)	05:20		06:26	07:21 (A0004)	07:30	08:21 (A0023)	07:40	08:35	
28	21:51	8 05:17 (A0006)	20:48		19:24	25 07:46 (A0004)	18:01	22 08:43 (A0023)	15:47	15:13	
29	04:21	05:11 (A0006)	05:22		06:28	07:23 (A0004)	07:32	08:21 (A0023)	07:43	08:36	
30	21:49	5 05:16 (A0006)	20:45		19:22	23 07:46 (A0004)	17:58	21 08:42 (A0023)	15:45	15:13	
31	04:23		05:24		06:30	07:23 (A0004)	07:34	08:21 (A0023)	07:45	08:37	
32	21:48		20:43		19:19	22 07:45 (A0004)	17:56	20 08:41 (A0023)	15:43	15:13	
33	04:25		05:26		06:32	07:24 (A0004)	07:37	08:22 (A0023)	07:47	08:38	
34	21:46		20:40		19:16	19 07:43 (A0004)	17:53	19 08:41 (A0023)	15:42	15:13	
35	04:26		05:29		06:34	07:26 (A0004)	07:39	08:22 (A0023)	07:49	08:39	
36	21:45		20:38		19:13	15 07:41 (A0004)	17:51	17 08:39 (A0023)	15:40	15:13	
37	04:28		05:31		06:36	07:29 (A0004)	07:41	08:23 (A0023)	07:52	08:40	
38	21:43		20:35		19:10	8 07:37 (A0004)	17:48	14 08:37 (A0023)	15:38	15:13	
39	04:30		05:33	06:41 (A0007)	06:38		07:43	08:26 (A0023)	07:54	08:41	
40	21:41		20:33	4 06:45 (A0007)	19:08		17:45	9 08:35 (A0023)	15:36	15:13	
41	04:32		05:35	06:38 (A0007)	06:41	07:34 (A0008)	07:46		07:56	08:41	
42	21:40		20:30	10 06:48 (A0007)	19:05	8 07:42 (A0008)	17:43		15:35	15:14	
43	04:33		05:37	06:36 (A0007)	06:43	07:32 (A0008)	07:48		07:58	08:42	
44	21:38		20:27	13 06:49 (A0007)	19:02	12 07:44 (A0008)	17:40		15:33	15:14	
45	04:35		05:39	06:35 (A0007)	06:45	07:31 (A0008)	07:50		08:00	08:42	
46	21:36		20:25	15 06:50 (A0007)	18:59	14 07:45 (A0008)	17:38		15:32	15:15	
47	04:37		05:41	06:34 (A0007)	06:47	07:30 (A0008)	07:52		08:02	08:43	
48	21:34		20:22	16 06:50 (A0007)	18:56	15 07:45 (A0008)	17:35		15:30	15:15	
49	04:39		05:44	06:33 (A0007)	06:49	07:29 (A0008)	06:55		08:04	08:43	
50	21:32		20:19	18 06:51 (A0007)	18:53	15 07:44 (A0008)	16:33		15:29	15:16	
51	04:41		05:46	06:33 (A0007)	06:51	07:30 (A0008)	06:57		08:06	08:43	
52	21:31		20:17	17 06:50 (A0007)	18:51	15 07:45 (A0008)	16:30		15:27	15:17	
53	04:43		05:48	06:33 (A0007)	06:53	07:30 (A0008)	06:59		08:08	08:44	
54	21:29		20:14	17 06:50 (A0007)	18:48	14 07:44 (A0008)	16:28		15:26	15:18	
55	04:45		05:50	06:33 (A0007)	06:55	07:30 (A0008)	07:02		08:10	08:44	
56	21:27		20:11	17 06:50 (A0007)	18:45	13 07:43 (A0008)	16:25		15:24	15:19	
57	04:47	05:56 (A0011)	05:52	06:33 (A0007)	06:58	07:31 (A0008)	07:04		08:12	08:44	
58	21:25	4 06:00 (A0011)	20:09	16 06:49 (A0007)	18:42	10 07:41 (A0008)	16:23		15:23	15:20	
59	04:49	05:54 (A0011)	05:54	06:34 (A0007)	07:00	07:34 (A0008)	07:06		08:14	08:44	
60	21:23	9 06:03 (A0011)	20:06	16 06:50 (A0012)	18:39	3 07:37 (A0008)	16:20		15:22	15:21	
61	04:51	05:52 (A0011)	05:56	06:35 (A0007)			07:08			08:44	
62	21:20	11 06:03 (A0011)	20:03	16 06:51 (A0012)			16:18			15:22	
63	Potential sun hours	538	474		386		321	241	207		
64	Total, worst case	220	316		533		238				
65	Sun reduction	0,38	0,35		0,31		0,26				
66	Oper. time red.	0,99	0,99		0,99		0,99				
67	Wind dir. red.	0,69	0,67		0,63		0,60				
68	Total reduction	0,26	0,23		0,19		0,15				
69	Total, real	57	73		103		36				

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:20>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (882)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:24	08:46 (A0023) 09:01 (A0023)	06:57 17:29	06:31 19:38	07:00 (A0011) 07:31 (A0003)
2	08:43 15:25	08:02 16:26	08:46 (A0023) 09:01 (A0023)	06:54 17:32	06:28 19:41	06:59 (A0011) 07:33 (A0003)
3	08:43 15:26	08:00 16:28	08:48 (A0023) 09:01 (A0023)	06:51 17:34	06:26 19:43	06:59 (A0011) 07:35 (A0003)
4	08:42 15:27	07:58 16:31	08:48 (A0023) 08:59 (A0023)	06:49 17:36	06:23 19:45	06:58 (A0011) 07:36 (A0003)
5	08:42 15:29	07:56 16:33	08:50 (A0023) 08:58 (A0023)	06:46 17:39	06:20 19:47	06:58 (A0011) 07:36 (A0003)
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	06:58 (A0011) 07:36 (A0003)	04:59 20:55
7	08:40 15:32	07:51 16:38	06:41 17:43	06:14 19:52	07:00 (A0011) 07:37 (A0003)	04:57 20:58
8	08:40 15:33	07:49 16:40	06:38 17:45	06:12 19:54	07:02 (A0011) 07:37 (A0003)	04:55 21:00
9	08:39 15:35	07:47 16:43	06:35 17:48	07:03 (A0007) 07:06 (A0007)	06:09 19:56	07:07 (A0003) 07:37 (A0003)
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	07:07 (A0003) 07:37 (A0003)	04:50 21:04
11	08:37 15:39	07:42 16:47	06:30 17:52	06:03 20:00	07:06 (A0003) 07:36 (A0003)	04:48 21:06
12	08:36 15:41	07:40 16:50	08:15 (A0004) 08:23 (A0004)	06:27 17:54	06:01 20:03	07:06 (A0003) 07:35 (A0003)
13	08:35 15:42	07:37 16:52	08:12 (A0004) 08:25 (A0004)	06:24 17:57	05:58 20:05	07:07 (A0003) 07:35 (A0003)
14	08:34 15:44	07:35 16:54	08:10 (A0004) 08:26 (A0004)	06:21 17:59	05:55 20:07	07:07 (A0003) 07:34 (A0003)
15	08:33 15:46	07:33 16:57	08:10 (A0004) 08:27 (A0004)	06:19 18:01	05:53 20:09	07:07 (A0003) 07:32 (A0003)
16	08:31 15:48	07:30 16:59	08:09 (A0004) 08:28 (A0004)	06:16 18:03	05:50 20:11	07:08 (A0003) 07:31 (A0003)
17	08:30 15:50	07:28 17:01	07:57 (A0008) 08:28 (A0004)	06:13 18:05	05:47 20:14	06:21 (A0006) 07:29 (A0003)
18	08:29 15:52	07:25 17:04	07:54 (A0008) 08:28 (A0004)	06:10 18:08	05:45 20:16	06:19 (A0006) 07:27 (A0003)
19	08:27 15:54	07:23 17:06	07:51 (A0008) 08:28 (A0004)	06:07 18:10	05:42 20:18	06:16 (A0006) 07:24 (A0003)
20	08:26 15:57	07:20 17:09	07:49 (A0008) 08:28 (A0004)	06:05 18:12	05:39 20:20	06:16 (A0006) 06:30 (A0006)
21	08:24 15:59	07:18 17:11	07:48 (A0008) 08:27 (A0004)	06:02 18:14	05:37 20:22	06:14 (A0006) 06:30 (A0006)
22	08:23 16:01	07:15 17:13	07:48 (A0008) 08:26 (A0004)	05:59 18:16	05:34 20:25	06:14 (A0006) 06:30 (A0006)
23	08:21 16:03	07:12 17:16	07:48 (A0008) 08:24 (A0004)	05:56 18:19	05:31 20:27	06:14 (A0006) 06:30 (A0006)
24	08:19 16:05	07:10 17:18	07:50 (A0008) 08:22 (A0004)	05:53 18:21	05:29 20:29	06:14 (A0006) 06:29 (A0006)
25	08:17 16:08	07:07 17:20	07:52 (A0008) 07:55 (A0008)	05:51 18:23	05:26 20:31	06:14 (A0006) 06:28 (A0006)
26	08:16 16:10	07:05 17:22	07:05 18:25	05:48 18:25	05:24 20:34	06:15 (A0006) 06:27 (A0006)
27	08:14 16:12	07:02 17:25	07:02 18:27	05:45 18:27	05:21 20:36	06:17 (A0006) 06:26 (A0006)
28	08:12 16:14	06:59 17:27	06:59 18:30	05:42 18:30	05:19 20:38	06:18 (A0006) 06:23 (A0006)
29	08:10 16:17	06:59 17:27	06:59 18:30	05:42 18:30	05:19 20:38	06:18 (A0006) 06:23 (A0006)
30	08:08 16:19	09:01 (A0023) 09:01 (A0023)	06:37 19:34	07:06 (A0011) 07:09 (A0011)	05:14 20:42	04:13 21:43
31	08:06 16:21	08:46 (A0023) 09:02 (A0023)	06:34 19:36	07:03 (A0011) 07:12 (A0011)	04:12 21:44	04:12 21:44
Potential sun hours	228	262	366	429	515	539
Total, worst case	92	345	129	691	140	
Sun reduction	0,19	0,16	0,22	0,42	0,53	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,56	0,58	0,61	0,65	0,69	
Total reduction	0,10	0,09	0,13	0,27	0,35	
Total, real	9	32	17	185	50	

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:20>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (882)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:04 22:03	04:53 21:18	05:37 (A0005) 20:01	05:58 20:01	07:05 (A0003) 18:37	07:11 16:15
2	04:05 22:02	04:55 21:16	05:37 (A0005) 19:58	06:01 19:58	07:05 (A0003) 18:34	07:13 16:13
3	04:06 22:02	04:57 21:14	05:37 (A0005) 19:55	06:03 19:55	07:05 (A0003) 18:31	07:15 16:11
4	04:07 22:01	04:59 21:12	05:37 (A0005) 19:52	06:05 19:52	06:59 (A0011) 18:28	07:08 16:09
5	04:08 22:00	05:01 21:09	05:38 (A0005) 19:50	06:07 19:50	06:56 (A0011) 18:26	07:10 16:06
6	04:09 22:00	05:03 21:07	05:38 (A0005) 19:47	06:09 19:47	06:54 (A0011) 18:23	07:13 16:04
7	04:10 21:59	05:05 21:05	05:40 (A0005) 19:44	06:11 19:44	06:53 (A0011) 18:20	07:15 16:02
8	04:11 21:58	05:07 21:02	05:41 (A0005) 19:41	06:13 19:41	06:53 (A0011) 18:17	07:17 16:00
9	04:12 21:57	05:09 21:00	05:43 (A0005) 19:38	06:15 19:38	06:52 (A0011) 18:15	07:19 15:57
10	04:14 21:56	05:12 20:58	05:45 (A0005) 19:36	06:17 19:36	06:52 (A0011) 18:12	07:21 15:55
11	04:15 21:54	05:14 20:55	06:20 19:33	06:53 (A0011) 18:09	07:23 18:09	07:34 15:53
12	04:17 21:53	05:16 20:53	06:22 19:30	06:54 (A0011) 18:07	07:26 18:07	07:36 15:51
13	04:18 21:52	05:18 20:50	06:24 19:27	06:56 (A0011) 18:04	07:28 18:04	07:38 15:49
14	04:20 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:30 18:01	07:41 15:47
15	04:21 21:49	05:22 20:45	06:25 (A0006) 19:22	06:28 19:22	07:32 17:58	07:43 15:45
16	04:23 21:48	05:24 20:43	06:23 (A0006) 19:19	06:30 19:19	07:35 17:56	07:45 15:43
17	04:25 21:46	05:26 20:40	06:21 (A0006) 19:16	06:32 19:16	07:37 17:53	07:47 15:42
18	04:26 21:45	05:29 20:38	06:20 (A0006) 19:13	06:34 19:13	07:39 17:51	07:49 15:40
19	04:28 21:43	05:31 20:35	06:20 (A0006) 19:10	06:36 19:10	07:41 17:48	07:52 15:38
20	04:30 21:41	05:33 20:33	06:19 (A0006) 19:08	06:38 19:08	07:43 17:45	07:54 15:36
21	04:32 21:40	05:35 20:30	06:19 (A0006) 19:05	06:41 19:05	07:46 17:43	07:56 15:35
22	04:33 21:38	05:37 20:27	06:19 (A0006) 19:02	06:43 19:02	07:48 17:40	07:58 15:33
23	04:35 21:36	05:39 20:25	06:19 (A0006) 18:59	06:45 18:59	07:50 17:38	08:00 15:31
24	04:37 21:34	05:41 20:22	06:20 (A0006) 18:56	06:47 18:56	07:52 17:35	08:02 15:30
25	04:39 21:33	05:44 20:19	06:22 (A0006) 18:53	06:49 18:53	07:55 16:33	08:04 15:29
26	04:41 21:31	05:46 20:17	06:24 (A0006) 18:51	06:51 18:51	07:57 16:30	08:06 15:27
27	04:43 21:29	05:48 20:14	07:10 (A0003) 18:48	06:53 18:48	07:38 (A0007) 16:28	07:40 (A0004) 15:26
28	04:45 21:27	05:50 20:11	07:09 (A0003) 18:45	06:55 18:45	07:51 (A0007) 16:25	07:40 (A0004) 15:24
29	04:47 21:25	05:52 20:09	07:08 (A0003) 18:42	06:58 18:42	07:36 (A0007) 16:23	07:42 (A0004) 15:23
30	04:49 21:23	05:54 20:06	07:34 (A0003) 18:40	07:00 18:40	07:51 (A0007) 16:20	07:44 (A0004) 15:22
31	04:51 21:20	05:56 20:03	07:06 (A0003) 18:35	07:06 (A0003) 18:35	07:08 16:18	07:08 15:22
Potential sun hours	538	474	386	321	241	207
Total, worst case	38	428	461	338	156	
Sun reduction	0,38	0,35	0,31	0,26	0,17	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,69	0,66	0,64	0,59	0,56	
Total reduction	0,26	0,23	0,19	0,15	0,09	
Total, real	10	97	90	50	15	

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

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



Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:22>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (825)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:24	08:47 (A0023) 09:02 (A0023)	06:57 17:29	07:02 (A0011) 07:41 (A0003)	05:11 20:45
2	08:43 15:25	08:02 16:26	08:48 (A0023) 09:02 (A0023)	06:54 17:32	07:01 (A0011) 07:42 (A0003)	05:09 20:47
3	08:43 15:26	08:00 16:28	08:50 (A0023) 09:01 (A0023)	06:51 17:34	07:02 (A0011) 07:43 (A0003)	05:06 20:49
4	08:42 15:27	07:58 16:31	08:51 (A0023) 08:59 (A0023)	06:49 17:36	07:02 (A0011) 07:43 (A0003)	05:04 20:51
5	08:42 15:29	07:56 16:33		06:46 17:39	07:02 (A0011) 07:43 (A0003)	05:02 20:53
6	08:41 15:30	07:53 16:35		06:43 17:41	07:03 (A0011) 07:42 (A0003)	05:01 20:55
7	08:40 15:32	07:51 16:38		06:41 17:43	07:13 (A0003) 07:43 (A0003)	05:00 20:58
8	08:40 15:33	07:49 16:40		06:38 17:45	07:13 (A0003) 07:42 (A0003)	05:00 21:00
9	08:39 15:35	07:47 16:43		06:35 17:48	07:12 (A0003) 07:41 (A0003)	05:00 21:02
10	08:38 15:37	07:44 16:45		06:32 17:50	07:13 (A0003) 07:41 (A0003)	05:00 21:04
11	08:37 15:39	07:42 16:47	08:16 (A0004) 08:25 (A0004)	06:30 17:52	07:13 (A0003) 07:40 (A0003)	05:00 21:06
12	08:36 15:41	07:40 16:50	08:15 (A0004) 08:28 (A0004)	06:27 17:54	07:13 (A0003) 07:38 (A0003)	05:00 21:08
13	08:35 15:42	07:37 16:52	08:13 (A0004) 08:29 (A0004)	06:24 17:57	07:14 (A0003) 07:37 (A0003)	05:00 21:10
14	08:34 15:44	07:35 16:54	08:12 (A0004) 08:29 (A0004)	06:21 17:59	07:15 (A0003) 07:35 (A0003)	05:00 21:13
15	08:33 15:46	07:33 16:57	08:12 (A0004) 08:30 (A0004)	06:19 18:01	07:16 (A0003) 07:32 (A0003)	05:00 21:15
16	08:31 15:48	07:30 16:59	08:11 (A0004) 08:30 (A0004)	06:16 18:03	06:23 (A0006) 07:30 (A0003)	05:00 21:17
17	08:30 15:50	07:28 17:01	07:57 (A0008) 08:31 (A0004)	06:13 18:05	07:01 (A0007) 07:07 (A0007)	05:00 21:19
18	08:29 15:52	07:25 17:04	07:54 (A0008) 08:30 (A0004)	06:10 18:08	05:45 06:33 (A0006)	05:00 21:21
19	08:27 15:54	07:23 17:06	07:51 (A0008) 08:29 (A0004)	06:07 18:10	05:42 06:33 (A0006)	05:00 21:23
20	08:26 15:57	07:20 17:09	07:50 (A0008) 08:29 (A0004)	06:05 18:12	05:39 06:34 (A0006)	05:00 21:25
21	08:24 15:59	07:18 17:11	07:50 (A0008) 08:28 (A0004)	06:02 18:14	05:37 06:33 (A0006)	05:00 21:27
22	08:23 16:01	07:15 17:13	07:50 (A0008) 08:26 (A0004)	05:59 18:16	05:34 06:33 (A0006)	05:00 21:28
23	08:21 16:03	08:56 (A0023) 08:57 (A0023)	07:12 17:16	05:56 18:19	05:31 06:32 (A0006)	05:00 21:30
24	08:19 16:05	08:54 (A0023) 08:59 (A0023)	07:10 17:18	05:53 18:21	05:29 06:31 (A0006)	05:00 21:32
25	08:17 16:08	08:52 (A0023) 09:00 (A0023)	07:07 17:20	05:51 18:23	05:26 06:19 (A0006)	05:00 21:34
26	08:16 16:10	08:50 (A0023) 09:01 (A0023)	07:05 17:22	05:48 18:25	05:24 06:21 (A0006)	05:00 21:36
27	08:14 16:12	08:48 (A0023) 09:02 (A0023)	07:02 17:25	05:45 18:27	05:21 06:36 (A0006)	05:00 21:38
28	08:12 16:14	08:46 (A0023) 09:02 (A0023)	06:59 17:27	05:42 18:30	05:19 06:39 (A0006)	05:00 21:40
29	08:10 16:17	08:46 (A0023) 09:02 (A0023)		05:39 19:32	07:07 (A0011) 07:35 (A0003)	05:00 21:41
30	08:08 16:19	08:47 (A0023) 09:03 (A0023)		06:37 19:34	07:05 (A0011) 07:39 (A0003)	05:00 21:43
31	08:06 16:21	08:47 (A0023) 09:03 (A0023)		06:34 19:36	07:03 (A0011) 07:40 (A0003)	05:00 21:44
Potential sun hours	228	262	366	429	515	539
Total, worst case	103	324	191	614	133	
Sun reduction	0,19	0,16	0,22	0,42	0,53	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,56	0,58	0,62	0,65	0,69	
Total reduction	0,10	0,09	0,13	0,27	0,35	
Total, real	10	30	25	164	47	

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:22>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (825)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:04 22:03	04:53 21:18	05:41 (A0005) 20:01	07:12 (A0003) 18:37	07:37 (A0007) 16:15	08:16 15:21
2	04:05 22:02	04:55 21:16	05:41 (A0005) 19:58	07:11 (A0003) 18:34	07:37 (A0007) 16:13	08:18 15:20
3	04:06 22:02	04:57 21:14	05:40 (A0005) 19:55	07:10 (A0003) 18:31	07:38 (A0007) 16:11	08:20 15:19
4	04:07 22:01	04:59 21:12	05:40 (A0005) 19:52	07:10 (A0003) 18:28	07:38 (A0007) 16:09	08:21 15:18
5	04:08 22:00	05:01 21:09	05:40 (A0005) 19:50	07:09 (A0003) 18:26	07:40 (A0007) 16:06	08:23 15:17
6	04:09 22:00	05:03 21:07	05:40 (A0005) 19:47	07:09 (A0003) 18:23	07:40 (A0007) 16:04	08:24 15:16
7	04:10 21:59	05:05 21:05	05:41 (A0005) 19:44	06:57 (A0011) 18:20	07:25 16:02	08:21 (A0023) 15:16
8	04:11 21:58	05:07 21:02	05:41 (A0005) 19:41	06:56 (A0011) 18:17	07:27 16:00	08:19 (A0023) 15:15
9	04:12 21:57	05:09 21:00	05:43 (A0005) 19:38	06:55 (A0011) 18:15	07:29 15:57	08:31 (A0023) 15:14
10	04:14 21:56	05:12 20:58	05:45 (A0005) 19:36	06:55 (A0011) 18:12	07:31 15:55	08:19 (A0023) 15:14
11	04:15 21:54	05:14 20:55	06:20 19:33	06:54 (A0011) 18:09	07:34 15:53	08:18 (A0023) 15:14
12	04:17 21:53	05:16 20:53	06:22 19:30	06:55 (A0011) 18:07	07:36 15:51	08:19 (A0023) 15:13
13	04:18 21:52	05:18 20:50	06:24 19:27	06:55 (A0011) 18:04	07:38 15:49	08:18 (A0023) 15:13
14	04:20 21:51	05:20 20:48	06:26 19:24	06:57 (A0011) 18:01	07:41 15:47	08:19 (A0023) 15:13
15	04:21 21:49	05:22 20:45	06:28 19:22	07:32 (A0003) 17:58	07:43 15:45	08:20 (A0023) 15:13
16	04:23 21:48	05:24 20:43	06:30 19:19	07:35 17:56	07:45 15:43	08:23 (A0023) 15:13
17	04:25 21:46	05:26 20:40	06:27 (A0006) 19:16	07:37 17:53	07:47 15:42	08:25 (A0023) 15:13
18	04:26 21:45	05:29 20:38	06:25 (A0006) 19:13	07:39 17:51	08:23 (A0008) 15:40	08:28 (A0023) 15:13
19	04:28 21:43	05:31 20:35	06:24 (A0006) 19:10	07:41 17:48	08:21 (A0008) 15:38	08:30 (A0023) 15:13
20	04:30 21:41	05:33 20:33	06:23 (A0006) 19:08	07:43 17:45	08:21 (A0008) 15:36	08:31 (A0023) 15:13
21	04:32 21:40	05:35 20:30	06:22 (A0006) 19:05	07:46 17:43	08:20 (A0008) 15:35	08:33 (A0023) 15:14
22	04:33 21:38	05:37 20:27	06:22 (A0006) 19:02	07:48 17:40	08:20 (A0008) 15:33	08:34 (A0023) 15:14
23	04:35 21:36	05:39 20:25	06:22 (A0006) 18:59	07:50 17:38	08:22 (A0008) 15:31	08:36 (A0023) 15:15
24	04:37 21:34	05:41 20:22	06:22 (A0006) 18:56	07:52 17:35	08:25 (A0008) 15:30	08:38 (A0023) 15:15
25	04:39 21:33	05:44 20:19	06:22 (A0006) 18:53	06:55 16:33	07:27 (A0008) 15:29	08:04 15:16
26	04:41 21:31	05:46 20:17	06:23 (A0006) 18:51	06:57 16:30	07:40 (A0004) 15:27	08:06 15:17
27	04:43 21:29	05:48 20:14	06:25 (A0006) 18:48	07:42 (A0007) 16:28	07:41 (A0004) 15:26	08:08 15:18
28	04:45 21:27	05:50 20:11	07:32 (A0003) 18:45	07:40 (A0007) 16:25	07:59 (A0004) 15:24	08:10 15:19
29	04:47 21:25	05:52 20:09	07:16 (A0003) 18:42	07:38 (A0007) 16:23	07:42 (A0004) 15:23	08:12 15:20
30	04:49 21:23	05:54 20:06	07:14 (A0003) 18:40	07:38 (A0007) 16:20	07:43 (A0004) 15:22	08:14 15:21
31	04:51 21:20	05:56 20:03	07:13 (A0003) 18:38	07:38 (A0007) 16:18	07:46 (A0004) 15:22	08:16 15:22
Potential sun hours	538	474	386	321	241	207
Total, worst case	16	353	508	344	151	
Sun reduction	0,38	0,35	0,31	0,26	0,17	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,69	0,66	0,64	0,59	0,56	
Total reduction	0,26	0,23	0,19	0,15	0,09	
Total, real	4	81	99	51	14	

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:23>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (884)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	January	February	March		April		May		June		
1	08:43 15:23	08:04 16:24	06:57 17:29		06:31 19:38	11	07:03 (A0008) 07:14 (A0008)	05:11 20:45	05:49 (A0007) 06:40 (A0004)	04:11 21:46	05:11 (A0011) 05:22 (A0011)
2	08:43 15:25	08:02 16:26	06:54 17:32		06:28 19:41	14	07:01 (A0008) 07:15 (A0008)	05:09 20:47	05:48 (A0007) 06:40 (A0004)	04:09 21:47	05:12 (A0011) 05:21 (A0011)
3	08:43 15:26	08:00 16:28	06:51 17:34		06:26 19:43	15	07:01 (A0008) 07:16 (A0008)	05:06 20:49	05:47 (A0007) 06:39 (A0004)	04:08 21:49	05:12 (A0011) 05:21 (A0011)
4	08:42 15:27	07:58 16:31	06:49 17:36		06:23 19:45	15	07:00 (A0008) 07:15 (A0008)	05:04 20:51	05:47 (A0007) 06:39 (A0004)	04:07 21:50	05:13 (A0011) 05:20 (A0011)
5	08:42 15:29	07:56 16:33	06:46 17:39		06:20 19:47	15	07:00 (A0008) 07:15 (A0008)	05:02 20:53	05:46 (A0007) 06:37 (A0004)	04:06 21:51	05:14 (A0011) 05:19 (A0011)
6	08:41 15:30	07:53 16:35	06:43 17:41		06:17 19:49	15	06:59 (A0008) 07:14 (A0008)	04:59 20:55	05:46 (A0007) 06:37 (A0004)	04:05 21:53	
7	08:40 15:32	07:51 16:38	06:41 17:43		06:14 19:52	12	07:01 (A0008) 07:13 (A0008)	04:57 20:58	05:46 (A0007) 06:36 (A0004)	04:04 21:54	
8	08:40 15:34	07:49 16:40	06:38 17:45		06:12 19:54	10	07:01 (A0008) 07:11 (A0008)	04:55 21:00	05:46 (A0007) 06:35 (A0004)	04:03 21:55	
9	08:39 15:35	07:47 16:43	06:35 17:48		06:09 19:56	5	07:03 (A0008) 07:08 (A0008)	04:52 21:02	05:47 (A0007) 06:33 (A0004)	04:03 21:56	
10	08:38 15:37	07:44 16:45	06:32 17:50		06:06 19:58			04:50 21:04	05:48 (A0007) 06:31 (A0004)	04:02 21:57	
11	08:37 15:39	07:42 16:47	06:30 17:52		06:03 20:00			04:48 21:06	05:49 (A0007) 05:59 (A0007)	04:01 21:58	
12	08:36 15:41	07:40 16:50	06:27 17:54		06:01 20:03			04:46 21:08	05:51 (A0007) 05:57 (A0007)	04:01 21:59	
13	08:35 15:42	07:37 16:52	06:24 17:57		05:58 20:05			04:44 21:10		04:00 22:00	
14	08:34 15:44	07:35 16:54	06:21 17:59		05:55 20:07			04:42 21:12		04:00 22:01	
15	08:32 15:46	07:32 16:57	06:19 18:01		05:53 20:09			04:39 21:15		03:59 22:01	
16	08:31 15:48	07:30 16:59	06:16 18:03		05:50 20:11			04:37 21:17		03:59 22:02	
17	08:30 15:50	07:28 17:02	06:13 18:05		05:47 20:14			04:35 21:19		03:59 22:03	
18	08:29 15:52	07:25 17:04	06:10 18:08	9	06:51 (A0023) 07:00 (A0023)			04:33 21:21	05:13 (A0011) 05:18 (A0011)	03:59 22:03	
19	08:27 15:55	07:23 17:06	06:07 18:10	14	06:48 (A0023) 07:02 (A0023)			04:32 21:23	05:12 (A0011) 05:20 (A0011)	03:59 22:04	
20	08:26 15:57	07:20 17:09	06:05 18:12	17	06:47 (A0023) 07:04 (A0023)			04:30 21:25	05:10 (A0011) 05:21 (A0011)	03:59 22:04	
21	08:24 15:59	07:18 17:11	06:02 18:14	20	06:45 (A0023) 07:05 (A0023)			04:28 21:26	05:09 (A0011) 05:21 (A0011)	03:59 22:04	
22	08:22 16:01	07:15 17:13	05:59 18:16	21	06:44 (A0023) 07:05 (A0023)	10	06:25 (A0004) 06:35 (A0004)	04:26 21:28	05:10 (A0011) 05:22 (A0011)	03:59 22:04	
23	08:21 16:03	07:12 17:16	05:56 18:19	22	06:43 (A0023) 07:05 (A0023)	14	06:22 (A0004) 06:36 (A0004)	04:24 21:30	05:09 (A0011) 05:22 (A0011)	03:59 22:04	
24	08:19 16:05	07:10 17:18	05:53 18:21	22	06:42 (A0023) 07:04 (A0023)	18	06:20 (A0004) 06:38 (A0004)	04:23 21:32	05:09 (A0011) 05:23 (A0011)	04:00 22:05	
25	08:17 16:08	07:07 17:20	05:51 18:23	22	06:43 (A0023) 07:05 (A0023)	20	06:18 (A0004) 06:38 (A0004)	04:21 21:34	05:08 (A0011) 05:22 (A0011)	04:00 22:05	
26	08:16 16:10	07:05 17:22	05:48 18:25	21	06:43 (A0023) 07:04 (A0023)	21	06:18 (A0004) 06:39 (A0004)	04:19 21:36	05:09 (A0011) 05:23 (A0011)	04:00 22:04	
27	08:14 16:12	07:02 17:25	05:45 18:27	20	06:43 (A0023) 07:03 (A0023)	23	06:17 (A0004) 06:40 (A0004)	04:18 21:37	05:09 (A0011) 05:23 (A0011)	04:01 22:04	
28	08:12 16:14	06:59 17:27	05:42 18:30	18	06:43 (A0023) 07:01 (A0023)	24	06:16 (A0004) 06:40 (A0004)	04:16 21:39	05:10 (A0011) 05:23 (A0011)	04:02 22:04	
29	08:10 16:17		06:39 19:32	15	07:44 (A0023) 07:59 (A0023)	27	05:54 (A0007) 06:40 (A0004)	04:15 21:41	05:09 (A0011) 05:22 (A0011)	04:02 22:04	
30	08:08 16:19		06:37 19:34	12	07:46 (A0023) 07:58 (A0023)	33	05:51 (A0007) 06:40 (A0004)	04:13 21:42	05:10 (A0011) 05:22 (A0011)	04:03 22:03	
31	08:06 16:21		06:34 19:36	11	07:06 (A0008) 07:53 (A0023)			04:12 21:44	05:10 (A0011) 05:22 (A0011)		
Potential sun hours	228	263	366		429		515		539		
Total, worst case			244		302		529			41	
Sun reduction			0,22		0,42		0,53			0,43	
Oper. time red.			0,99		0,99		0,99			0,99	
Wind dir. red.			0,62		0,65		0,67			0,69	
Total reduction			0,14		0,27		0,35			0,29	
Total, real			33		83		186			12	

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:23>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (884)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

July		August		September		October	November	December
1	04:04	04:53	06:00 (A0007)	05:58		07:02	07:11	08:16
	22:03	21:18	8 06:08 (A0007)	20:00		18:37	16:16	15:21
2	04:05	04:55	05:59 (A0007)	06:01		07:04	07:13	08:18
	22:02	21:16	16 06:39 (A0004)	19:58		18:34	16:13	15:20
3	04:06	04:57	05:58 (A0007)	06:03	07:01 (A0008)	07:06	07:15	08:19
	22:02	21:14	24 06:42 (A0004)	19:55	5 07:06 (A0008)	18:31	16:11	15:19
4	04:07	04:59	05:57 (A0007)	06:05	06:58 (A0008)	07:08	07:18	08:21
	22:01	21:12	29 06:44 (A0004)	19:52	10 07:08 (A0008)	18:28	16:09	15:18
5	04:08	05:01	05:57 (A0007)	06:07	06:57 (A0008)	07:10	07:20	08:23
	22:00	21:09	32 06:45 (A0004)	19:49	12 07:09 (A0008)	18:26	16:06	15:17
6	04:09	05:03	05:56 (A0007)	06:09	06:56 (A0008)	07:13	07:22	08:24
	21:59	21:07	35 06:46 (A0004)	19:47	14 07:10 (A0008)	18:23	16:04	15:16
7	04:10	05:22 (A0011)	05:05	05:56 (A0007)	06:11	06:55 (A0008)	07:15	07:25
	21:59	3 05:25 (A0011)	21:05	37 06:47 (A0004)	19:44	15 07:10 (A0008)	18:20	16:02
8	04:11	05:21 (A0011)	05:07	05:55 (A0007)	06:13	06:54 (A0008)	07:17	07:27
	21:58	6 05:24 (A0011)	21:02	38 06:47 (A0004)	19:41	16 07:10 (A0008)	18:17	16:00
9	04:13	05:20 (A0011)	05:10	05:55 (A0007)	06:15	06:54 (A0008)	07:19	07:29
	21:57	8 05:28 (A0011)	21:00	39 06:47 (A0004)	19:38	15 07:09 (A0008)	18:15	15:58
10	04:14	05:20 (A0011)	05:12	05:56 (A0007)	06:17	06:55 (A0008)	07:21	07:31
	21:55	9 05:29 (A0011)	20:58	39 06:48 (A0004)	19:36	13 07:08 (A0008)	18:12	15:55
11	04:15	05:19 (A0011)	05:14	05:56 (A0007)	06:20	06:55 (A0008)	07:23	07:34
	21:54	10 05:29 (A0011)	20:55	39 06:48 (A0004)	19:33	12 07:07 (A0008)	18:09	15:53
12	04:17	05:19 (A0011)	05:16	05:57 (A0007)	06:22	06:57 (A0008)	07:26	07:36
	21:53	11 05:30 (A0011)	20:53	37 06:48 (A0004)	19:30	8 07:43 (A0023)	18:07	15:51
13	04:18	05:19 (A0011)	05:18	05:59 (A0007)	06:24	07:37 (A0023)	07:28	07:38
	21:52	12 05:31 (A0011)	20:50	33 06:48 (A0004)	19:27	11 07:48 (A0023)	18:04	15:49
14	04:20	05:18 (A0011)	05:20	06:23 (A0004)	06:26	07:34 (A0023)	07:30	07:40
	21:51	13 05:31 (A0011)	20:48	25 06:48 (A0004)	19:24	15 07:49 (A0023)	18:01	15:47
15	04:21	05:19 (A0011)	05:22	06:23 (A0004)	06:28	07:34 (A0023)	07:32	07:43
	21:49	13 05:32 (A0011)	20:45	24 06:47 (A0004)	19:22	18 07:52 (A0023)	17:58	15:45
16	04:23	05:18 (A0011)	05:24	06:24 (A0004)	06:30	07:32 (A0023)	07:34	07:45
	21:48	14 05:32 (A0011)	20:43	23 06:47 (A0004)	19:19	20 07:52 (A0023)	17:56	15:44
17	04:25	05:19 (A0011)	05:27	06:24 (A0004)	06:32	07:31 (A0023)	07:37	07:47
	21:46	13 05:32 (A0011)	20:40	22 06:46 (A0004)	19:16	21 07:52 (A0023)	17:53	15:42
18	04:26	05:18 (A0011)	05:29	06:25 (A0004)	06:34	07:31 (A0023)	07:39	07:49
	21:45	14 05:32 (A0011)	20:38	20 06:45 (A0004)	19:13	21 07:52 (A0023)	17:51	15:40
19	04:28	05:19 (A0011)	05:31	06:26 (A0004)	06:36	07:30 (A0023)	07:41	07:52
	21:43	14 05:33 (A0011)	20:35	17 06:43 (A0004)	19:10	22 07:52 (A0023)	17:48	15:38
20	04:30	05:18 (A0011)	05:33	06:28 (A0004)	06:38	07:30 (A0023)	07:43	07:54
	21:41	14 05:32 (A0011)	20:33	13 06:41 (A0004)	19:08	21 07:51 (A0023)	17:45	15:36
21	04:32	05:19 (A0011)	05:35	06:30 (A0004)	06:41	07:30 (A0023)	07:46	07:56
	21:40	13 05:32 (A0011)	20:30	9 06:39 (A0004)	19:05	21 07:51 (A0023)	17:43	15:35
22	04:33	05:20 (A0011)	05:37		06:43	07:30 (A0023)	07:48	07:58
	21:38	12 05:32 (A0011)	20:27		19:02	20 07:50 (A0023)	17:40	15:33
23	04:35	05:20 (A0011)	05:39		06:45	07:30 (A0023)	07:50	08:00
	21:36	11 05:31 (A0011)	20:25		18:59	18 07:48 (A0023)	17:38	15:32
24	04:37	05:21 (A0011)	05:41		06:47	07:31 (A0023)	07:52	08:02
	21:34	10 05:31 (A0011)	20:22		18:56	16 07:47 (A0023)	17:35	15:30
25	04:39	05:23 (A0011)	05:44		06:49	07:33 (A0023)	06:55	08:04
	21:32	7 05:30 (A0011)	20:19		18:53	11 07:44 (A0023)	16:33	15:29
26	04:41	05:25 (A0011)	05:46		06:51		06:57	08:06
	21:31	1 05:26 (A0011)	20:17		18:51		16:30	15:27
27	04:43		05:48		06:53		06:59	08:08
	21:29		20:14		18:48		16:28	15:26
28	04:45		05:50		06:55		07:02	08:10
	21:27		20:11		18:45		16:25	15:25
29	04:47		05:52		06:58		07:04	08:12
	21:25		20:09		18:42		16:23	15:23
30	04:49		05:54		07:00		07:06	08:14
	21:22		20:06		18:39		16:20	15:22
31	04:51		05:56				07:08	08:44
	21:20		20:03				16:18	15:22
Potential sun hours	538		474		386		321	241
Total, worst case	208		559		355			
Sun reduction	0,38		0,35		0,31			
Oper. time red.	0,99		0,99		0,99			
Wind dir. red.	0,69		0,66		0,63			
Total reduction	0,26		0,23		0,19			
Total, real	54		129		69			

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:24>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (824)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June			
1	08:43 15:23	08:04 16:24	08:51 (A0023) 09:03 (A0023)	06:57 17:29	06:31 19:38	07:06 (A0011) 07:52 (A0003)	05:11 20:45	05:40 (A0005) 05:47 (A0005)	04:11 21:46
2	08:43 15:25	08:02 16:26	08:52 (A0023) 09:02 (A0023)	06:54 17:32	06:28 19:41	07:06 (A0011) 07:52 (A0003)	05:09 20:47	05:38 (A0005) 05:48 (A0005)	04:09 21:47
3	08:43 15:26	08:00 16:28	08:55 (A0023) 09:00 (A0023)	06:51 17:34	06:26 19:43	07:07 (A0011) 07:52 (A0003)	05:06 20:49	05:36 (A0005) 05:49 (A0005)	04:08 21:49
4	08:42 15:27	07:58 16:31		06:49 17:36	06:23 19:45	07:08 (A0011) 07:51 (A0003)	05:04 20:51	05:36 (A0005) 05:49 (A0005)	04:07 21:50
5	08:42 15:29	07:56 16:33		06:46 17:39	06:20 19:47	07:22 (A0003) 07:50 (A0003)	05:02 20:53	05:34 (A0005) 05:48 (A0005)	04:06 21:51
6	08:41 15:30	07:53 16:35		06:43 17:41	07:10 (A0007) 07:13 (A0007)	07:22 (A0003) 07:49 (A0003)	04:59 20:55	05:34 (A0005) 05:48 (A0005)	04:05 21:53
7	08:40 15:32	07:51 16:38		06:41 17:43	07:07 (A0007) 07:16 (A0007)	07:23 (A0003) 07:49 (A0003)	04:57 20:58	05:35 (A0005) 05:48 (A0005)	04:04 21:54
8	08:40 15:33	07:49 16:40		06:38 17:45	07:04 (A0007) 07:17 (A0007)	07:23 (A0003) 07:47 (A0003)	04:55 21:00	05:35 (A0005) 05:48 (A0005)	04:03 21:55
9	08:39 15:35	07:47 16:43	08:20 (A0004) 08:29 (A0004)	06:35 17:48	07:04 (A0007) 07:18 (A0007)	07:24 (A0003) 07:45 (A0003)	04:52 21:02	05:36 (A0005) 05:47 (A0005)	04:03 21:56
10	08:38 15:37	07:44 16:45	08:18 (A0004) 08:31 (A0004)	06:32 17:50	07:03 (A0007) 07:18 (A0007)	07:26 (A0003) 07:44 (A0003)	04:50 21:04	05:37 (A0005) 05:46 (A0005)	04:02 21:57
11	08:37 15:39	07:42 16:47	08:16 (A0004) 08:32 (A0004)	06:30 17:52	07:02 (A0007) 07:18 (A0007)	07:28 (A0003) 07:40 (A0003)	04:48 21:06	05:38 (A0005) 05:44 (A0005)	04:01 21:58
12	08:36 15:41	07:40 16:50	08:16 (A0004) 08:33 (A0004)	06:27 17:54	07:02 (A0007) 07:17 (A0007)	07:32 (A0003) 07:35 (A0003)	04:46 21:08		04:01 21:59
13	08:35 15:42	07:37 16:52	08:15 (A0004) 08:33 (A0004)	06:24 17:57	07:02 (A0007) 07:16 (A0007)	06:32 (A0006) 06:34 (A0006)	04:44 21:10		04:00 22:00
14	08:34 15:44	07:35 16:54	08:14 (A0004) 08:33 (A0004)	06:21 17:59	07:04 (A0007) 07:15 (A0007)	06:28 (A0006) 06:37 (A0006)	04:41 21:13		04:00 22:01
15	08:33 15:46	07:33 16:57	08:02 (A0008) 08:34 (A0004)	06:19 18:01	07:06 (A0007) 07:12 (A0007)	06:25 (A0006) 06:38 (A0006)	04:39 21:15		03:59 22:01
16	08:31 15:48	07:30 16:59	07:59 (A0008) 08:33 (A0004)	06:16 18:03		05:50 20:11	06:25 (A0006) 06:39 (A0006)	04:37 21:17	03:59 22:02
17	08:30 15:50	07:28 17:01	07:57 (A0008) 08:34 (A0004)	06:13 18:05		05:47 20:14	06:23 (A0006) 06:39 (A0006)	04:35 21:19	03:59 22:03
18	08:29 15:52	07:25 17:04	07:54 (A0008) 08:33 (A0004)	06:10 18:08	11	07:15 (A0007) 07:06 (A0007)	06:23 (A0006) 06:39 (A0006)	04:33 21:21	03:59 22:03
19	08:27 15:54	07:23 17:06	07:52 (A0008) 08:31 (A0004)	06:07 18:10		05:42 20:18	06:23 (A0006) 06:38 (A0006)	04:31 21:23	03:59 22:04
20	08:26 15:57	07:20 17:09	07:53 (A0008) 08:30 (A0004)	06:05 18:12		05:39 20:20	06:23 (A0006) 06:38 (A0006)	04:30 21:25	03:59 22:04
21	08:24 15:59	07:18 17:11	07:54 (A0008) 08:27 (A0004)	06:02 18:14		05:37 20:22	06:23 (A0006) 06:37 (A0006)	04:28 21:27	03:59 22:04
22	08:23 16:01	07:15 08:58 (A0023)	07:54 (A0008) 09:00 (A0023)	05:59 17:13		05:34 20:25	06:24 (A0006) 06:36 (A0006)	04:26 21:28	03:59 22:04
23	08:21 16:03	08:56 (A0023) 09:01 (A0023)	07:12 17:16	05:56 18:19		05:31 20:27	06:25 (A0006) 06:34 (A0006)	04:24 21:30	03:59 22:05
24	08:19 16:05	08:54 (A0023) 09:02 (A0023)	07:10 17:18	05:53 18:21		05:29 20:29		04:22 21:32	04:00 22:05
25	08:17 16:08	08:52 (A0023) 09:03 (A0023)	07:07 17:20	05:51 18:23	9	06:36 (A0003) 06:45 (A0003)		04:21 21:34	04:00 22:05
26	08:16 16:10	08:50 (A0023) 09:04 (A0023)	07:05 17:22	05:48 18:25	16	06:32 (A0003) 06:48 (A0003)		04:19 21:36	04:00 22:05
27	08:14 16:12	08:49 (A0023) 09:04 (A0023)	07:02 17:25	05:45 18:27	25	06:13 (A0011) 06:50 (A0003)		04:18 21:38	04:01 22:04
28	08:12 16:14	08:48 (A0023) 09:04 (A0023)	06:59 17:27	05:42 18:30	32	06:10 (A0011) 06:50 (A0003)		04:16 21:39	04:02 22:04
29	08:10 16:17	08:49 (A0023) 09:04 (A0023)		06:39 19:32	37	07:08 (A0011) 07:51 (A0003)		04:15 21:41	04:02 22:04
30	08:08 16:19	08:50 (A0023) 09:04 (A0023)		06:37 19:34	39	07:08 (A0011) 07:52 (A0003)	05:42 (A0005) 05:44 (A0005)	04:13 21:43	04:03 22:03
31	08:06 16:21	08:51 (A0023) 09:04 (A0023)		06:34 19:36	42	07:07 (A0011) 07:52 (A0003)		04:12 21:44	
Potential sun hours	228	262	366	429			515		539
Total, worst case	113	294	316	458			123		
Sun reduction	0,19	0,16	0,22	0,42			0,53		
Oper. time red.	0,99	0,99	0,99	0,99			0,99		
Wind dir. red.	0,55	0,58	0,62	0,64			0,68		
Total reduction	0,10	0,09	0,13	0,27			0,35		
Total, real	11	27	43	122			43		

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

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

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:24>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (824)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:04 22:03	04:53 21:18	05:51 (A0005) 20:01	07:26 (A0003) 18:37	07:42 (A0007) 16:15	07:48 (A0004) 15:21
2	04:05 22:02	04:55 21:16	05:48 (A0005) 19:58	07:24 (A0003) 18:34	07:41 (A0007) 16:13	07:50 (A0004) 15:20
3	04:06 22:02	04:57 21:14	05:46 (A0005) 19:55	07:22 (A0003) 18:31	07:41 (A0007) 16:11	07:48 (A0004) 15:19
4	04:07 22:01	04:59 21:12	05:46 (A0005) 19:52	07:20 (A0003) 18:28	07:41 (A0007) 16:09	07:48 (A0004) 15:18
5	04:08 22:00	05:01 21:09	05:45 (A0005) 19:50	07:19 (A0003) 18:26	07:41 (A0007) 16:06	07:48 (A0004) 15:17
6	04:09 22:00	05:03 21:07	05:45 (A0005) 19:47	07:18 (A0003) 18:23	07:42 (A0007) 16:04	07:48 (A0004) 15:16
7	04:10 21:59	05:05 21:05	05:45 (A0005) 19:44	07:17 (A0003) 18:20	07:45 (A0007) 16:02	07:48 (A0004) 15:16
8	04:11 21:58	05:07 21:02	05:44 (A0005) 19:41	07:17 (A0011) 18:17	07:51 (A0007) 16:00	07:48 (A0004) 15:15
9	04:12 21:57	05:09 21:00	05:44 (A0005) 19:38	07:01 (A0011) 18:15	07:29 15:57	07:48 (A0004) 15:14
10	04:14 21:56	05:12 20:58	05:45 (A0005) 19:36	06:59 (A0011) 18:12	07:31 15:55	07:48 (A0004) 15:14
11	04:15 21:54	05:14 20:55	05:47 (A0005) 19:33	06:59 (A0011) 18:09	07:34 15:53	07:48 (A0004) 15:14
12	04:17 21:53	05:16 20:53	05:49 (A0005) 19:30	06:58 (A0011) 18:07	07:36 15:51	07:48 (A0004) 15:13
13	04:18 21:52	05:18 20:50	05:54 (A0005) 19:27	06:58 (A0011) 18:04	07:38 15:49	07:48 (A0004) 15:13
14	04:20 21:51	05:20 20:48	06:26 19:24	06:58 (A0011) 18:01	07:41 15:47	07:48 (A0004) 15:13
15	04:21 21:49	05:22 20:45	06:28 19:22	07:00 (A0011) 17:58	07:43 15:45	07:48 (A0004) 15:13
16	04:23 21:48	05:24 20:43	06:30 19:19	07:02 (A0011) 17:56	07:45 15:43	07:48 (A0004) 15:13
17	04:25 21:46	05:26 20:40	06:32 19:16	07:20 (A0003) 17:53	07:47 15:42	07:48 (A0004) 15:13
18	04:26 21:45	05:29 20:38	06:34 19:13	07:23 (A0003) 17:51	07:49 15:40	07:48 (A0004) 15:13
19	04:28 21:43	05:31 20:35	06:33 (A0006) 19:10	07:41 17:48	08:27 (A0008) 15:38	07:48 (A0004) 15:13
20	04:30 21:41	05:33 20:33	06:30 (A0006) 19:08	07:43 17:45	08:25 (A0008) 15:36	07:48 (A0004) 15:13
21	04:31 21:40	05:35 20:30	06:29 (A0006) 19:05	07:46 17:43	08:23 (A0008) 15:35	07:48 (A0004) 15:13
22	04:33 21:38	05:37 20:27	06:28 (A0006) 19:02	07:48 17:40	08:23 (A0008) 15:33	07:48 (A0004) 15:13
23	04:35 21:36	05:39 20:25	06:27 (A0006) 18:59	07:50 17:38	08:23 (A0008) 15:31	07:48 (A0004) 15:13
24	04:37 21:34	05:41 20:22	06:26 (A0006) 18:56	07:52 17:35	09:02 (A0004) 15:30	07:48 (A0004) 15:13
25	04:39 21:33	05:44 20:19	06:26 (A0006) 18:53	06:55 16:33	07:27 (A0008) 15:29	07:48 (A0004) 15:13
26	04:41 21:31	05:46 20:17	06:26 (A0006) 18:51	06:57 16:30	08:03 (A0004) 15:27	07:48 (A0004) 15:13
27	04:43 21:29	05:48 20:14	06:26 (A0006) 18:48	06:59 16:28	08:03 (A0004) 15:26	07:48 (A0004) 15:13
28	04:45 21:27	05:50 20:11	06:27 (A0006) 18:45	07:49 (A0007) 16:25	08:03 (A0004) 15:24	07:48 (A0004) 15:13
29	04:47 21:25	05:52 20:09	06:29 (A0006) 18:42	07:45 (A0007) 16:23	07:45 (A0004) 15:23	07:48 (A0004) 15:13
30	04:49 21:23	05:54 20:06	07:00 18:40	07:43 (A0007) 16:20	07:45 (A0004) 15:22	07:48 (A0004) 15:13
31	04:51 21:20	05:56 20:03	07:31 (A0003) 07:35 (A0003)	07:55 (A0007) 16:18	07:46 (A0004) 15:22	07:48 (A0004) 15:13
Potential sun hours	538	474	386	321	241	207
Total, worst case		266	546	341	164	
Sun reduction		0,35	0,31	0,26	0,17	
Oper. time red.		0,99	0,99	0,99	0,99	
Wind dir. red.		0,67	0,64	0,59	0,56	
Total reduction		0,23	0,19	0,15	0,09	
Total, real		61	106	51	15	

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:25>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (862)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23 08:43 15:25	08:04 16:24 08:02 16:26	06:57 17:29 08:13 (A0023) 17:32	06:31 19:38 07:54 (A0023) 19:41	07:37 (A0004) 20:45 08:02 (A0004) 20:47	05:11 8 05:56 (A0011) 21:47
2	08:43 15:26 08:43 15:27	08:00 16:28 07:58 16:31	06:51 17:34 08:10 (A0023) 17:36	06:26 19:43 07:58 (A0023) 19:45	07:38 (A0004) 20:49 08:00 (A0004) 20:51	05:06 14 05:59 (A0011) 21:50
3	08:42 15:27 08:42 15:29	07:58 16:31 07:56 16:33	06:49 17:39 07:58 (A0023) 17:39	06:23 19:45 08:08 (A0023) 19:47	07:38 (A0004) 20:51 06:49 (A0012) 20:53	05:04 14 05:59 (A0011) 21:51
4	08:41 15:30 08:40 15:32	07:53 16:35 07:51 16:38	06:43 17:41 07:51 17:43	06:17 19:49 07:53 (A0004) 19:52	04:59 21 06:45 (A0012) 20:58	05:43 (A0011) 16 05:59 (A0011) 21:54
5	08:40 15:32 08:40 15:34	07:49 16:38 07:49 16:40	06:38 17:43 07:49 17:45	06:12 19:52 06:42 (A0012) 20:00	04:55 16 06:56 (A0012) 21:06	05:44 (A0011) 16 05:59 (A0011) 21:55
6	08:39 15:35 08:38 15:37	07:47 16:43 07:44 16:45	06:35 17:48 07:44 17:50	06:09 19:56 06:41 (A0007) 19:58	04:52 14 06:55 (A0012) 21:04	05:44 (A0011) 16 05:58 (A0011) 21:56
7	08:38 15:37 08:37 15:39	07:44 16:45 07:42 16:47	06:32 17:50 07:42 17:52	06:06 19:58 06:56 (A0012) 20:00	04:50 12 06:56 (A0012) 21:06	05:45 (A0011) 16 05:57 (A0011) 21:57
8	08:37 15:39 08:36 15:41	07:42 16:47 07:40 16:50	06:30 17:52 07:40 17:54	06:03 20:00 06:58 (A0008) 20:03	04:48 11 06:37 (A0007) 21:08	05:45 (A0011) 16 05:56 (A0011) 21:58
9	08:36 15:41 08:35 15:42	07:40 16:50 07:37 16:52	06:27 17:57 07:37 17:57	06:01 20:03 06:54 (A0008) 20:05	04:46 9 06:37 (A0007) 21:08	05:46 (A0011) 16 05:55 (A0011) 21:59
10	08:34 15:44 08:33 15:46	07:35 16:54 07:33 16:57	06:21 17:59 07:33 18:01	05:55 17 07:06 (A0008) 20:09	04:41 21 06:53 (A0007) 21:15	05:52 (A0011) 3 05:52 (A0011) 22:00
11	08:33 15:46 08:31 15:48	07:33 16:57 07:30 16:59	06:19 18:01 07:30 18:03	05:53 17 06:52 (A0007) 20:11	04:39 17 06:52 (A0007) 21:17	05:49 (A0011) 16 05:58 (A0011) 22:02
12	08:31 15:48 08:30 15:50	07:30 16:59 07:28 17:01	06:16 18:03 07:28 18:05	05:50 18 06:51 (A0008) 20:11	04:37 18 06:35 (A0007) 21:17	05:49 (A0011) 16 05:58 (A0011) 22:02
13	08:29 15:52 08:28 15:52	07:25 17:04 07:25 17:04	06:10 18:08 07:25 18:08	05:45 15 06:50 (A0008) 20:16	04:33 15 06:36 (A0007) 21:21	05:49 (A0011) 15 05:56 (A0011) 21:59
14	08:27 15:54 08:26 15:57	07:23 17:06 07:20 17:09	06:07 18:10 07:20 18:12	05:42 13 07:04 (A0008) 20:18	04:31 13 06:49 (A0007) 21:23	05:49 (A0011) 15 05:58 (A0011) 22:04
15	08:24 15:59 08:22 16:01	07:18 17:11 07:15 17:13	06:02 18:14 07:15 18:16	05:37 6 07:00 (A0008) 20:22	04:28 4 06:40 (A0007) 21:26	05:49 (A0011) 15 05:59 (A0011) 22:04
16	08:22 16:01 08:21 16:03	07:15 17:13 07:12 17:16	05:59 18:16 07:12 18:19	05:34 12 06:47 (A0004) 20:25	04:26 20:25 06:44 (A0004) 20:31	05:49 (A0011) 15 05:58 (A0011) 22:04
17	08:21 16:03 08:19 16:05	07:12 17:16 07:10 17:18	05:56 18:19 07:10 18:21	05:31 17 07:01 (A0004) 20:27	04:24 21:30 04:22 21:32	05:49 (A0011) 15 05:58 (A0011) 22:05
18	08:19 16:05 08:17 16:08	07:10 17:18 07:07 17:20	05:53 18:21 07:07 18:23	05:29 20 07:02 (A0004) 20:29	04:22 21:32 04:21 21:34	05:49 (A0011) 15 05:58 (A0011) 22:05
19	08:16 16:10 08:14 16:12	07:05 17:22 07:02 17:25	05:48 18:25 07:02 18:27	05:24 24 06:38 (A0004) 20:34	04:19 21:36 05:04 (A0006) 22:04	05:06 (A0006) 2 05:08 (A0006) 22:04
20	08:14 16:12 08:12 16:14	07:02 17:25 06:59 17:27	05:45 18:27 07:54 (A0023) 18:30	05:21 26 07:04 (A0004) 20:36	04:18 21:37 05:11 (A0006) 22:04	05:04 (A0006) 7 05:11 (A0006) 22:04
21	08:12 16:14 08:10 16:17	06:59 17:27 07:54 (A0023) 18:30	05:42 18:30 07:54 (A0023) 18:39	05:19 27 07:04 (A0004) 20:38	04:16 21:39 05:12 (A0006) 22:04	05:02 (A0006) 10 05:12 (A0006) 22:04
22	08:10 16:17 08:08 16:19	07:54 (A0023) 18:30 07:54 (A0023) 18:39	05:16 18:39 07:54 (A0023) 18:42	05:16 26 08:03 (A0004) 20:40	04:15 21:41 05:13 (A0006) 22:04	05:05 (A0006) 11 05:13 (A0006) 22:04
23	08:08 16:19 08:06 16:21	07:54 (A0023) 18:30 07:54 (A0023) 18:39	05:14 18:42 07:54 (A0023) 18:42	05:14 27 08:04 (A0004) 20:42	04:13 21:42 05:14 (A0006) 22:03	05:01 (A0006) 13 05:14 (A0006) 22:03
24	08:06 16:21	07:54 (A0023) 18:30 07:54 (A0023) 18:39	05:14 18:42 07:54 (A0023) 18:42	05:14 26 08:04 (A0004) 20:42	04:12 21:44 05:14 (A0006) 22:03	05:01 (A0006) 13 05:14 (A0006) 22:03
Potential sun hours	228	263	366	429	515	539
Total, worst case		171	407	341	215	464
Sun reduction		0,16	0,22	0,42	0,53	0,43
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,59	0,62	0,64	0,68	0,69
Total reduction		0,09	0,13	0,27	0,35	0,29
Total, real		16	54	91	76	134

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:25>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (862)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

July		August		September		October		November		December	
1	04:04	05:06 (A0006)	04:53	05:56 (A0011)	05:58	06:38 (A0007)	07:02	07:35 (A0008)	07:11	08:16	
2	22:03	16 05:22 (A0006)	21:18	10 06:06 (A0011)	20:00	15 06:53 (A0012)	18:37	7 07:42 (A0008)	16:15	15:21	
3	04:05	05:06 (A0006)	04:55	05:55 (A0011)	06:01	06:39 (A0007)	07:04		07:13	08:18	
4	22:02	16 05:22 (A0006)	21:16	12 06:07 (A0011)	19:58	15 06:54 (A0012)	18:34		16:13	15:20	
5	04:06	05:07 (A0006)	04:57	05:55 (A0011)	06:03	06:40 (A0012)	07:06		07:15	08:20	
6	22:02	16 05:23 (A0006)	21:14	13 06:08 (A0011)	19:55	13 06:53 (A0012)	18:31		16:11	15:19	
7	04:07	05:06 (A0006)	04:59	05:54 (A0011)	06:05	06:40 (A0012)	07:08		07:18	08:21	
8	22:01	16 05:22 (A0006)	21:12	15 06:09 (A0011)	19:52	13 06:53 (A0012)	18:28		16:09	15:18	
9	04:08	05:06 (A0006)	05:01	05:54 (A0011)	06:07	06:41 (A0012)	07:10		07:20	08:23	
10	22:00	16 05:22 (A0006)	21:09	15 06:09 (A0011)	19:49	11 06:52 (A0012)	18:26		16:06	15:17	
11	04:09	05:06 (A0006)	05:03	05:54 (A0011)	06:09	06:41 (A0012)	07:13		07:22	08:25	
12	21:59	16 05:22 (A0006)	21:07	15 06:09 (A0011)	19:47	22 07:49 (A0004)	18:23		16:04	15:16	
13	04:10	05:08 (A0006)	05:05	05:54 (A0011)	06:11	06:44 (A0012)	07:15		07:25	08:26	
14	21:59	15 05:23 (A0006)	21:05	15 06:09 (A0011)	19:44	21 07:51 (A0004)	18:20		16:02	15:16	
15	04:11	05:08 (A0006)	05:07	05:53 (A0011)	06:13	07:33 (A0004)	07:17		07:27	08:28	
16	21:58	15 05:23 (A0006)	21:02	15 06:08 (A0011)	19:41	19 07:52 (A0004)	18:17		16:00	15:15	
17	04:13	05:08 (A0006)	05:09	05:53 (A0011)	06:15	07:31 (A0004)	07:19	08:34 (A0023)	07:29	08:29	
18	21:57	15 05:23 (A0006)	21:00	14 06:07 (A0011)	19:38	22 07:53 (A0004)	18:15	6 08:40 (A0023)	15:57	15:15	
19	04:14	05:08 (A0006)	05:12	05:54 (A0011)	06:17	07:30 (A0004)	07:21	08:31 (A0023)	07:31	08:30	
20	21:56	15 05:23 (A0006)	20:58	13 06:07 (A0011)	19:36	24 07:54 (A0004)	18:12	12 08:43 (A0023)	15:55	15:14	
21	04:15	05:08 (A0006)	05:14	05:55 (A0011)	06:20	07:29 (A0004)	07:23	08:29 (A0023)	07:34	08:32	
22	21:54	14 05:22 (A0006)	20:55	11 06:06 (A0011)	19:33	25 07:54 (A0004)	18:09	16 08:45 (A0023)	15:53	15:14	
23	04:17	05:09 (A0006)	05:16	05:57 (A0011)	06:22	07:28 (A0004)	07:26	08:28 (A0023)	07:36	08:33	
24	21:53	14 05:23 (A0006)	20:53	7 06:04 (A0011)	19:30	26 07:54 (A0004)	18:07	18 08:46 (A0023)	15:51	15:13	
25	04:18	05:10 (A0006)	05:18		06:24	07:27 (A0004)	07:28	08:26 (A0023)	07:38	08:34	
26	21:52	12 05:22 (A0006)	20:50		19:27	27 07:54 (A0004)	18:04	20 08:46 (A0023)	15:49	15:13	
27	04:20	05:10 (A0006)	05:20		06:26	07:27 (A0004)	07:30	08:26 (A0023)	07:41	08:35	
28	21:51	12 05:22 (A0006)	20:48		19:24	27 07:54 (A0004)	18:01	21 08:47 (A0023)	15:47	15:13	
29	04:21	05:11 (A0006)	05:22		06:28	07:28 (A0004)	07:32	08:26 (A0023)	07:43	08:36	
30	21:49	11 05:22 (A0006)	20:45		19:22	26 07:54 (A0004)	17:58	21 08:47 (A0023)	15:45	15:13	
31	04:23	05:12 (A0006)	05:24		06:30	07:28 (A0004)	07:34	08:25 (A0023)	07:45	08:37	
32	21:48	8 05:20 (A0006)	20:43		19:19	25 07:53 (A0004)	17:56	21 08:46 (A0023)	15:43	15:13	
33	04:25	05:14 (A0006)	05:26		06:32	07:28 (A0004)	07:37	08:26 (A0023)	07:47	08:38	
34	21:46	6 05:20 (A0006)	20:40		19:16	24 07:52 (A0004)	17:53	21 08:47 (A0023)	15:42	15:13	
35	04:26		05:29		06:34	07:28 (A0004)	07:39	08:26 (A0023)	07:49	08:39	
36	21:45		20:38		19:13	23 07:51 (A0004)	17:51	20 08:46 (A0023)	15:40	15:13	
37	04:28		05:31		06:36	07:29 (A0004)	07:41	08:26 (A0023)	07:52	08:40	
38	21:43		20:35		19:10	21 07:50 (A0004)	17:48	19 08:45 (A0023)	15:38	15:13	
39	04:30		05:33		06:38	07:30 (A0004)	07:43	08:27 (A0023)	07:54	08:41	
40	21:41		20:33		19:08	18 07:48 (A0004)	17:45	17 08:44 (A0023)	15:36	15:13	
41	04:32		05:35		06:41	07:32 (A0004)	07:46	08:28 (A0023)	07:56	08:41	
42	21:40		20:30		19:05	13 07:45 (A0004)	17:43	14 08:42 (A0023)	15:35	15:14	
43	04:33		05:37	06:44 (A0007)	06:43	07:36 (A0004)	07:48	08:31 (A0023)	07:58	08:42	
44	21:38		20:27	5 06:49 (A0007)	19:02	8 07:44 (A0008)	17:40	10 08:41 (A0023)	15:33	15:14	
45	04:35		05:39	06:41 (A0007)	06:45	07:36 (A0008)	07:50		08:00	08:42	
46	21:36		20:25	11 06:52 (A0007)	18:59	10 07:46 (A0008)	17:38		15:32	15:15	
47	04:37		05:41	06:40 (A0007)	06:47	07:34 (A0008)	07:52		08:02	08:43	
48	21:34		20:22	13 06:53 (A0007)	18:56	13 07:47 (A0008)	17:35		15:30	15:15	
49	04:39		05:44	06:38 (A0007)	06:49	07:33 (A0008)	06:55		08:04	08:43	
50	21:32		20:19	16 06:54 (A0007)	18:53	15 07:48 (A0008)	16:33		15:29	15:16	
51	04:41		05:46	06:38 (A0007)	06:51	07:33 (A0008)	06:57		08:06	08:43	
52	21:31		20:17	16 06:54 (A0007)	18:51	16 07:49 (A0008)	16:30		15:27	15:17	
53	04:43		05:48	06:37 (A0007)	06:53	07:33 (A0008)	06:59		08:08	08:44	
54	21:29		20:14	17 06:54 (A0007)	18:48	15 07:48 (A0008)	16:28		15:26	15:18	
55	04:45		05:50	06:37 (A0007)	06:55	07:33 (A0008)	07:02		08:10	08:44	
56	21:27		20:11	17 06:54 (A0007)	18:45	15 07:48 (A0008)	16:25		15:24	15:19	
57	04:47		05:52	06:36 (A0007)	06:58	07:33 (A0008)	07:04		08:12	08:44	
58	21:25		20:09	18 06:54 (A0007)	18:42	13 07:46 (A0008)	16:23		15:23	15:20	
59	04:49		05:54	06:36 (A0007)	07:00	07:33 (A0008)	07:06		08:14	08:44	
60	21:23		20:06	17 06:53 (A0007)	18:39	12 07:45 (A0008)	16:20		15:22	15:21	
61	04:51		05:56	06:37 (A0007)			07:08			08:44	
62	21:20	6 06:04 (A0011)	20:03	16 06:53 (A0012)			16:18			15:22	
Potential sun hours	538		474		386		321		241	207	
Total, worst case	239		301		547		243				
Sun reduction	0,38		0,35		0,31		0,26				
Oper. time red.	0,99		0,99		0,99		0,99				
Wind dir. red.	0,69		0,67		0,63		0,59				
Total reduction	0,26		0,23		0,19		0,15				
Total, real	62		70		105		37				

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:26>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (891)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:24	08:36 (A0023) 06:57	07:33 (A0008) 06:31	05:11 20:45	05:57 (A0006) 21:46
2	08:43 15:25	08:02 16:26	08:34 (A0023) 06:54	07:33 (A0008) 06:28	05:09 20:47	05:57 (A0006) 21:47
3	08:43 15:26	08:00 16:28	08:32 (A0023) 06:51	07:35 (A0008) 06:26	05:06 20:49	05:58 (A0006) 21:49
4	08:42 15:27	07:58 16:31	08:30 (A0023) 06:49	07:48 (A0004) 06:23	05:04 20:51	05:59 (A0006) 21:50
5	08:42 15:29	07:56 16:33	08:30 (A0023) 06:46	07:49 (A0004) 06:20	05:02 20:53	06:00 (A0006) 21:51
6	08:41 15:30	07:53 16:35	08:30 (A0023) 06:43	07:53 (A0004) 06:17	04:59 20:55	06:03 (A0006) 21:53
7	08:40 15:32	07:51 16:38	08:30 (A0023) 06:41	07:55 (A0004) 06:14	04:57 20:58	06:04 (A0006) 21:54
8	08:40 15:34	07:49 16:40	08:30 (A0023) 06:38	06:12 19:54	04:55 21:00	04:03 21:55
9	08:39 15:35	07:47 16:43	08:30 (A0023) 06:35	06:09 19:56	04:52 21:02	04:03 21:56
10	08:38 15:37	07:44 16:45	08:31 (A0023) 06:32	06:06 19:58	04:50 21:04	04:02 21:57
11	08:37 15:39	07:42 16:47	08:32 (A0023) 06:30	06:03 20:00	04:48 21:06	04:01 21:58
12	08:36 15:41	07:40 16:50	08:34 (A0023) 06:27	06:01 20:03	04:46 21:08	04:01 21:59
13	08:35 15:42	07:37 16:52	08:36 (A0023) 06:24	05:58 20:05	04:44 21:10	04:00 22:00
14	08:34 15:44	07:35 16:54	08:40 (A0023) 06:21	05:55 20:07	04:41 21:13	04:00 22:01
15	08:33 15:46	07:33 16:57	06:19 18:01	05:53 20:09	04:39 21:15	03:59 22:01
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:17	03:59 22:02
17	08:30 15:50	07:28 17:01	06:13 18:05	05:47 20:14	04:35 21:19	03:59 22:03
18	08:29 15:52	07:25 17:04	06:10 18:08	05:45 20:16	04:33 21:21	03:59 22:03
19	08:27 15:54	07:23 17:06	06:07 18:10	05:42 20:18	04:31 21:23	03:59 22:04
20	08:26 15:57	07:20 17:09	06:05 18:12	05:39 20:20	04:30 21:25	03:59 22:04
21	08:24 15:59	07:18 17:11	07:56 (A0004) 06:02	06:36 (A0007) 05:37	04:28 21:27	03:59 22:04
22	08:23 16:01	07:15 17:13	07:51 (A0004) 05:59	06:36 (A0007) 05:34	04:26 21:28	03:59 22:04
23	08:21 16:03	07:12 17:16	08:02 (A0004) 05:56	06:51 (A0007) 05:31	04:24 21:30	03:59 22:05
24	08:19 16:05	07:10 17:18	08:03 (A0004) 05:53	06:50 (A0007) 05:29	04:22 21:32	04:00 22:05
25	08:17 16:08	07:07 17:20	08:05 (A0004) 05:51	06:48 (A0007) 05:26	04:21 21:34	04:00 22:05
26	08:16 16:10	07:05 17:22	08:06 (A0004) 05:48	06:47 (A0007) 05:24	04:19 21:36	04:00 22:05
27	08:14 16:12	07:02 17:25	07:33 (A0008) 05:45	05:21 20:36	04:18 21:38	04:01 22:04
28	08:12 16:14	06:59 17:27	07:33 (A0008) 05:42	05:19 20:38	04:16 21:39	04:02 22:04
29	08:10 16:17		08:06 (A0004) 06:39	05:16 20:40	04:15 21:41	04:02 22:04
30	08:08 16:19			05:14 20:42	04:13 21:43	04:03 22:03
31	08:06 16:21				04:12 21:44	
Potential sun hours	228	262	366	429	515	539
Total, worst case		339	221	582	287	
Sun reduction		0,16	0,22	0,42	0,53	
Oper. time red.		0,99	0,99	0,99	0,99	
Wind dir. red.		0,59	0,61	0,66	0,68	
Total reduction		0,09	0,13	0,27	0,35	
Total, real		31	29	158	100	

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: KONGSERYD 1:26>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (891)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:04 22:03	04:53 21:18	05:28 (A0005) 20:01	06:40 (A0011) 18:37	07:11 16:15	08:01 (A0023) 15:21
2	04:05 22:02	04:55 21:16	05:30 (A0005) 19:58	06:40 (A0011) 18:34	07:13 16:13	08:00 (A0023) 15:20
3	04:06 22:02	04:57 21:14	06:03 19:55	06:40 (A0011) 18:31	07:15 16:11	08:00 (A0023) 15:19
4	04:07 22:01	04:59 21:12	06:05 19:52	06:40 (A0011) 18:28	07:18 16:09	08:00 (A0023) 15:18
5	04:08 22:00	05:01 21:09	06:07 19:50	06:41 (A0011) 18:26	07:20 16:06	08:00 (A0023) 15:17
6	04:09 22:00	05:03 21:07	06:09 19:47	06:43 (A0011) 18:23	07:22 16:04	08:00 (A0023) 15:16
7	04:10 21:59	05:05 21:05	06:12 (A0006) 19:44	07:15 18:20	07:25 16:02	08:01 (A0023) 15:16
8	04:11 21:58	05:07 21:02	06:08 (A0006) 19:41	07:17 18:17	08:26 (A0004) 16:00	08:02 (A0023) 15:15
9	04:13 21:57	05:09 21:00	06:07 (A0006) 19:38	07:19 18:15	08:23 (A0004) 15:57	08:05 (A0023) 15:15
10	04:14 21:56	05:12 20:58	06:06 (A0006) 19:36	07:21 18:12	08:21 (A0004) 15:55	08:08 (A0023) 15:14
11	04:15 21:54	05:14 20:55	06:06 (A0006) 19:33	07:23 18:09	08:09 (A0008) 15:53	08:11 (A0023) 15:14
12	04:17 21:53	05:16 20:53	06:05 (A0006) 19:30	07:26 18:07	08:07 (A0008) 15:51	08:14 (A0023) 15:13
13	04:18 21:52	05:18 20:50	06:05 (A0006) 19:27	07:28 18:04	08:06 (A0008) 15:49	08:13 (A0023) 15:13
14	04:20 21:51	05:20 20:48	06:05 (A0006) 19:24	07:30 18:01	08:06 (A0008) 15:47	08:15 (A0023) 15:13
15	04:21 21:49	05:22 20:45	06:05 (A0006) 19:22	07:32 17:58	08:05 (A0008) 15:45	08:16 (A0023) 15:13
16	04:23 21:48	05:24 20:43	06:06 (A0006) 19:19	07:35 17:56	08:05 (A0008) 15:43	08:17 (A0023) 15:13
17	04:25 21:46	05:26 20:40	06:07 (A0006) 19:16	07:37 17:53	08:08 (A0008) 15:42	08:18 (A0023) 15:13
18	04:26 21:45	05:29 20:38	06:08 (A0006) 19:13	07:39 17:51	08:10 (A0008) 15:40	08:19 (A0023) 15:13
19	04:28 21:43	05:31 20:35	06:37 (A0003) 19:10	07:41 17:48	08:21 (A0004) 15:38	08:20 (A0023) 15:13
20	04:30 21:41	05:29 (A0005) 20:33	06:37 (A0003) 19:08	07:43 17:45	08:23 (A0004) 15:36	08:21 (A0023) 15:13
21	04:32 21:40	05:33 (A0005) 20:30	06:37 (A0003) 19:05	07:46 17:43	08:32 (A0004) 15:35	08:22 (A0023) 15:14
22	04:33 21:38	05:35 (A0005) 20:27	06:38 (A0003) 19:02	07:48 17:40	15:33	08:23 (A0004) 15:14
23	04:35 21:36	05:37 (A0005) 20:25	06:38 (A0003) 18:59	07:50 17:38	08:00 15:31	08:24 (A0023) 15:15
24	04:37 21:34	05:38 (A0005) 20:22	06:38 (A0003) 18:56	07:52 17:35	08:02 15:30	08:25 (A0023) 15:15
25	04:39 21:33	05:40 (A0005) 20:19	06:39 (A0003) 18:53	07:55 17:33	08:04 15:29	08:26 (A0023) 15:16
26	04:41 21:31	05:42 (A0005) 20:17	06:40 (A0003) 18:51	07:57 17:30	08:06 15:27	08:27 (A0023) 15:17
27	04:43 21:29	05:44 (A0005) 20:14	06:42 (A0003) 18:48	07:59 17:28	08:08 15:26	08:28 (A0023) 15:18
28	04:45 21:27	05:46 (A0005) 20:11	06:44 (A0003) 18:45	08:00 17:25	08:10 15:24	08:29 (A0023) 15:19
29	04:47 21:25	05:48 (A0005) 20:09	06:46 (A0003) 18:42	08:02 17:23	08:12 15:23	08:30 (A0023) 15:20
30	04:49 21:23	05:50 (A0005) 20:06	06:48 (A0003) 18:40	08:04 (A0023) 17:21	08:14 15:22	08:31 (A0023) 15:21
31	04:51 21:20	05:52 (A0005) 20:03	06:50 (A0003) 18:37	08:06 (A0023) 17:19	08:16 15:21	08:32 (A0023) 15:22
Potential sun hours	538	474	386	321	241	207
Total, worst case	135	682	185	323	132	
Sun reduction	0,38	0,35	0,31	0,26	0,17	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,69	0,66	0,64	0,59	0,57	
Total reduction	0,26	0,23	0,19	0,15	0,10	
Total, real	35	155	36	48	13	

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LILLA HESTER 2:1>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (856)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	06:58 (5) 07:08 (5)	05:11 20:44
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	06:59 (5) 07:05 (5)	05:08 20:47
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:49
4	08:42 15:27	07:58 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:50
5	08:42 15:28	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:05 21:51
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:53
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:04 21:54
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:50 21:04	04:01 21:57
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	05:19 (1) 05:22 (1)
12	08:36 15:40	07:40 16:49	06:27 17:54	06:00 20:02	04:45 21:08	05:17 (1) 05:22 (1)
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	05:15 (1) 05:22 (1)
14	08:34 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	05:13 (1) 05:21 (1)
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	05:11 (1) 05:21 (1)
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	05:09 (1) 05:20 (1)
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	05:07 (1) 05:19 (1)
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:16	04:33 21:21	05:07 (1) 05:19 (1)
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:22	05:08 (1) 05:18 (1)
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	05:09 (1) 05:16 (1)
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	04:58 (2) 05:00 (2)
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:24	04:25 21:28	04:56 (2) 05:00 (2)
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	04:58 (2) 05:00 (2)
24	08:19 16:05	07:10 17:17	05:53 18:21	05:28 20:29	04:22 21:32	04:56 (2) 04:59 (2)
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	04:55 (2) 04:59 (2)
26	08:16 16:09	07:04 17:22	05:48 18:25	05:23 20:33	04:19 21:36	04:54 (2) 04:59 (2)
27	08:14 16:12	07:02 17:24	05:45 18:27	05:21 20:36	04:17 21:37	04:52 (2) 04:58 (2)
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:51 (2) 04:58 (2)
29	08:10 16:16	06:39 19:32	06:39 19:32	07:05 (5) 07:11 (5)	05:16 20:40	04:50 (2) 04:57 (2)
30	08:08 16:19	06:36 19:34	06:36 19:34	07:02 (5) 07:10 (5)	05:13 20:42	04:50 (2) 04:57 (2)
31	08:06 16:21	06:34 19:36	06:34 19:36	07:00 (5) 07:10 (5)	04:11 21:44	04:52 (2) 04:55 (2)
Potential sun hours	228	262	366	429	515	539
Total, worst case			38	87		130
Sun reduction			0,22	0,42		0,53
Oper. time red.			0,99	0,99		0,99
Wind dir. red.			0,65	0,67		0,69
Total reduction			0,14	0,28		0,36
Total, real			5	24		47

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LILLA HESTER 2:1>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (856)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:28 (1) 05:58	07:02 18:36	07:11 16:15	08:16 15:20
2	04:04 22:02	04:54 21:16	05:30 (1) 06:00	07:04 18:34	07:13 16:13	08:18 15:19
3	04:05 22:02	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:19 15:18
4	04:06 22:01	04:59 21:12	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	07:22 16:04	08:24 15:16
7	04:09 21:59	05:05 21:05	06:11 19:44	07:14 18:20	07:24 16:01	08:26 15:15
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	04:13 21:55	05:11 20:58	06:17 19:35	06:53 (5) 06:58 (5)	07:21 18:12	07:31 15:55
11	04:15 21:54	05:13 20:55	06:19 19:33	06:50 (5) 07:00 (5)	07:23 18:09	07:34 15:53
12	04:16 21:53	05:15 20:53	06:21 19:30	06:51 (5) 07:01 (5)	07:25 18:06	07:36 15:51
13	04:18 21:52	04:59 (2) 05:03 (2)	05:18 20:50	06:23 06:05 (4)	07:28 18:03	07:38 15:49
14	04:19 21:51	04:58 (2) 05:06 (2)	05:20 20:48	06:26 06:07 (4)	07:30 18:01	07:40 15:47
15	04:21 21:49	04:59 (2) 05:06 (2)	05:22 20:45	06:28 06:08 (4)	07:32 17:58	07:43 15:45
16	04:22 21:48	05:01 (2) 05:08 (2)	05:24 20:43	06:30 06:09 (4)	07:34 17:55	07:45 15:43
17	04:24 21:46	05:02 (2) 05:04 (2)	05:26 20:40	06:32 06:01 (4)	07:36 17:53	07:47 15:41
18	04:26 21:45	05:09 (2) 05:05 (2)	05:30 20:38	06:34 06:09 (4)	07:39 17:50	07:49 15:39
19	04:27 21:43	05:09 (2) 05:07 (2)	05:32 20:35	06:36 06:09 (4)	07:41 17:48	07:51 15:38
20	04:29 21:41	05:09 (2) 05:08 (2)	05:32 20:35	06:38 06:05 (4)	07:43 17:45	07:54 15:36
21	04:31 21:40	05:09 (2) 05:09 (2)	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34
22	04:33 21:38	05:37 20:27	06:42 19:02	07:12 (6) 07:16 (6)	07:48 17:40	07:58 15:33
23	04:35 21:36	05:22 (1) 05:25 (1)	05:39 20:25	06:44 18:59	07:50 17:37	08:00 15:31
24	04:37 21:34	05:19 (1) 05:27 (1)	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:29
25	04:38 21:32	05:18 (1) 05:28 (1)	05:43 20:19	06:49 18:53	06:55 16:32	08:04 15:28
26	04:40 21:30	05:17 (1) 05:30 (1)	05:45 20:17	06:51 18:50	06:57 16:30	08:06 15:27
27	04:42 21:29	05:19 (1) 05:31 (1)	05:47 20:14	06:53 18:48	06:59 16:27	08:08 15:25
28	04:44 21:27	05:20 (1) 05:31 (1)	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24
29	04:46 21:24	05:22 (1) 05:31 (1)	05:52 20:08	06:57 18:42	07:04 16:22	08:12 15:23
30	04:48 21:22	05:24 (1) 05:32 (1)	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22
31	04:50 21:20	05:26 (1) 05:32 (1)	05:56 20:03		07:08 16:17	08:16 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case	124	79	54			
Sun reduction	0,38	0,35	0,31			
Oper. time red.	0,99	0,99	0,99			
Wind dir. red.	0,69	0,67	0,65			
Total reduction	0,26	0,24	0,20			
Total, real	32	19	11			

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

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



Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
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## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LILLA HESTER 2:2>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (832)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	06:57 (5) 07:11 (5)	05:11 20:44
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	06:58 (5) 07:09 (5)	05:08 20:47
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	06:59 (5) 07:06 (5)	05:06 20:49
4	08:42 15:27	07:58 16:30	06:48 17:36	06:22 19:45	05:04 20:51	05:04 21:50
5	08:42 15:28	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:05 21:51
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:04 21:53
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:57	04:04 21:54
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56
10	08:38 15:36	07:44 16:44	06:32 17:49	06:06 19:58	04:50 21:04	04:01 21:57
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58
12	08:36 15:40	07:40 16:49	06:27 17:54	06:00 20:02	04:45 21:08	04:00 21:59
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00
14	08:34 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:01
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	05:09 (1) 05:10 (1)
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	05:07 (1) 05:11 (1)
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:16	04:33 21:20	05:06 (1) 05:11 (1)
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:22	05:04 (1) 05:11 (1)
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	05:02 (1) 05:11 (1)
21	08:24 15:58	07:17 17:10	06:01 18:14	05:36 20:22	04:27 21:26	05:01 (1) 05:12 (1)
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:24	04:25 21:28	04:59 (1) 05:11 (1)
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	04:58 (1) 05:11 (1)
24	08:19 16:05	07:10 17:17	05:53 18:21	05:28 20:29	04:22 21:32	04:56 (1) 05:11 (1)
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	05:11 (1) 05:11 (1)
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:36	04:55 (1) 05:11 (1)
27	08:14 16:12	07:02 17:24	05:45 18:27	05:21 20:36	04:17 21:37	04:55 (1) 05:09 (1)
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:56 (1) 05:09 (1)
29	08:10 16:16	06:39 19:32	05:16 19:32	05:16 20:40	04:14 21:41	04:57 (1) 05:09 (1)
30	08:08 16:19	06:36 19:34	05:13 19:34	05:13 20:42	04:13 21:42	04:49 (2) 05:08 (1)
31	08:06 16:21	06:34 19:36	05:11 19:36	05:11 20:42	04:11 21:44	04:48 (2) 05:07 (1)
Potential sun hours	228	262	366	429	515	539
Total, worst case			57	83	229	222
Sun reduction			0,22	0,42	0,53	0,43
Oper. time red.			0,99	0,99	0,99	0,99
Wind dir. red.			0,64	0,67	0,69	0,69
Total reduction			0,14	0,28	0,36	0,29
Total, real			8	23	83	64

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

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Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:44 (2) 04:53 (2)	04:52 21:18	05:58 20:00	07:02 18:36	07:11 16:15
2	04:04 22:02	04:44 (2) 04:54 (2)	04:54 21:16	06:00 19:58	07:04 18:34	07:13 16:13
3	04:05 22:02	04:45 (2) 04:55 (2)	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10
4	04:06 22:01	04:46 (2) 04:55 (2)	04:59 21:12	06:04 19:52	07:08 18:28	07:17 16:08
5	04:07 22:00	04:47 (2) 04:56 (2)	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06
6	04:08 21:59	04:48 (2) 04:56 (2)	05:03 21:07	06:09 19:46	07:12 18:23	07:22 16:04
7	04:09 21:59	04:49 (2) 04:57 (2)	05:05 21:05	06:11 19:44	07:14 18:20	07:24 16:01
8	04:11 21:58	04:50 (2) 04:57 (2)	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59
9	04:12 21:57	04:51 (2) 04:57 (2)	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57
10	04:13 21:55	04:53 (2) 04:58 (2)	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55
11	04:15 21:54	04:54 (2) 04:58 (2)	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53
12	04:16 21:53	04:55 (2) 05:14 (1)	05:15 20:53	06:21 19:30	07:25 18:06	07:36 15:51
13	04:18 21:52	04:56 (2) 05:15 (1)	05:17 20:50	06:23 19:27	07:28 18:03	07:38 15:49
14	04:19 21:51	04:58 (2) 05:17 (1)	05:20 20:48	06:25 19:24	07:30 18:01	07:40 15:47
15	04:21 21:49	05:05 (1) 05:17 (1)	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45
16	04:22 21:48	05:05 (1) 05:19 (1)	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43
17	04:24 21:46	05:04 (1) 05:19 (1)	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41
18	04:26 21:45	05:04 (1) 05:20 (1)	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:39
19	04:27 21:43	05:05 (1) 05:20 (1)	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38
20	04:29 21:41	05:07 (1) 05:21 (1)	05:32 20:32	06:38 19:07	07:43 17:45	07:54 15:36
21	04:31 21:40	05:08 (1) 05:21 (1)	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34
22	04:33 21:38	05:10 (1) 05:21 (1)	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:33
23	04:35 21:36	05:12 (1) 05:22 (1)	05:39 20:25	06:44 18:59	07:50 17:37	08:00 15:31
24	04:37 21:34	05:13 (1) 05:21 (1)	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:29
25	04:38 21:32	05:15 (1) 05:22 (1)	05:43 20:19	06:49 18:53	07:55 17:32	08:04 15:28
26	04:40 21:30	05:17 (1) 05:22 (1)	05:45 20:17	06:51 18:50	07:57 17:30	08:06 15:27
27	04:42 21:29	05:19 (1) 05:22 (1)	05:47 20:14	06:53 18:48	07:59 16:27	08:08 15:25
28	04:44 21:27	05:20 (1) 05:22 (1)	05:48 20:11	06:55 18:45	08:01 16:25	08:10 15:24
29	04:46 21:24	05:22 (1) 05:24 (1)	05:50 20:08	06:57 18:42	08:03 16:22	08:12 15:23
30	04:48 21:22	05:24 (1) 05:26 (1)	05:52 20:06	06:59 18:39	08:05 16:20	08:14 15:22
31	04:50 21:20	05:26 (1) 05:28 (1)	05:54 20:03	07:01 18:37	08:07 16:17	08:16 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case	260	112	91			
Sun reduction	0,38	0,35	0,31			
Oper. time red.	0,99	0,99	0,99			
Wind dir. red.	0,69	0,68	0,65			
Total reduction	0,26	0,24	0,20			
Total, real	68	27	18			

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LÖVSEHULT 1:20>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (906)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:15 15:21
2	08:42 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:09 20:46	04:09 21:47	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	07:59 16:28	06:51 17:34	06:25 19:42	05:06 20:48	04:08 21:48	04:05 22:01	04:57 21:13	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:49	04:06 22:00	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:18
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:19 16:06	08:22 15:17
6	08:40 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:46	07:12 18:23	07:22 16:04	08:24 15:16
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:04	06:11 19:44	07:14 18:20	07:24 16:02	08:26 15:16
8	08:39 15:33	07:48 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:54	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:26 15:59	08:27 15:15
9	08:38 15:35	07:46 16:42	06:35 17:47	06:09 19:56	04:52 21:01	04:02 21:55	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:28 15:14
10	08:37 15:37	07:44 16:45	06:32 17:49	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:11 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:36 15:39	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:31 15:13
12	08:35 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:46 21:08	04:00 21:58	04:17 21:53	05:16 20:52	06:21 19:30	07:25 18:06	07:35 15:51	08:32 15:13
13	08:34 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 21:59	04:18 21:51	05:18 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:13
14	08:33 15:44	07:34 16:54	06:21 17:58	05:55 20:07	04:41 21:12	04:00 22:00	04:20 21:50	05:20 20:47	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	03:59 22:01	04:23 21:47	05:24 20:42	06:30 19:18	07:34 17:55	07:44 15:43	08:37 15:13
17	08:29 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:13
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19	08:27 15:54	07:22 17:06	06:07 18:09	05:42 20:18	04:31 21:22	03:59 22:03	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:39 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:59 22:03	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:24 15:58	07:17 17:11	06:01 18:14	05:36 20:22	04:28 21:26	03:59 22:04	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:55 15:34	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:37	05:37 20:27	06:42 19:02	07:47 17:40	07:58 15:33	08:41 15:14
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:15
24	08:19 16:05	07:09 17:18	05:53 18:20	05:29 20:29	04:22 21:32	03:59 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:42 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:21 21:33	04:00 22:04	04:39 21:32	05:43 20:19	06:49 18:53	06:54 16:32	08:04 15:28	08:43 15:16
26	08:15 16:10	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:41 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:17
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:01 22:04	04:43 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:26	08:43 15:17
28	08:11 16:14	06:59 17:27	05:42 18:29	05:18 20:37	04:16 21:39	04:01 22:03	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:43 15:18
29	08:10 16:16	06:59 19:31	05:42 19:31	05:16 20:40	04:14 21:40	04:02 22:03	04:47 21:24	05:52 20:08	06:57 18:42	07:03 16:22	08:12 15:23	08:43 15:19
30	08:08 16:19	06:56 19:34	05:40 19:34	05:13 20:42	04:13 21:42	04:03 22:03	04:49 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21	06:54 19:36	05:38 19:36	05:11 21:43	04:12 21:43	04:01 22:03	04:51 21:20	05:56 20:03	07:08 16:18	07:08 15:22	08:43 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LÖVSEHULT 1:21>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (892)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:15 15:21
2	08:42 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:09 20:46	04:09 21:47	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	07:59 16:28	06:51 17:34	06:25 19:42	05:06 20:48	04:08 21:48	04:05 22:01	04:57 21:13	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:49	04:06 22:00	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:18
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:19 16:06	08:22 15:17
6	08:40 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:46	07:12 18:23	07:22 16:04	08:24 15:16
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:04	06:11 19:44	07:14 18:20	07:24 16:02	08:26 15:16
8	08:39 15:33	07:48 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:54	04:11 21:57	05:07 21:02	06:13 19:41	07:16 18:17	07:26 15:59	08:27 15:15
9	08:38 15:35	07:46 16:42	06:35 17:47	06:09 19:56	04:52 21:01	04:02 21:55	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:28 15:14
10	08:37 15:37	07:44 16:45	06:32 17:49	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:11 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:36 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:31 15:13
12	08:35 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:58	04:17 21:53	05:16 20:52	06:21 19:30	07:25 18:06	07:35 15:51	08:32 15:13
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16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	03:59 22:01	04:23 21:47	05:24 20:42	06:30 19:18	07:34 17:55	07:44 15:43	08:37 15:13
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19	08:27 15:54	07:22 17:06	06:07 18:09	05:42 20:18	04:31 21:22	03:59 22:03	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:39 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:59 22:03	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:24 15:58	07:17 17:11	06:01 18:14	05:36 20:22	04:28 21:26	03:59 22:04	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:55 15:34	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:37	05:37 20:27	06:42 19:01	07:47 17:40	07:58 15:33	08:41 15:14
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:15
24	08:19 16:05	07:09 17:18	05:53 18:20	05:29 20:29	04:22 21:32	03:59 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:42 15:15
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29	08:10 16:16	06:59 19:31	05:42 19:31	05:16 20:40	04:14 21:40	04:02 22:03	04:47 21:24	05:52 20:08	06:57 18:42	07:03 16:22	08:12 15:23	08:43 15:19
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31	08:06 16:21	06:54 19:36	05:38 19:36	05:11 21:43	04:12 21:43	04:01 22:03	04:51 21:20	05:56 20:03	07:08 16:18	07:08 15:22	08:43 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LÖVSEHULT 1:23>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (893)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:15 15:21
2	08:42 15:24	08:01 16:26	06:54 17:31	06:28 19:40	05:09 20:46	04:09 21:46	04:05 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	07:59 16:28	06:51 17:34	06:25 19:42	05:06 20:48	04:08 21:48	04:05 22:01	04:57 21:13	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:49	04:06 22:00	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:18
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6	08:40 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:04	08:24 15:16
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9	08:38 15:35	07:46 16:42	06:35 17:47	06:09 19:56	04:52 21:01	04:02 21:55	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:28 15:14
10	08:37 15:37	07:44 16:45	06:32 17:49	06:06 19:58	04:50 21:03	04:02 21:56	04:14 21:55	05:11 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:36 15:39	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:57	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:31 15:13
12	08:35 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:46 21:08	04:00 21:58	04:17 21:53	05:16 20:52	06:21 19:30	07:25 18:06	07:35 15:51	08:32 15:13
13	08:34 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 21:59	04:18 21:51	05:18 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:13
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15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	03:59 22:01	04:23 21:47	05:24 20:42	06:30 19:18	07:34 17:55	07:44 15:43	08:37 15:13
17	08:29 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:13
18	08:28 15:52	07:25 17:04	06:10 18:07	05:44 20:15	04:33 21:20	03:59 22:02	04:26 21:44	05:28 20:37	06:34 19:13	07:38 17:50	07:49 15:40	08:39 15:13
19	08:27 15:54	07:22 17:06	06:07 18:09	05:42 20:18	04:31 21:22	03:59 22:03	04:28 21:42	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:39 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:59 22:03	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:23 15:58	07:17 17:11	06:01 18:14	05:36 20:22	04:28 21:26	03:59 22:04	04:31 21:39	05:35 20:29	06:40 19:04	07:45 17:42	07:55 15:34	08:41 15:14
22	08:22 16:01	07:14 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:37	05:37 20:27	06:42 19:01	07:47 17:40	07:57 15:33	08:41 15:14
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:15
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Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LÖVSEHULT 1:24>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (911)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
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2	08:42 15:25	08:01 16:26	06:54 17:31	06:28 19:40	05:09 20:46	04:09 21:46	04:05 22:02	04:55 21:15	06:00 19:57	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	07:59 16:28	06:51 17:34	06:25 19:42	05:06 20:48	04:08 21:48	04:06 22:01	04:57 21:13	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:57 16:31	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:49	04:07 22:00	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:18
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:19 16:06	08:22 15:17
6	08:40 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:46	07:12 18:23	07:22 16:04	08:24 15:16
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:04	06:11 19:43	07:14 18:20	07:24 16:02	08:25 15:16
8	08:39 15:33	07:48 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:54	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:26 15:59	08:27 15:15
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12	08:35 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:46 21:08	04:01 21:58	04:17 21:52	05:16 20:52	06:21 19:30	07:25 18:06	07:35 15:51	08:32 15:13
13	08:34 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 21:59	04:18 21:51	05:18 20:50	06:23 19:27	07:27 18:04	07:38 15:49	08:34 15:13
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16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	03:59 22:01	04:23 21:47	05:24 20:42	06:30 19:18	07:34 17:56	07:44 15:43	08:37 15:13
17	08:29 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:25 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:13
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19	08:26 15:54	07:22 17:06	06:07 18:09	05:42 20:18	04:31 21:22	03:59 22:03	04:28 21:42	05:31 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:39 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:59 22:03	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:23 15:59	07:17 17:11	06:01 18:14	05:36 20:22	04:28 21:26	03:59 22:03	04:31 21:39	05:35 20:29	06:40 19:04	07:45 17:42	07:55 15:35	08:41 15:14
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23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:15
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25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:21 21:33	04:00 22:04	04:39 21:32	05:43 20:19	06:49 18:53	06:54 16:32	08:04 15:28	08:43 15:16
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27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:18 21:37	04:01 22:04	04:43 21:28	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:26	08:43 15:18
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30	08:07 16:19		06:36 19:34	05:14 20:42	04:13 21:42	04:03 22:03	04:49 21:22	05:54 20:05	06:59 18:39	07:06 16:20	08:13 15:22	08:43 15:21
31	08:06 16:21		06:34 19:36		04:12 21:43		04:51 21:20	05:56 20:03		07:08 16:18		08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	242	208
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LÖVSEHULT 1:26>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (903)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:02 18:36	07:10 16:15	08:16 15:21
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3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48	04:06 22:01	04:57 21:13	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
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	Minutes with flicker		

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LÖVSEHULT 1:27>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (871)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

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609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:15 15:21
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:09 20:46	04:09 21:47	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	07:59 16:28	06:51 17:34	06:25 19:42	05:06 20:48	04:08 21:48	04:05 22:01	04:57 21:13	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:49	04:06 22:00	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:18
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:22 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:49	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:46	07:12 18:23	07:22 16:04	08:24 15:16
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:04	06:11 19:44	07:14 18:20	07:24 16:02	08:26 15:16
8	08:39 15:33	07:49 16:45	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:54	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:26 15:59	08:27 15:15
9	08:38 15:35	07:46 16:42	06:35 17:47	06:09 19:56	04:52 21:01	04:02 21:56	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	08:37 15:37	07:44 16:45	06:32 17:49	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:11 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:36 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:31 15:13
12	08:35 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:46 21:08	04:00 21:58	04:16 21:53	05:16 20:52	06:21 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:34 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 21:59	04:18 21:51	05:18 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:13
14	08:33 15:44	07:34 16:54	06:21 17:58	05:55 20:07	04:41 21:12	04:00 22:00	04:20 21:50	05:20 20:47	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	03:59 22:01	04:23 21:47	05:24 20:42	06:30 19:18	07:34 17:55	07:44 15:43	08:37 15:13
17	08:29 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:13
18	08:28 15:52	07:25 17:04	06:10 18:07	05:44 20:15	04:33 21:20	03:59 22:03	04:26 21:44	05:28 20:37	06:34 19:13	07:39 17:50	07:49 15:40	08:39 15:13
19	08:27 15:54	07:22 17:06	06:07 18:09	05:42 20:18	04:31 21:22	03:59 22:03	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:59 22:03	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:24 15:58	07:17 17:11	06:01 18:14	05:36 20:22	04:28 21:26	03:59 22:04	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:55 15:34	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:37	05:37 20:27	06:42 19:02	07:47 17:40	07:58 15:33	08:41 15:14
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:15
24	08:19 16:05	07:09 17:18	05:53 18:20	05:29 20:29	04:22 21:32	03:59 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:42 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:21 21:33	04:00 22:04	04:39 21:32	05:43 20:19	06:49 18:53	06:54 16:32	08:04 15:28	08:43 15:16
26	08:15 16:10	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:41 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:17
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:01 22:04	04:43 21:28	05:47 20:14	06:53 18:48	06:59 16:27	08:08 15:26	08:43 15:17
28	08:11 16:14	06:59 17:27	05:42 18:29	05:18 20:37	04:16 21:39	04:01 22:03	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:43 15:18
29	08:10 16:16	06:59 19:31	05:42 19:31	05:16 20:40	04:14 21:40	04:02 22:03	04:47 21:24	05:52 20:08	06:57 18:42	07:03 16:22	08:12 15:23	08:43 15:19
30	08:08 16:19	06:56 19:34	05:43 19:34	05:13 20:42	04:13 21:42	04:03 22:03	04:49 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21	06:54 19:36	05:43 19:36	05:13 20:42	04:12 21:44	04:03 22:03	04:51 21:20	05:56 20:03	07:08 16:18	07:08 15:22	08:43 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: LÖVSEHULT 1:5>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (874)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:01 18:36	07:10 16:15	08:15 15:21
2	08:42 15:24	08:01 16:26	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:46	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	07:59 16:28	06:51 17:34	06:25 19:42	05:06 20:48	04:08 21:48	04:05 22:01	04:57 21:13	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:49	04:06 22:00	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	08:21 15:18
5	08:41 15:29	07:55 16:33	06:45 17:38	06:20 19:47	05:01 20:53	04:06 21:51	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:19 16:06	08:22 15:17
6	08:40 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:46	07:12 18:22	07:22 16:04	08:24 15:16
7	08:40 15:32	07:51 16:37	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:04	06:11 19:43	07:14 18:20	07:24 16:02	08:25 15:15
8	08:39 15:33	07:48 16:40	06:37 17:45	06:11 19:53	04:54 20:59	04:03 21:54	04:11 21:57	05:07 21:02	06:13 19:41	07:16 18:17	07:26 15:59	08:27 15:15
9	08:38 15:35	07:46 16:42	06:35 17:47	06:09 19:56	04:52 21:01	04:02 21:55	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:28 15:14
10	08:37 15:37	07:44 16:45	06:32 17:49	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:11 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:36 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:57	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	08:31 15:13
12	08:35 15:40	07:39 16:49	06:26 17:54	06:00 20:02	04:45 21:08	04:00 21:58	04:16 21:53	05:16 20:52	06:21 19:30	07:25 18:06	07:35 15:51	08:32 15:13
13	08:34 15:42	07:37 16:52	06:24 17:56	05:58 20:04	04:43 21:10	04:00 21:59	04:18 21:51	05:18 20:50	06:23 19:27	07:27 18:03	07:38 15:49	08:34 15:13
14	08:33 15:44	07:34 16:54	06:21 17:58	05:55 20:07	04:41 21:12	04:00 22:00	04:20 21:50	05:20 20:47	06:25 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:16	03:59 22:01	04:23 21:47	05:24 20:42	06:30 19:18	07:34 17:55	07:44 15:43	08:37 15:13
17	08:29 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	08:38 15:13
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:15	04:33 21:20	03:59 22:02	04:26 21:44	05:28 20:37	06:34 19:13	07:38 17:50	07:49 15:40	08:39 15:13
19	08:27 15:54	07:22 17:06	06:07 18:09	05:42 20:18	04:31 21:22	03:59 22:03	04:28 21:42	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:39 15:13
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:59 22:03	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:13
21	08:24 15:58	07:17 17:11	06:01 18:14	05:36 20:22	04:27 21:26	03:59 22:04	04:31 21:39	05:35 20:29	06:40 19:04	07:45 17:42	07:55 15:34	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:37	05:37 20:27	06:42 19:01	07:47 17:40	07:57 15:33	08:41 15:14
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:42 15:15
24	08:19 16:05	07:09 17:17	05:53 18:20	05:29 20:29	04:22 21:32	03:59 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:42 15:15
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:21 21:33	04:00 22:04	04:39 21:32	05:43 20:19	06:49 18:53	06:54 16:32	08:04 15:28	08:43 15:16
26	08:15 16:10	07:04 17:22	05:47 18:25	05:23 20:33	04:19 21:35	04:00 22:04	04:41 21:30	05:45 20:16	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:17
27	08:13 16:12	07:01 17:24	05:45 18:27	05:21 20:35	04:17 21:37	04:01 22:04	04:43 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:26	08:43 15:17
28	08:11 16:14	06:59 17:27	05:42 18:29	05:18 20:37	04:16 21:39	04:01 22:03	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:43 15:18
29	08:09 16:16		06:39 19:31	05:16 20:40	04:14 21:40	04:02 22:03	04:47 21:24	05:52 20:08	06:57 18:42	07:03 16:22	08:12 15:23	08:43 15:19
30	08:08 16:19		06:36 19:34	05:13 20:42	04:13 21:42	04:03 22:03	04:49 21:22	05:54 20:05	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	08:06 16:21		06:33 19:36		04:12 21:43		04:51 21:20	05:56 20:03		07:08 16:18		08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NAREBO 1:3>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (848)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:04	06:57		06:31	05:11	04:11	04:04	04:53	05:58		07:02		07:44 (A0001)	07:11	08:16
	15:23	16:24	17:29		19:39	20:45	21:46	22:03	21:19	20:01		18:37	17	08:01 (A0001)	16:16	15:21
2	08:43	08:02	06:54		06:28	05:09	04:09	04:05	04:55	06:01		07:04		07:44 (A0001)	07:13	08:18
	15:25	16:26	17:32		19:41	20:47	21:47	22:03	21:16	19:58		18:34	17	08:01 (A0001)	16:13	15:20
3	08:43	08:00	06:51		06:26	05:06	04:08	04:06	04:57	06:03		07:06		07:44 (A0001)	07:16	08:20
	15:26	16:28	17:34		19:43	20:49	21:49	22:02	21:14	19:55		18:31	16	08:00 (A0001)	16:11	15:19
4	08:42	07:58	06:49		06:23	05:04	04:07	04:07	04:59	06:05		07:08		07:44 (A0001)	07:18	08:22
	15:27	16:31	17:36		19:45	20:51	21:50	22:01	21:12	19:52		18:28	15	07:59 (A0001)	16:09	15:18
5	08:42	07:56	06:46		06:20	05:02	04:06	04:08	05:01	06:07		07:11		07:44 (A0001)	07:20	08:23
	15:29	16:33	17:39		19:47	20:54	21:52	22:01	21:10	19:50		18:26	14	07:58 (A0001)	16:06	15:17
6	08:41	07:54	06:43		06:17	04:59	04:05	04:09	05:03	06:09		07:13		07:45 (A0001)	07:22	08:25
	15:30	16:35	17:41		19:50	20:56	21:53	22:00	21:07	19:47		18:23	11	07:56 (A0001)	16:04	15:16
7	08:41	07:51	06:41		06:15	04:57	04:04	04:10	05:05	06:11		07:15		07:49 (A0001)	07:25	08:26
	15:32	16:38	17:43	9	07:19 (A0001)	19:52	20:58	21:54	21:59	21:05	19:44	18:20	4	07:53 (A0001)	16:02	15:16
8	08:40	07:49	06:38		06:12	04:55	04:03	04:11	05:07	06:13		07:17			07:27	08:28
	15:33	16:40	17:45	12	07:21 (A0001)	19:54	21:00	21:55	21:58	21:03	19:41	18:17			16:00	15:15
9	08:39	07:47	06:35		06:09	04:52	04:02	04:12	05:10	06:15		07:19			07:29	08:29
	15:35	16:43	17:48	15	07:22 (A0001)	19:56	21:02	21:56	21:57	21:00	19:39	18:15			15:58	15:14
10	08:38	07:45	06:32		06:06	04:50	04:02	04:14	05:12	06:18		07:21			07:32	08:31
	15:37	16:45	17:50	16	07:22 (A0001)	19:58	21:04	21:57	21:56	20:58	19:36	18:12			15:55	15:14
11	08:37	07:42	06:30		06:04	04:48	04:01	04:15	05:14	06:20		07:24			07:34	08:32
	15:39	16:47	17:52	17	07:22 (A0001)	20:01	21:06	21:58	21:55	20:55	19:33	18:09			15:53	15:14
12	08:36	07:40	06:27		06:01	04:46	04:01	04:17	05:16	06:22		07:26			07:36	08:33
	15:41	16:50	17:54	17	07:22 (A0001)	20:03	21:09	21:59	21:53	20:53	19:30	18:07			15:51	15:13
13	08:35	07:38	06:24		06:05	04:44	04:00	04:18	05:18	06:24		07:28			07:38	08:35
	15:42	16:52	17:57	17	07:22 (A0001)	20:05	21:11	22:00	21:52	20:51	19:27	18:04			15:49	15:13
14	08:34	07:35	06:21		06:06	04:55	04:41	04:00	04:20	05:20	06:26	07:30			07:41	08:36
	15:44	16:54	17:59	15	07:21 (A0001)	20:07	21:13	22:01	21:51	20:48	19:25	18:01			15:47	15:13
15	08:33	07:33	06:19		06:06	04:53	04:39	03:59	04:21	05:22	06:28	07:32			07:43	08:37
	15:46	16:57	18:01	13	07:19 (A0001)	20:09	21:15	22:02	21:49	20:46	19:22	17:59			15:45	15:13
16	08:32	07:30	06:16		06:07	04:50	04:37	03:59	04:23	05:24	06:30	07:35			07:45	08:38
	15:48	16:59	18:03	10	07:17 (A0001)	20:12	21:17	22:02	21:48	20:43	19:19	17:56			15:43	15:13
17	08:30	07:28	06:13		05:47	04:35	03:59	04:25	05:27	06:32		07:37			07:47	08:39
	15:50	17:02	18:06		20:14	21:19	22:03	21:47	20:41	19:16		17:53			15:42	15:13
18	08:29	07:25	06:10		05:45	04:33	03:59	04:26	05:29	06:34		07:39			07:50	08:40
	15:52	17:04	18:08		20:16	21:21	22:03	21:45	20:38	19:13		17:51			15:40	15:13
19	08:27	07:23	06:08		05:42	04:31	03:59	04:28	05:31	06:36		07:41			07:52	08:40
	15:54	17:06	18:10		20:18	21:23	22:04	21:43	20:35	19:10		17:48			15:38	15:13
20	08:26	07:20	06:05		05:39	04:30	03:59	04:30	05:33	06:39		07:44			07:54	08:41
	15:57	17:09	18:12		20:20	21:25	22:04	21:42	20:33	19:08		17:45			15:36	15:13
21	08:24	07:18	06:02		05:37	04:28	03:59	04:32	05:35	06:41		07:46			07:56	08:42
	15:59	17:11	18:14		20:23	21:27	22:05	21:40	20:30	19:05		17:43			15:35	15:14
22	08:23	07:15	05:59		05:34	04:26	03:59	04:33	05:37	06:43		07:48			07:58	08:42
	16:01	17:13	18:17		20:25	21:29	22:05	21:38	20:28	19:02		17:40			15:33	15:14
23	08:21	07:13	05:56		05:31	04:24	03:59	04:35	05:39	06:45		07:50			08:00	08:43
	16:03	17:16	18:19		20:27	21:31	22:05	21:36	20:25	18:59		17:38			15:32	15:15
24	08:19	07:10	05:54		05:29	04:22	03:59	04:37	05:41	06:47		07:53			08:02	08:43
	16:05	17:18	18:21		20:29	21:32	22:05	21:35	20:22	18:56		17:35			15:30	15:15
25	08:18	07:07	05:51		05:26	04:21	04:00	04:39	05:44	06:49		06:55			08:05	08:44
	16:08	17:20	18:23		20:31	21:34	22:05	21:33	20:20	18:54		16:33			15:29	15:16
26	08:16	07:05	05:48		05:24	04:19	04:00	04:41	05:46	06:51		06:57			08:07	08:44
	16:10	17:23	18:25		20:34	21:36	22:05	21:31	20:17	18:51		16:30			15:27	15:17
27	08:14	07:02	05:45		05:21	04:18	04:01	04:43	05:48	06:53					08:09	08:44
	16:12	17:25	18:28		20:36	21:38	22:05	21:29	20:14	18:48	8	07:58 (A0001)			15:26	15:18
28	08:12	06:59	05:42		05:19	04:16	04:01	04:45	05:50	06:56		07:48 (A0001)			08:11	08:44
	16:14	17:27	18:30		20:38	21:39	22:04	21:27	20:12	18:45	11	07:59 (A0001)			15:24	15:19
29	08:10		06:40		05:16	04:15	04:02	04:47	05:52	06:58		07:46 (A0001)			08:12	08:44
	16:17		19:32		20:40	21:41	22:04	21:25	20:09	18:42	14	08:00 (A0001)			15:23	15:20
30	08:08		06:37		05:14	04:13	04:03	04:49	05:54	07:00		07:45 (A0001)			08:14	08:44
	16:19		19:34		20:43	21:43	22:04	21:23	20:06	18:40	16	08:01 (A0001)			15:22	15:21
31	08:06		06:34			04:12		04:51	05:56						07:09	08:44
	16:21		19:36			21:44		21:21	20:03						16:18	15:22
Potential sun hours	228	262	366		429	515	539	538	474	386		321			241	207
Total, worst case																
Sun reduction																
Oper. time red.																
Wind dir. red.																
Total reduction																
Total, real																

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NAREBO 1:3&gt;1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (878)

## Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:04	06:57		06:31	05:11	04:11	04:04	04:53	05:58		07:02		07:46 (A0001)	07:11	08:16
	15:23	16:24	17:29		19:39	20:45	21:46	22:03	21:19	20:01		18:37	16	08:02 (A0001)	16:16	15:21
2	08:43	08:02	06:54		06:28	05:09	04:09	04:05	04:55	06:01		07:04		07:46 (A0001)	07:13	08:18
	15:25	16:26	17:32		19:41	20:47	21:47	22:03	21:16	19:58		18:34	17	08:03 (A0001)	16:13	15:20
3	08:43	08:00	06:51		06:26	05:06	04:08	04:06	04:57	06:03		07:06		07:46 (A0001)	07:16	08:20
	15:26	16:28	17:34		19:43	20:49	21:49	22:02	21:14	19:55		18:31	16	08:02 (A0001)	16:11	15:19
4	08:42	07:58	06:49		06:23	05:04	04:07	04:07	04:59	06:05		07:08		07:45 (A0001)	07:18	08:22
	15:27	16:31	17:36		19:45	20:51	21:50	22:01	21:12	19:52		18:28	17	08:02 (A0001)	16:09	15:18
5	08:42	07:56	06:46		06:20	05:02	04:06	04:08	05:01	06:07		07:11		07:45 (A0001)	07:20	08:23
	15:29	16:33	17:39		19:47	20:54	21:52	22:01	21:10	19:50		18:26	16	08:01 (A0001)	16:06	15:17
6	08:41	07:54	06:43		06:17	04:59	04:05	04:09	05:03	06:09		07:13		07:46 (A0001)	07:22	08:25
	15:30	16:35	17:41	8	07:21 (A0001)	19:50	20:56	21:53	22:00	21:07		18:23	13	07:59 (A0001)	16:04	15:16
7	08:41	07:51	06:41		07:10 (A0001)	06:15	04:57	04:10	05:05	06:11		07:15		07:48 (A0001)	07:25	08:26
	15:32	16:38	17:43	12	07:22 (A0001)	19:52	20:58	21:54	21:59	21:05		18:20	10	07:58 (A0001)	16:02	15:16
8	08:40	07:49	06:38		07:10 (A0001)	06:12	04:55	04:11	05:07	06:13		07:17		07:50 (A0001)	07:27	08:28
	15:33	16:40	17:45	14	07:24 (A0001)	19:54	21:00	21:55	21:58	21:03		18:17	5	07:55 (A0001)	16:00	15:15
9	08:39	07:47	06:35		07:08 (A0001)	06:09	04:52	04:12	05:10	06:15		07:19			07:29	08:29
	15:35	16:43	17:48	16	07:24 (A0001)	19:56	21:02	21:56	21:57	21:00		18:15			15:58	15:14
10	08:38	07:45	06:32		07:08 (A0001)	06:06	04:50	04:14	05:12	06:18		07:21			07:32	08:31
	15:37	16:45	17:50	16	07:24 (A0001)	19:58	21:04	21:57	21:56	20:58		18:12			15:55	15:14
11	08:37	07:42	06:30		07:07 (A0001)	06:04	04:48	04:15	05:14	06:20		07:24			07:34	08:32
	15:39	16:47	17:52	17	07:24 (A0001)	20:01	21:06	21:58	21:55	20:55		18:09			15:53	15:14
12	08:36	07:40	06:27		07:07 (A0001)	06:01	04:46	04:17	05:16	06:22		07:26			07:36	08:33
	15:41	16:50	17:54	16	07:23 (A0001)	20:03	21:09	21:59	21:53	20:53		18:07			15:51	15:13
13	08:35	07:38	06:24		07:08 (A0001)	05:58	04:44	04:18	05:18	06:24		07:28			07:38	08:35
	15:42	16:52	17:57	15	07:23 (A0001)	20:05	21:11	22:00	21:52	20:51		18:04			15:49	15:13
14	08:34	07:35	06:21		07:09 (A0001)	05:55	04:41	04:00	04:20	05:20	06:26	07:30			07:41	08:36
	15:44	16:54	17:59	12	07:21 (A0001)	20:07	21:13	22:01	21:51	20:48	19:25	18:01			15:47	15:13
15	08:33	07:33	06:19		07:10 (A0001)	05:53	04:39	03:59	04:21	05:22	06:28	07:32			07:43	08:37
	15:46	16:57	18:01	9	07:19 (A0001)	20:09	21:15	22:02	21:49	20:46	19:22	17:59			15:45	15:13
16	08:32	07:30	06:16		05:50	04:37	03:59	04:23	05:24	06:30		07:35			07:45	08:38
	15:48	16:59	18:03		20:12	21:17	22:02	21:48	20:43	19:19		17:56			15:43	15:13
17	08:30	07:28	06:13		05:47	04:35	03:59	04:25	05:27	06:32		07:37			07:47	08:39
	15:50	17:02	18:06		20:14	21:19	22:03	21:47	20:41	19:16		17:53			15:42	15:13
18	08:29	07:25	06:10		05:45	04:33	03:59	04:26	05:29	06:34		07:39			07:50	08:40
	15:52	17:04	18:08		20:16	21:21	22:03	21:45	20:38	19:13		17:51			15:40	15:13
19	08:27	07:23	06:08		05:42	04:31	03:59	04:28	05:31	06:36		07:41			07:52	08:40
	15:54	17:06	18:10		20:18	21:23	22:04	21:43	20:35	19:10		17:48			15:38	15:13
20	08:26	07:20	06:05		05:39	04:30	03:59	04:30	05:33	06:39		07:44			07:54	08:41
	15:57	17:09	18:12		20:20	21:25	22:04	21:42	20:33	19:08		17:45			15:36	15:13
21	08:24	07:18	06:02		05:37	04:28	03:59	04:32	05:35	06:41		07:46			07:56	08:42
	15:59	17:11	18:14		20:23	21:27	22:05	21:40	20:30	19:05		17:43			15:35	15:14
22	08:23	07:15	05:59		05:34	04:26	03:59	04:33	05:37	06:43		07:48			07:58	08:42
	16:01	17:13	18:17		20:25	21:29	22:05	21:38	20:28	19:02		17:40			15:33	15:14
23	08:21	07:13	05:56		05:31	04:24	03:59	04:35	05:39	06:45		07:50			08:00	08:43
	16:03	17:16	18:19		20:27	21:31	22:05	21:36	20:25	18:59		17:38			15:32	15:15
24	08:19	07:10	05:54		05:29	04:22	03:59	04:37	05:41	06:47		07:53			08:02	08:43
	16:05	17:18	18:21		20:29	21:32	22:05	21:35	20:22	18:56		17:35			15:30	15:15
25	08:18	07:07	05:51		05:26	04:21	04:00	04:39	05:44	06:49		06:55			08:05	08:44
	16:08	17:20	18:23		20:31	21:34	22:05	21:33	20:20	18:54		16:33			15:29	15:16
26	08:16	07:05	05:48		05:24	04:19	04:00	04:41	05:46	06:51		06:57			08:07	08:44
	16:10	17:23	18:25		20:34	21:36	22:05	21:31	20:17	18:51		16:30			15:27	15:17
27	08:14	07:02	05:45		05:21	04:18	04:01	04:43	05:48	06:53		06:59			08:09	08:44
	16:12	17:25	18:28		20:36	21:38	22:05	21:29	20:14	18:48		16:28			15:26	15:18
28	08:12	06:59	05:42		05:19	04:16	04:01	04:45	05:50	06:56	07:52 (A0001)	07:02			08:11	08:44
	16:14	17:27	18:30		20:38	21:39	22:04	21:27	20:12	18:45	6	07:58 (A0001)	16:25		15:24	15:19
29	08:10		06:40		05:16	04:15	04:02	04:47	05:52	06:58		07:49 (A0001)	07:04		08:12	08:44
	16:17		19:32		20:40	21:41	22:04	21:25	20:09	18:42	11	08:00 (A0001)	16:23		15:23	15:20
30	08:08		06:37		05:14	04:13	04:03	04:49	05:54	07:00		07:48 (A0001)	07:06		08:14	08:44
	16:19		19:34		20:43	21:43	22:04	21:23	20:06	18:40	13	08:01 (A0001)	16:20		15:22	15:21
31	08:06		06:34			04:12		04:51	05:56			07:09				08:44
	16:21		19:36			21:44		21:21	20:03			16:18				15:22
Potential sun hours	228	262	366		429	515	539	538	474	386		321		241	207	
Total, worst case				135								110				
Sun reduction				0,22							0,31	0,26				
Oper. time red.				0,99							0,99	0,99				
Wind dir. red.				0,59							0,59	0,59				
Total reduction				0,13							0,18	0,15				
Total, real				18							6	17				

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 1:10>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (826)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:56 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:40	05:09 20:46	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48	04:06 22:01	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:58 16:31	06:48 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:11	06:05 19:52	07:08 18:28	07:17 16:09	08:21 15:18
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:49	07:10 18:26	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:54	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:17
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:04	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:16
8	08:39 15:34	07:49 16:45	06:38 17:45	06:12 19:54	04:55 20:59	04:04 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 16:00	08:27 15:15
9	08:38 15:35	07:46 16:43	06:35 17:47	06:09 19:56	04:52 21:02	04:03 21:56	04:13 21:56	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:12 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:37 15:39	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:19 19:33	07:23 18:09	07:33 15:53	08:31 15:14
12	08:36 15:41	07:39 16:50	06:27 17:54	06:01 20:02	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:25 18:06	07:36 15:51	08:33 15:13
13	08:35 15:43	07:37 16:52	06:24 17:56	05:58 20:05	04:44 21:10	04:00 21:59	04:18 21:51	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:33 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:00	04:20 21:50	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	08:32 15:46	07:32 16:57	06:18 18:01	05:53 20:09	04:40 21:14	04:00 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:16	03:59 22:02	04:23 21:47	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:44	08:37 15:13
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:25 21:46	05:27 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:28 15:52	07:25 17:04	06:10 18:08	05:45 20:16	04:34 21:20	03:59 22:03	04:26 21:44	05:29 20:38	06:34 19:13	07:39 17:50	07:49 15:40	08:39 15:13
19	08:27 15:55	07:22 17:06	06:07 18:10	05:42 20:18	04:32 21:22	03:59 22:03	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
20	08:25 15:57	07:20 17:09	06:04 18:12	05:39 20:20	04:30 21:24	03:59 22:03	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:14
21	08:24 15:59	07:17 17:11	06:02 18:14	05:37 20:22	04:28 21:26	03:59 22:04	04:32 21:39	05:35 20:30	06:40 19:05	07:45 17:43	07:56 15:35	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:23 21:32	04:00 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:42 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:04	04:39 21:32	05:44 20:19	06:49 18:53	06:55 16:33	08:04 15:29	08:43 15:16
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27	08:13 16:12	07:02 17:25	05:45 18:27	05:21 20:35	04:18 21:37	04:01 22:04	04:43 21:28	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:43 15:18
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Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	208
Total, worst case												
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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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (910)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
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2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:40	05:09 20:46	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48	04:06 22:01	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:58 16:31	06:48 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:11	06:05 19:52	07:08 18:28	07:17 16:09	08:21 15:18
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6	08:41 15:30	07:53 16:40	06:43 17:45	06:17 19:54	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:17
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:16
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9	08:38 15:35	07:46 16:43	06:35 17:47	06:09 19:56	04:52 21:02	04:03 21:56	04:13 21:56	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
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13	08:35 15:43	07:37 16:52	06:24 17:56	05:58 20:05	04:44 21:10	04:00 21:59	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
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15	08:32 15:46	07:32 16:57	06:18 18:01	05:53 20:09	04:40 21:14	04:00 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:13
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19	08:27 15:55	07:22 17:06	06:07 18:10	05:42 20:18	04:32 21:22	03:59 22:03	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
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21	08:24 15:59	07:17 17:11	06:02 18:14	05:37 20:22	04:28 21:26	03:59 22:04	04:32 21:39	05:35 20:30	06:40 19:05	07:45 17:43	07:56 15:35	08:41 15:14
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23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
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Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 1:8>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (885)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:56 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:16	08:16 15:21
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## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 1:9>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (840) Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

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

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3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48	04:06 22:01	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:58 16:31	06:48 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:11	06:05 19:52	07:08 18:28	07:17 16:09	08:21 15:18
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Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 2:11>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (863)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:56 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:02 18:37	07:10 16:15	08:15 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:40	05:09 20:46	04:10 21:47	04:05 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	08:17 15:20
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Potential sun hours	228	263	366	429	515	538	538	474	386	321	242	208
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 2:12>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (813)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONÖBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:56 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:02	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:40	05:09 20:46	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:17 15:20
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23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:24	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:23 21:32	04:00 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:42 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:04	04:39 21:32	05:44 20:19	06:49 18:53	06:54 16:33	08:04 15:29	08:43 15:16
26	08:15 16:10	07:04 17:22	05:48 18:25	05:24 20:33	04:19 21:35	04:01 22:04	04:41 21:30	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:13 16:12	07:02 17:25	05:45 18:27	05:21 20:35	04:18 21:37	04:01 22:04	04:43 21:28	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:43 15:18
28	08:12 16:14	06:59 17:27	05:42 18:29	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:25	08:43 15:19
29	08:10 16:17	06:59 19:32	05:42 20:40	05:16 21:40	04:15 22:03	04:02 21:24	04:47 20:08	05:52 18:42	06:57 16:23	07:04 15:23	08:12 15:20	08:43 15:20
30	08:08 16:19	06:57 19:34	05:41 20:42	05:14 21:42	04:13 22:03	04:03 21:22	04:49 21:22	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:43 15:21
31	08:06 16:21	06:54 19:36	05:40 20:42	05:12 21:44	04:11 22:04	04:01 21:20	04:51 20:03	05:56 16:18	07:08 15:22	07:08 15:22	08:14 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	208
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 2:12>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (839)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

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

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 2:13>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (899)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONÖBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43	08:04	06:56	06:31	05:11	04:11	04:04	04:53	05:58	07:02	07:11	08:16
	15:23	16:24	17:29	19:38	20:44	21:45	22:02	21:18	20:00	18:37	16:15	15:21
2	08:43	08:02	06:54	06:28	05:09	04:10	04:05	04:55	06:01	07:04	07:13	08:17
	15:25	16:26	17:32	19:40	20:46	21:47	22:02	21:16	19:58	18:34	16:13	15:20
3	08:42	08:00	06:51	06:25	05:06	04:08	04:06	04:57	06:03	07:06	07:15	08:19
	15:26	16:28	17:34	19:43	20:49	21:48	22:01	21:14	19:55	18:31	16:11	15:19
4	08:42	07:58	06:48	06:23	05:04	04:07	04:07	04:59	06:05	07:08	07:17	08:21
	15:27	16:31	17:36	19:45	20:51	21:50	22:01	21:11	19:52	18:28	16:09	15:18
5	08:41	07:55	06:46	06:20	05:02	04:06	04:08	05:01	06:07	07:10	07:20	08:23
	15:29	16:33	17:38	19:47	20:53	21:51	22:00	21:09	19:49	18:26	16:06	15:17
6	08:41	07:53	06:43	06:17	04:59	04:05	04:09	05:03	06:09	07:12	07:22	08:24
	15:30	16:35	17:41	19:49	20:55	21:52	21:59	21:07	19:47	18:23	16:04	15:17
7	08:40	07:51	06:40	06:14	04:57	04:04	04:10	05:05	06:11	07:15	07:24	08:26
	15:32	16:38	17:43	19:51	20:57	21:53	21:58	21:05	19:44	18:20	16:02	15:16
8	08:39	07:49	06:38	06:12	04:55	04:04	04:11	05:07	06:13	07:17	07:27	08:27
	15:34	16:40	17:45	19:54	20:59	21:55	21:57	21:02	19:41	18:17	16:00	15:15
9	08:38	07:46	06:35	06:09	04:52	04:03	04:13	05:10	06:15	07:19	07:29	08:29
	15:35	16:43	17:47	19:56	21:02	21:56	21:56	21:00	19:38	18:15	15:58	15:15
10	08:38	07:44	06:32	06:06	04:50	04:02	04:14	05:12	06:17	07:21	07:31	08:30
	15:37	16:45	17:50	19:58	21:04	21:57	21:55	20:57	19:35	18:12	15:55	15:14
11	08:37	07:42	06:29	06:03	04:48	04:01	04:15	05:14	06:19	07:23	07:33	08:31
	15:39	16:47	17:52	20:00	21:06	21:58	21:54	20:55	19:33	18:09	15:53	15:14
12	08:36	07:39	06:27	06:01	04:46	04:01	04:17	05:16	06:22	07:25	07:36	08:33
	15:41	16:50	17:54	20:02	21:08	21:59	21:53	20:53	19:30	18:06	15:51	15:13
13	08:35	07:37	06:24	05:58	04:44	04:00	04:18	05:18	06:24	07:28	07:38	08:34
	15:43	16:52	17:56	20:05	21:10	21:59	21:52	20:50	19:27	18:04	15:49	15:13
14	08:33	07:35	06:21	05:55	04:42	04:00	04:20	05:20	06:26	07:30	07:40	08:35
	15:44	16:54	17:59	20:07	21:12	22:00	21:50	20:48	19:24	18:01	15:47	15:13
15	08:32	07:32	06:18	05:53	04:40	04:00	04:21	05:22	06:28	07:32	07:42	08:36
	15:46	16:57	18:01	20:09	21:14	22:01	21:49	20:45	19:21	17:58	15:45	15:13
16	08:31	07:30	06:16	05:50	04:37	03:59	04:23	05:24	06:30	07:34	07:45	08:37
	15:48	16:59	18:03	20:11	21:16	22:02	21:47	20:43	19:19	17:56	15:44	15:13
17	08:30	07:27	06:13	05:47	04:35	03:59	04:25	05:27	06:32	07:37	07:47	08:38
	15:50	17:01	18:05	20:13	21:18	22:02	21:46	20:40	19:16	17:53	15:42	15:13
18	08:28	07:25	06:10	05:45	04:34	03:59	04:26	05:29	06:34	07:39	07:49	08:39
	15:52	17:04	18:08	20:16	21:20	22:03	21:44	20:38	19:13	17:50	15:40	15:13
19	08:27	07:22	06:07	05:42	04:32	03:59	04:28	05:31	06:36	07:41	07:51	08:40
	15:55	17:06	18:10	20:18	21:22	22:03	21:43	20:35	19:10	17:48	15:38	15:13
20	08:25	07:20	06:04	05:39	04:30	03:59	04:30	05:33	06:38	07:43	07:53	08:40
	15:57	17:09	18:12	20:20	21:24	22:03	21:41	20:32	19:07	17:45	15:36	15:14
21	08:24	07:17	06:02	05:37	04:28	03:59	04:32	05:35	06:40	07:45	07:56	08:41
	15:59	17:11	18:14	20:22	21:26	22:04	21:39	20:30	19:05	17:43	15:35	15:14
22	08:22	07:15	05:59	05:34	04:26	03:59	04:33	05:37	06:43	07:48	07:58	08:42
	16:01	17:13	18:16	20:24	21:28	22:04	21:38	20:27	19:02	17:40	15:33	15:14
23	08:21	07:12	05:56	05:31	04:24	03:59	04:35	05:39	06:45	07:50	08:00	08:42
	16:03	17:15	18:19	20:27	21:30	22:04	21:36	20:25	18:59	17:38	15:32	15:15
24	08:19	07:10	05:53	05:29	04:23	04:00	04:37	05:41	06:47	07:52	08:02	08:43
	16:05	17:18	18:21	20:29	21:32	22:04	21:34	20:22	18:56	17:35	15:30	15:16
25	08:17	07:07	05:51	05:26	04:21	04:00	04:39	05:44	06:49	06:55	08:04	08:43
	16:08	17:20	18:23	20:31	21:34	22:04	21:32	20:19	18:53	16:33	15:29	15:16
26	08:15	07:04	05:48	05:24	04:19	04:01	04:41	05:46	06:51	06:57	08:06	08:43
	16:10	17:22	18:25	20:33	21:35	22:04	21:30	20:17	18:51	16:30	15:27	15:17
27	08:14	07:02	05:45	05:21	04:18	04:01	04:43	05:48	06:53	06:59	08:08	08:43
	16:12	17:25	18:27	20:35	21:37	22:04	21:28	20:14	18:48	16:28	15:26	15:18
28	08:12	06:59	05:42	05:19	04:16	04:02	04:45	05:50	06:55	07:01	08:10	08:43
	16:14	17:27	18:30	20:38	21:39	22:04	21:26	20:11	18:45	16:25	15:25	15:19
29	08:10		06:39	05:16	04:15	04:02	04:47	05:52	06:57	07:04	08:12	08:43
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30	08:08		06:37	05:14	04:13	04:03	04:49	05:54	07:00	07:06	08:14	08:43
	16:19		19:34	20:42	21:42	22:03	21:22	20:06	18:39	16:20	15:22	15:21
31	08:06		06:34		04:12		04:51	05:56		07:08		08:43
	16:21		19:36		21:44		21:20	20:03		16:18		15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	208
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 4:5>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (864)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
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3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48	04:06 22:01	04:57 21:13	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
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Potential sun hours	228	263	366	429	515	538	538	474	386	321	242	208
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 5:2>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (814)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:56 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
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Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 5:3>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (886)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:40	05:09 20:46	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:17 15:20
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22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:23 21:32	04:00 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:04	04:39 21:32	05:44 20:19	06:49 18:53	06:55 16:33	08:04 15:29	08:43 15:16
26	08:15 16:10	07:04 17:22	05:48 18:25	05:24 20:33	04:19 21:35	04:01 22:04	04:41 21:30	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:35	04:18 21:37	04:01 22:04	04:43 21:28	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:43 15:18
28	08:12 16:14	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:25	08:43 15:19
29	08:10 16:17	06:59 19:32	05:42 20:40	05:16 21:41	04:15 22:03	04:02 21:24	04:47 20:08	05:52 18:42	06:57 16:23	07:04 15:23	08:12 15:20	08:43 15:20
30	08:08 16:19	06:57 19:34	05:41 20:42	05:14 21:42	04:13 22:03	04:03 21:22	04:49 21:22	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:43 15:21
31	08:06 16:21	06:54 19:36	05:40 20:44	05:13 21:44	04:12 22:04	04:01 21:20	04:51 20:03	05:56 16:18	07:08 15:22	07:08 15:22	08:14 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: NÖDJEHULT 5:3>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (912)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:29	06:31 19:38	05:11 20:44	04:11 21:45	04:04 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:40	05:09 20:46	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:17 15:20
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	04:08 21:48	04:06 22:01	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	08:42 15:27	07:58 16:31	06:48 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:11	06:05 19:52	07:08 18:28	07:17 16:09	08:21 15:18
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:49	07:10 18:26	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	04:59 20:55	04:05 21:52	04:09 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:17
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	04:04 21:53	04:10 21:58	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:16
8	08:39 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:03 21:55	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 16:00	08:27 15:15
9	08:39 15:35	07:46 16:43	06:35 17:47	06:09 19:56	04:52 21:02	04:03 21:56	04:13 21:56	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:55	05:12 20:57	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	08:37 15:39	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:19 19:33	07:23 18:09	07:33 15:53	08:31 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:02	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	08:35 15:43	07:37 16:52	06:24 17:56	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:33 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:00	04:20 21:50	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	08:32 15:46	07:32 16:57	06:18 18:01	05:53 20:09	04:39 21:14	04:00 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:16	03:59 22:02	04:23 21:47	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:44	08:37 15:13
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	03:59 22:02	04:25 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:28 15:52	07:25 17:04	06:10 18:08	05:45 20:16	04:33 21:20	03:59 22:03	04:26 21:44	05:29 20:38	06:34 19:13	07:39 17:50	07:49 15:40	08:39 15:13
19	08:27 15:55	07:22 17:06	06:07 18:10	05:42 20:18	04:32 21:22	03:59 22:03	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:51 15:38	08:40 15:13
20	08:25 15:57	07:20 17:09	06:04 18:12	05:39 20:20	04:30 21:24	03:59 22:04	04:30 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	08:40 15:14
21	08:24 15:59	07:17 17:11	06:02 18:14	05:37 20:22	04:28 21:26	03:59 22:04	04:32 21:39	05:35 20:30	06:40 19:05	07:45 17:43	07:56 15:35	08:41 15:14
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04	04:33 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:15	05:56 18:19	05:31 20:27	04:24 21:30	03:59 22:04	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:23 21:32	04:00 22:04	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:04	04:39 21:32	05:44 20:19	06:49 18:53	06:55 16:33	08:04 15:29	08:43 15:16
26	08:15 16:10	07:04 17:22	05:48 18:25	05:24 20:33	04:19 21:35	04:01 22:04	04:41 21:30	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:35	04:18 21:37	04:01 22:04	04:43 21:28	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:43 15:18
28	08:12 16:14	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:26	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:25	08:43 15:19
29	08:10 16:17	06:59 19:32	05:42 20:40	05:16 21:41	04:15 22:03	04:02 21:24	04:47 20:08	05:52 18:42	06:57 16:23	07:04 15:23	08:12 15:20	08:43 15:20
30	08:08 16:19	06:57 19:34	05:41 20:42	05:14 21:42	04:13 22:03	04:03 21:22	04:49 21:22	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:43 15:21
31	08:06 16:21	06:54 19:36	05:40 20:44	05:12 21:44	04:11 22:04	04:01 21:20	04:51 20:03	05:56 16:18	07:08 15:22	07:08 15:22	08:14 15:22	08:43 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: PASSAMÄLEN 1:3>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (917)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April	May	June
1	08:43	13:56 (A0018)	08:04	14:46 (A0017)	06:56	06:31	05:11	04:10
	15:23	11 14:07 (A0018)	16:23	42 15:32 (A0020)	17:29	19:38	20:44	21:45
2	08:43	13:57 (A0018)	08:02	14:46 (A0017)	06:54	16:41 (A0015)	06:28	05:08
	15:24	9 14:06 (A0018)	16:26	41 15:32 (A0020)	17:31	10 16:51 (A0015)	19:40	20:46
3	08:42	13:58 (A0018)	08:00	14:47 (A0017)	06:51	16:38 (A0015)	06:25	05:06
	15:25	9 14:07 (A0018)	16:28	40 15:32 (A0020)	17:34	15 16:53 (A0015)	19:43	20:49
4	08:42	13:59 (A0018)	07:58	14:47 (A0017)	06:48	16:36 (A0015)	06:22	05:04
	15:27	7 14:06 (A0018)	16:30	36 15:30 (A0020)	17:36	18 16:54 (A0015)	19:45	20:51
5	08:41	14:01 (A0018)	07:55	14:48 (A0017)	06:46	16:36 (A0015)	06:20	05:01
	15:28	4 14:05 (A0018)	16:33	29 15:28 (A0020)	17:38	21 17:07 (A0010)	19:47	20:53
6	08:41		07:53	14:49 (A0017)	06:43	16:35 (A0015)	06:17	04:59
	15:30		16:35	22 15:11 (A0017)	17:40	31 17:11 (A0010)	19:49	20:55
7	08:40		07:51	14:50 (A0017)	06:40	16:34 (A0015)	06:14	04:57
	15:31		16:37	21 15:11 (A0017)	17:43	34 17:12 (A0010)	19:51	20:57
8	08:39		07:49	14:51 (A0017)	06:37	16:33 (A0015)	06:11	04:54
	15:33		16:40	18 15:09 (A0017)	17:45	38 17:13 (A0010)	19:54	21:00
9	08:39		07:46	14:54 (A0017)	06:35	16:33 (A0015)	06:09	04:52
	15:35		16:42	14 15:08 (A0017)	17:47	39 17:13 (A0010)	19:56	21:02
10	08:38		07:44	14:57 (A0017)	06:32	16:34 (A0015)	06:06	04:50
	15:37		16:45	8 15:05 (A0017)	17:50	37 17:13 (A0010)	19:58	21:04
11	08:37	14:54 (A0013)	07:42		06:29	16:34 (A0015)	06:03	04:48
	15:38	1 14:55 (A0013)	16:47		17:52	36 17:13 (A0010)	20:00	21:06
12	08:36	14:54 (A0013)	07:39		06:27	16:34 (A0015)	06:00	04:45
	15:40	3 14:57 (A0013)	16:49		17:54	34 17:12 (A0010)	20:02	21:08
13	08:35	14:54 (A0013)	07:37	16:12 (A0016)	06:24	16:35 (A0015)	05:58	04:43
	15:42	5 14:59 (A0013)	16:52	7 16:19 (A0016)	17:56	30 17:10 (A0010)	20:05	21:10
14	08:34	14:54 (A0013)	07:35	16:10 (A0016)	06:21	16:36 (A0015)	05:55	04:41
	15:44	8 15:02 (A0013)	16:54	11 16:21 (A0016)	17:58	23 17:08 (A0010)	20:07	21:12
15	08:32	14:54 (A0013)	07:32	16:08 (A0016)	06:18	16:38 (A0015)	05:52	04:39
	15:46	9 15:03 (A0013)	16:56	14 16:22 (A0016)	18:01	10 16:48 (A0015)	20:09	21:14
16	08:31	14:55 (A0013)	07:30	16:08 (A0016)	06:15		05:50	04:37
	15:48	11 15:06 (A0013)	16:59	15 16:23 (A0016)	18:03		20:11	21:16
17	08:30	14:55 (A0013)	07:27	16:07 (A0016)	06:13		05:47	04:35
	15:50	13 15:08 (A0013)	17:01	16 16:23 (A0016)	18:05		20:13	21:18
18	08:28	14:53 (A0017)	07:25	16:08 (A0016)	06:10		05:44	04:33
	15:52	15 15:08 (A0013)	17:03	16 16:24 (A0016)	18:07		20:16	21:20
19	08:27	14:50 (A0017)	07:22	16:08 (A0016)	06:07		05:42	04:31
	15:54	18 15:08 (A0013)	17:06	16 16:24 (A0016)	18:10		20:18	21:22
20	08:25	14:50 (A0017)	07:20	16:08 (A0016)	06:04		05:39	04:29
	15:56	19 15:09 (A0013)	17:08	15 16:23 (A0016)	18:12		20:20	21:24
21	08:24	14:49 (A0017)	07:17	16:09 (A0016)	06:02		05:36	04:27
	15:58	19 15:08 (A0013)	17:11	14 16:23 (A0016)	18:14		20:22	21:26
22	08:22	14:48 (A0017)	07:15	16:10 (A0016)	05:59		05:34	04:26
	16:01	21 15:21 (A0020)	17:13	11 16:21 (A0016)	18:16		20:24	21:28
23	08:21	14:47 (A0017)	07:12	16:12 (A0016)	05:56		05:31	04:24
	16:03	27 15:24 (A0020)	17:15	7 16:19 (A0016)	18:18		20:27	21:30
24	08:19	14:47 (A0017)	07:10		05:53		05:29	04:22
	16:05	31 15:26 (A0020)	17:18		18:21		20:29	21:32
25	08:17	14:46 (A0017)	07:07		05:50		05:26	04:20
	16:07	36 15:29 (A0020)	17:20		18:23		20:31	21:34
26	08:15	14:46 (A0017)	07:04		05:48		05:23	04:19
	16:09	40 15:31 (A0020)	17:22		18:25		20:33	21:36
27	08:14	14:45 (A0017)	07:02		05:45		05:21	04:17
	16:12	42 15:31 (A0020)	17:24		18:27		20:35	21:37
28	08:12	14:45 (A0017)	06:59		05:42		05:18	04:16
	16:14	44 15:32 (A0020)	17:27		18:29		20:38	21:39
29	08:10	14:45 (A0017)			06:39		05:16	04:14
	16:16	43 15:32 (A0020)			19:32		20:40	21:41
30	08:08	14:46 (A0017)			06:36		05:13	04:13
	16:19	44 15:33 (A0020)			19:34		20:42	21:42
31	08:06	14:46 (A0017)			06:34			04:11
	16:21	44 15:33 (A0020)			19:36			21:44
Potential sun hours	228		262		366		429	515
Total, worst case	533		413		376			
Sun reduction	0,19		0,16		0,22			
Oper. time red.	0,99		0,99		0,99			
Wind dir. red.	0,69		0,69		0,67			
Total reduction	0,13		0,11		0,15			
Total, real	68		46		55			

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: PASSAMÅLEN 1:3>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (917)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December			
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	17:13 (A0015) 17:51 (A0010)	07:11 16:15	14:26 (A0017) 14:35 (A0017)	08:16 15:21	14:36 (A0013) 14:37 (A0013)
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	17:12 (A0015) 17:51 (A0010)	07:13 16:13	14:23 (A0017) 14:38 (A0017)	08:18 15:20	
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	17:11 (A0015) 17:51 (A0010)	07:15 16:10	14:21 (A0017) 14:39 (A0017)	08:19 15:19	
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	17:11 (A0015) 17:51 (A0010)	07:17 16:08	14:20 (A0017) 14:41 (A0017)	08:21 15:18	
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	17:10 (A0015) 17:50 (A0010)	07:20 16:06	14:18 (A0017) 14:41 (A0017)	08:23 15:17	
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	17:10 (A0015) 17:49 (A0010)	07:22 16:04	14:18 (A0017) 14:58 (A0020)	08:24 15:16	
7	04:10 21:58	05:05 21:05	06:11 19:44	07:14 18:20	17:10 (A0015) 17:47 (A0010)	07:24 16:01	14:18 (A0017) 15:01 (A0020)	08:26 15:15	13:48 (A0018) 13:52 (A0018)
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	17:11 (A0015) 17:45 (A0010)	07:27 15:59	14:17 (A0017) 15:02 (A0020)	08:27 15:15	13:47 (A0018) 13:53 (A0018)
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	17:11 (A0015) 17:30 (A0015)	07:29 15:57	14:17 (A0017) 15:03 (A0020)	08:29 15:14	13:47 (A0018) 13:55 (A0018)
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12	17:11 (A0015) 17:29 (A0015)	07:31 15:55	14:16 (A0017) 15:03 (A0020)	08:30 15:14	13:47 (A0018) 13:56 (A0018)
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	17:13 (A0015) 17:26 (A0015)	07:33 15:53	14:17 (A0017) 15:04 (A0020)	08:32 15:13	13:46 (A0018) 13:57 (A0018)
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	17:16 (A0015) 17:24 (A0015)	07:36 15:51	14:17 (A0017) 15:04 (A0020)	08:33 15:13	13:46 (A0018) 13:57 (A0018)
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03		07:38 15:49	14:17 (A0017) 15:04 (A0020)	08:34 15:13	13:47 (A0018) 13:59 (A0018)
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01		07:40 15:47	14:18 (A0017) 15:05 (A0020)	08:35 15:12	13:47 (A0018) 13:59 (A0018)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58		07:43 15:45	14:18 (A0017) 15:04 (A0020)	08:36 15:12	13:47 (A0018) 13:59 (A0018)
16	04:22 21:48	05:24 20:43	06:30 19:18	07:34 17:55		07:45 15:43	14:19 (A0017) 15:04 (A0020)	08:37 15:12	13:47 (A0018) 14:00 (A0018)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53		07:47 15:41	14:19 (A0017) 15:02 (A0020)	08:38 15:12	13:47 (A0018) 14:01 (A0018)
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50		07:49 15:39	14:21 (A0017) 15:00 (A0020)	08:39 15:12	13:48 (A0018) 14:01 (A0018)
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48		07:51 15:38	14:21 (A0017) 14:58 (A0020)	08:40 15:13	13:49 (A0018) 14:02 (A0018)
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45		07:54 15:36	14:23 (A0017) 14:56 (A0020)	08:41 15:13	13:48 (A0018) 14:02 (A0018)
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42		07:56 15:34	14:24 (A0017) 14:43 (A0013)	08:41 15:13	13:49 (A0018) 14:03 (A0018)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40		07:58 15:33	14:26 (A0017) 14:45 (A0013)	08:42 15:14	13:50 (A0018) 14:04 (A0018)
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37		08:00 15:31	14:27 (A0017) 14:45 (A0013)	08:42 15:14	13:50 (A0018) 14:04 (A0018)
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35		08:02 15:30	14:30 (A0017) 14:45 (A0013)	08:43 15:15	13:50 (A0018) 14:04 (A0018)
25	04:39 21:32	05:43 20:19	06:49 18:53	06:54 16:32		08:04 15:28	14:33 (A0013) 14:47 (A0013)	08:43 15:16	13:51 (A0018) 14:04 (A0018)
26	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:30		08:06 15:27	14:33 (A0013) 14:45 (A0013)	08:43 15:16	13:51 (A0018) 14:04 (A0018)
27	04:42 21:28	05:47 20:14	06:53 18:48	06:59 16:27		08:08 15:25	14:33 (A0013) 14:43 (A0013)	08:43 15:17	13:52 (A0018) 14:05 (A0018)
28	04:44 21:26	05:50 20:11	06:55 18:45	07:01 16:25		08:10 15:24	14:34 (A0013) 14:42 (A0013)	08:44 15:18	13:53 (A0018) 14:05 (A0018)
29	04:46 21:24	05:52 20:08	06:57 18:42	07:04 17:48 (A0015)		08:12 15:23	14:35 (A0013) 14:40 (A0013)	08:44 15:19	13:53 (A0018) 14:06 (A0018)
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 17:15 (A0015)		08:14 15:22	14:35 (A0013) 14:38 (A0013)	08:44 15:20	13:54 (A0018) 14:06 (A0018)
31	04:50 21:20	05:56 20:03		07:08 16:17				08:43 15:21	13:54 (A0018) 14:06 (A0018)
Potential sun hours	538	474	386	321		241		207	
Total, worst case			53	485		769		297	
Sun reduction			0,31	0,26		0,17		0,13	
Oper. time red.			0,99	0,99		0,99		0,99	
Wind dir. red.			0,67	0,68		0,69		0,69	
Total reduction			0,21	0,17		0,12		0,09	
Total, real			11	84		90		27	

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: PASSAMÅLEN 1:6>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (914)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

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

609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January		February		March		April	May	June
1	08:43	09:31 (A0017)	08:04	10:26 (A0015)	06:57	15:56 (A0005)	06:31	05:11	04:10
	15:23	87 14:20 (A0011)	16:23	35 15:27 (A0006)	17:29	41 16:57 (A0002)	19:38	20:44	21:46
2	08:43	09:31 (A0017)	08:02	10:30 (A0015)	06:54	15:56 (A0005)	06:28	05:09	04:09
	15:24	90 14:20 (A0011)	16:26	28 15:28 (A0006)	17:31	39 16:56 (A0002)	19:40	20:47	21:47
3	08:43	09:32 (A0017)	08:00	15:07 (A0006)	06:51	15:56 (A0005)	06:25	05:06	04:08
	15:26	90 14:21 (A0011)	16:28	21 15:28 (A0006)	17:34	35 16:54 (A0002)	19:43	20:49	21:49
4	08:42	09:32 (A0017)	07:58	15:07 (A0006)	06:48	15:56 (A0005)	06:23	05:04	04:07
	15:27	94 14:22 (A0011)	16:30	21 15:28 (A0006)	17:36	29 16:51 (A0002)	19:45	20:51	21:50
5	08:42	09:32 (A0017)	07:56	15:07 (A0006)	06:46	15:58 (A0005)	06:20	05:01	04:06
	15:28	93 14:22 (A0011)	16:33	22 15:29 (A0006)	17:38	23 16:21 (A0005)	19:47	20:53	21:51
6	08:41	09:32 (A0017)	07:53	15:07 (A0006)	06:43	16:00 (A0005)	06:17	04:59	04:05
	15:30	96 14:23 (A0011)	16:35	21 15:28 (A0006)	17:41	19 16:19 (A0005)	19:49	20:55	21:53
7	08:40	09:32 (A0017)	07:51	15:08 (A0006)	06:40	16:02 (A0005)	06:14	04:57	04:04
	15:32	98 14:23 (A0011)	16:38	20 15:28 (A0006)	17:43	14 16:16 (A0005)	19:51	20:58	21:54
8	08:40	09:32 (A0017)	07:49	15:09 (A0006)	06:38	16:05 (A0005)	06:11	04:54	04:03
	15:33	99 14:24 (A0011)	16:40	19 15:28 (A0006)	17:45	7 16:12 (A0005)	19:54	21:00	21:55
9	08:39	09:33 (A0017)	07:47	15:10 (A0006)	06:35		06:09	04:52	04:02
	15:35	100 14:24 (A0011)	16:42	17 15:27 (A0006)	17:47		19:56	21:02	21:56
10	08:38	09:33 (A0017)	07:44	15:11 (A0006)	06:32		06:06	04:50	04:01
	15:37	102 14:25 (A0011)	16:45	14 15:25 (A0006)	17:50		19:58	21:04	21:57
11	08:37	09:33 (A0017)	07:42	15:13 (A0006)	06:29		06:03	04:48	04:01
	15:38	100 14:24 (A0011)	16:47	11 15:24 (A0006)	17:52		20:00	21:06	21:58
12	08:36	09:34 (A0017)	07:40	15:17 (A0006)	06:27		06:01	04:45	04:00
	15:40	101 14:25 (A0011)	16:49	3 15:20 (A0006)	17:54		20:02	21:08	21:59
13	08:35	09:34 (A0017)	07:37		06:24		05:58	04:43	04:00
	15:42	102 14:25 (A0011)	16:52		17:56		20:05	21:10	22:00
14	08:34	09:35 (A0017)	07:35		06:21		05:55	04:41	03:59
	15:44	101 14:25 (A0011)	16:54		17:59		20:07	21:12	22:01
15	08:32	09:35 (A0017)	07:32		06:18		05:52	04:39	03:59
	15:46	100 14:25 (A0011)	16:57		18:01		20:09	21:14	22:01
16	08:31	09:36 (A0017)	07:30		06:16		05:50	04:37	03:59
	15:48	97 14:25 (A0011)	16:59		18:03		20:11	21:17	22:02
17	08:30	09:36 (A0017)	07:27		06:13		05:47	04:35	03:59
	15:50	97 14:25 (A0011)	17:01		18:05		20:14	21:19	22:03
18	08:28	09:37 (A0017)	07:25	16:06 (A0005)	06:10		05:44	04:33	03:58
	15:52	94 14:24 (A0011)	17:04	10 16:16 (A0005)	18:07		20:16	21:21	22:03
19	08:27	09:38 (A0017)	07:22	16:03 (A0005)	06:07		05:42	04:31	03:58
	15:54	89 14:24 (A0011)	17:06	15 16:18 (A0005)	18:10		20:18	21:23	22:04
20	08:26	09:39 (A0017)	07:20	16:00 (A0005)	06:04		05:39	04:29	03:58
	15:56	84 14:23 (A0011)	17:08	20 16:20 (A0005)	18:12		20:20	21:24	22:04
21	08:24	09:40 (A0017)	07:17	16:00 (A0005)	06:02		05:36	04:27	03:58
	15:58	73 13:23 (A0010)	17:11	22 16:22 (A0005)	18:14		20:22	21:26	22:04
22	08:22	09:42 (A0017)	07:15	15:58 (A0005)	05:59		05:34	04:26	03:59
	16:01	68 13:22 (A0010)	17:13	25 16:23 (A0005)	18:16		20:25	21:28	22:04
23	08:21	09:44 (A0017)	07:12	15:57 (A0005)	05:56		05:31	04:24	03:59
	16:03	62 13:22 (A0010)	17:15	26 16:23 (A0005)	18:18		20:27	21:30	22:05
24	08:19	10:17 (A0015)	07:10	15:57 (A0005)	05:53		05:29	04:22	03:59
	16:05	52 13:21 (A0010)	17:18	28 16:25 (A0005)	18:21		20:29	21:32	22:05
25	08:17	10:18 (A0015)	07:07	15:56 (A0005)	05:50		05:26	04:20	04:00
	16:07	49 13:20 (A0010)	17:20	32 16:49 (A0002)	18:23		20:31	21:34	22:05
26	08:16	10:19 (A0015)	07:04	15:55 (A0005)	05:48		05:23	04:19	04:00
	16:10	47 15:17 (A0006)	17:22	37 16:52 (A0002)	18:25		20:33	21:36	22:04
27	08:14	10:20 (A0015)	07:02	15:55 (A0005)	05:45		05:21	04:17	04:01
	16:12	45 15:21 (A0006)	17:25	40 16:54 (A0002)	18:27		20:36	21:37	22:04
28	08:12	10:20 (A0015)	06:59	15:56 (A0005)	05:42		05:18	04:16	04:01
	16:14	39 15:22 (A0006)	17:27	42 16:57 (A0002)	18:29		20:38	21:39	22:04
29	08:10	10:21 (A0015)			06:39		05:16	04:14	04:02
	16:16	40 15:24 (A0006)			19:32		20:40	21:41	22:04
30	08:08	10:23 (A0015)			06:36		05:13	04:13	04:03
	16:19	40 15:26 (A0006)			19:34		20:42	21:42	22:03
31	08:06	10:25 (A0015)			06:34			04:12	
	16:21	37 15:27 (A0006)			19:36			21:44	
Potential sun hours	228		262		366		429	515	539
Total, worst case	2466		529		207				
Sun reduction	0,19		0,16		0,22				
Oper. time red.	0,99		0,99		0,99				
Wind dir. red.	0,63		0,68		0,69				
Total reduction	0,12		0,11		0,15				
Total, real	285		58		31				

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: PASSAMÄLEN 1:6>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (914)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	04:04 22:02	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	04:08 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:16
7	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:15
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	04:14 21:55	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	04:16 21:53	05:16 20:53	06:21 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:36 15:12
16	04:23 21:48	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:43	08:37 15:12
17	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:38 15:12
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:40	08:39 15:13
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	04:31 21:40	05:35 20:30	06:40 19:05	07:46 17:42	07:56 15:34	08:41 15:13
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	04:39 21:32	05:43 20:19	06:49 18:53	07:55 16:32	08:04 15:28	08:43 15:16
26	04:41 21:31	05:45 20:17	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:25	08:44 15:17
28	04:44 21:27	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:44 15:18
29	04:46 21:25	05:52 20:09	06:57 18:42	07:04 16:22	08:12 15:23	08:44 15:19
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:44 15:20
31	04:51 21:20	05:56 20:03		07:08 16:18	08:16 15:20	08:44 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case				533	1635	2809
Sun reduction				0,26	0,17	0,13
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,69	0,63	0,64
Total reduction				0,18	0,11	0,08
Total, real				94	176	234

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: PASSAMÅLEN 1:7>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (913)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January		February		March		April	May	June
1	08:43	09:28 (A0017)	08:04	10:12 (A0015)	06:57	15:48 (A0005)	06:31	05:11	04:10
	15:23	72 14:13 (A0011)	16:23	50 15:47 (A0003)	17:29	43 16:54 (A0002)	19:38	20:44	21:46
2	08:43	09:27 (A0017)	08:02	10:14 (A0015)	06:54	15:49 (A0005)	06:28	05:09	04:09
	15:24	76 14:13 (A0011)	16:26	50 15:50 (A0003)	17:31	39 16:53 (A0002)	19:40	20:47	21:47
3	08:43	09:28 (A0017)	08:00	10:16 (A0015)	06:51	15:49 (A0005)	06:25	05:06	04:08
	15:26	77 14:15 (A0011)	16:28	49 15:53 (A0003)	17:34	36 16:52 (A0002)	19:43	20:49	21:49
4	08:42	09:27 (A0017)	07:58	10:19 (A0015)	06:48	15:50 (A0005)	06:23	05:04	04:07
	15:27	82 14:15 (A0011)	16:30	41 15:53 (A0003)	17:36	28 16:48 (A0002)	19:45	20:51	21:50
5	08:42	09:27 (A0017)	07:56	15:01 (A0006)	06:46	15:52 (A0005)	06:20	05:01	04:06
	15:28	83 14:15 (A0011)	16:33	33 15:53 (A0003)	17:38	22 16:14 (A0005)	19:47	20:53	21:51
6	08:41	09:27 (A0017)	07:53	15:01 (A0006)	06:43	15:53 (A0005)	06:17	04:59	04:05
	15:30	87 14:16 (A0011)	16:35	30 15:51 (A0003)	17:41	19 16:12 (A0005)	19:49	20:55	21:53
7	08:40	09:27 (A0017)	07:51	15:02 (A0006)	06:40	15:55 (A0005)	06:14	04:57	04:04
	15:32	90 14:16 (A0011)	16:38	27 15:51 (A0003)	17:43	14 16:09 (A0005)	19:51	20:58	21:54
8	08:40	09:27 (A0017)	07:49	15:03 (A0006)	06:38	15:59 (A0005)	06:11	04:54	04:03
	15:33	91 14:17 (A0011)	16:40	18 15:21 (A0006)	17:45	6 16:05 (A0005)	19:54	21:00	21:55
9	08:39	09:28 (A0017)	07:47	15:04 (A0006)	06:35		06:09	04:52	04:02
	15:35	92 14:17 (A0011)	16:42	16 15:20 (A0006)	17:47		19:56	21:02	21:56
10	08:38	09:28 (A0017)	07:44	15:05 (A0006)	06:32		06:06	04:50	04:01
	15:37	94 14:18 (A0011)	16:45	13 15:18 (A0006)	17:50		19:58	21:04	21:57
11	08:37	09:27 (A0017)	07:42	15:09 (A0006)	06:29		06:03	04:48	04:01
	15:38	95 14:17 (A0011)	16:47	6 15:15 (A0006)	17:52		20:00	21:06	21:58
12	08:36	09:28 (A0017)	07:40		06:27		06:01	04:45	04:00
	15:40	96 14:18 (A0011)	16:49		17:54		20:02	21:08	21:59
13	08:35	09:28 (A0017)	07:37		06:24		05:58	04:43	04:00
	15:42	96 14:17 (A0011)	16:52		17:56		20:05	21:10	22:00
14	08:34	09:28 (A0017)	07:35		06:21		05:55	04:41	03:59
	15:44	98 14:18 (A0011)	16:54		17:59		20:07	21:12	22:01
15	08:32	09:28 (A0017)	07:32		06:18		05:52	04:39	03:59
	15:46	96 14:17 (A0011)	16:57		18:01		20:09	21:14	22:01
16	08:31	09:29 (A0017)	07:30		06:16		05:50	04:37	03:59
	15:48	97 14:18 (A0011)	16:59		18:03		20:11	21:17	22:02
17	08:30	09:29 (A0017)	07:27	15:58 (A0005)	06:13		05:47	04:35	03:59
	15:50	94 14:17 (A0011)	17:01	11 16:09 (A0005)	18:05		20:14	21:19	22:03
18	08:28	09:30 (A0017)	07:25	15:56 (A0005)	06:10		05:44	04:33	03:58
	15:52	91 14:16 (A0011)	17:04	16 16:12 (A0005)	18:07		20:16	21:21	22:03
19	08:27	09:31 (A0017)	07:22	15:54 (A0005)	06:07		05:42	04:31	03:58
	15:54	87 14:15 (A0011)	17:06	20 16:14 (A0005)	18:10		20:18	21:23	22:04
20	08:26	09:31 (A0017)	07:20	15:52 (A0005)	06:04		05:39	04:29	03:58
	15:56	76 13:10 (A0010)	17:08	23 16:15 (A0005)	18:12		20:20	21:24	22:04
21	08:24	09:32 (A0017)	07:17	15:51 (A0005)	06:02		05:36	04:27	03:58
	15:58	75 13:10 (A0010)	17:11	26 16:17 (A0005)	18:14		20:22	21:26	22:04
22	08:22	09:33 (A0017)	07:15	15:50 (A0005)	05:59		05:34	04:26	03:59
	16:01	73 13:10 (A0010)	17:13	27 16:17 (A0005)	18:16		20:25	21:28	22:04
23	08:21	09:34 (A0017)	07:12	15:49 (A0005)	05:56		05:31	04:24	03:59
	16:03	70 13:09 (A0010)	17:15	29 16:18 (A0005)	18:18		20:27	21:30	22:05
24	08:19	09:36 (A0017)	07:10	15:49 (A0005)	05:53		05:29	04:22	03:59
	16:05	63 13:08 (A0010)	17:18	32 16:47 (A0002)	18:21		20:29	21:32	22:05
25	08:17	09:38 (A0017)	07:07	15:49 (A0005)	05:50		05:26	04:20	04:00
	16:07	62 15:12 (A0006)	17:20	36 16:49 (A0002)	18:23		20:31	21:34	22:05
26	08:16	10:07 (A0015)	07:04	15:48 (A0005)	05:48		05:23	04:19	04:00
	16:10	56 15:15 (A0006)	17:22	40 16:52 (A0002)	18:25		20:33	21:36	22:04
27	08:14	10:08 (A0015)	07:02	15:48 (A0005)	05:45		05:21	04:17	04:01
	16:12	51 15:17 (A0006)	17:25	43 16:54 (A0002)	18:27		20:36	21:37	22:04
28	08:12	10:07 (A0015)	06:59	15:48 (A0005)	05:42		05:18	04:16	04:01
	16:14	46 15:18 (A0006)	17:27	45 16:55 (A0002)	18:29		20:38	21:39	22:04
29	08:10	10:08 (A0015)			06:39		05:16	04:14	04:02
	16:16	46 15:19 (A0006)			19:32		20:40	21:41	22:04
30	08:08	10:10 (A0015)			06:36		05:13	04:13	04:03
	16:19	46 15:42 (A0003)			19:34		20:42	21:42	22:03
31	08:06	10:11 (A0015)			06:34			04:12	
	16:21	50 15:45 (A0003)			19:36			21:44	
Potential sun hours	228		262		366		429	515	539
Total, worst case	2408		681		207				
Sun reduction	0,19		0,16		0,22				
Oper. time red.	0,99		0,99		0,99				
Wind dir. red.	0,63		0,68		0,69				
Total reduction	0,12		0,11		0,15				
Total, real	279		74		31				

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: PASSAMÄLEN 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (913)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October		November		December		
1	04:03 22:03	04:53 21:18	05:58 20:00	07:02 18:37		07:11 16:15	14:35 (A0006) 14:47 (A0006)	08:16 15:21	09:09 (A0017) 13:59 (A0011)	
2	04:04 22:02	04:55 21:16	06:00 19:58	07:04 18:34		07:13 16:13	14:33 (A0006) 14:49 (A0006)	08:18 15:20	09:10 (A0017) 14:00 (A0011)	
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31		07:15 16:11	14:33 (A0006) 14:51 (A0006)	08:19 15:19	09:11 (A0017) 14:00 (A0011)	
4	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28		07:18 16:08	14:31 (A0006) 15:20 (A0003)	08:21 15:18	09:11 (A0017) 14:01 (A0011)	
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25		07:20 16:06	14:31 (A0006) 15:22 (A0003)	08:23 15:17	09:12 (A0017) 14:01 (A0011)	
6	04:08 21:59	05:03 21:07	06:09 19:47	07:12 18:23	11	16:33 (A0005) 16:44 (A0005)	07:22 16:04	14:30 (A0006) 15:22 (A0003)	08:24 15:16	09:13 (A0017) 14:02 (A0011)
7	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	17	16:29 (A0005) 16:46 (A0005)	07:24 16:02	09:49 (A0015) 15:23 (A0003)	08:26 15:15	09:14 (A0017) 14:02 (A0011)
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	21	16:28 (A0005) 16:49 (A0005)	07:27 15:59	09:46 (A0015) 15:22 (A0003)	08:28 15:15	09:16 (A0017) 14:03 (A0011)
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	23	16:26 (A0005) 16:49 (A0005)	07:29 15:57	09:44 (A0015) 15:20 (A0003)	08:29 15:14	09:16 (A0017) 14:03 (A0011)
10	04:14 21:56	05:11 20:58	06:17 19:35	07:21 18:12	33	16:24 (A0005) 17:25 (A0002)	07:31 15:55	09:42 (A0015) 15:17 (A0003)	08:30 15:14	09:17 (A0017) 14:04 (A0011)
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	38	16:22 (A0005) 17:26 (A0002)	07:34 15:53	09:42 (A0015) 15:15 (A0003)	08:32 15:13	09:18 (A0017) 14:03 (A0011)
12	04:16 21:53	05:16 20:53	06:21 19:30	07:26 18:06	42	16:22 (A0005) 17:28 (A0002)	07:36 15:51	09:41 (A0015) 14:52 (A0006)	08:33 15:13	09:20 (A0017) 14:04 (A0011)
13	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	44	16:21 (A0005) 17:28 (A0002)	07:38 15:49	09:40 (A0015) 14:51 (A0006)	08:34 15:13	09:20 (A0017) 14:04 (A0011)
14	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	45	16:20 (A0005) 17:27 (A0002)	07:40 15:47	09:40 (A0015) 14:51 (A0006)	08:35 15:13	09:21 (A0017) 14:04 (A0011)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	42	16:21 (A0005) 17:26 (A0002)	07:43 15:45	09:40 (A0015) 14:49 (A0006)	08:36 15:12	09:23 (A0017) 14:05 (A0011)
16	04:23 21:48	05:24 20:43	06:30 19:19	07:34 17:56	39	16:20 (A0005) 17:23 (A0002)	07:45 15:43	09:40 (A0015) 14:48 (A0006)	08:37 15:12	09:24 (A0017) 14:05 (A0011)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	34	16:20 (A0005) 17:19 (A0002)	07:47 15:41	09:11 (A0017) 14:45 (A0006)	08:38 15:12	11:38 (A0016) 14:05 (A0011)
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	30	16:20 (A0005) 16:50 (A0005)	07:49 15:40	09:10 (A0017) 12:42 (A0010)	08:39 15:13	11:38 (A0016) 14:06 (A0011)
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	29	16:20 (A0005) 16:49 (A0005)	07:52 15:38	09:08 (A0017) 12:43 (A0010)	08:40 15:13	11:39 (A0016) 14:07 (A0011)
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	27	16:21 (A0005) 16:48 (A0005)	07:54 15:36	09:08 (A0017) 12:45 (A0010)	08:41 15:13	11:39 (A0016) 14:07 (A0011)
21	04:31 21:40	05:35 20:30	06:40 19:05	07:46 17:42	25	16:22 (A0005) 16:47 (A0005)	07:56 15:34	09:07 (A0017) 12:45 (A0010)	08:41 15:13	11:39 (A0016) 14:07 (A0011)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	23	16:22 (A0005) 16:45 (A0005)	07:58 15:33	09:07 (A0017) 12:46 (A0010)	08:42 15:14	11:40 (A0016) 14:08 (A0011)
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	20	16:24 (A0005) 16:44 (A0005)	08:00 15:31	09:07 (A0017) 13:51 (A0011)	08:42 15:14	11:40 (A0016) 14:08 (A0011)
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	15	16:26 (A0005) 16:41 (A0005)	08:02 15:30	09:08 (A0017) 13:54 (A0011)	08:43 15:15	11:40 (A0016) 14:08 (A0011)
25	04:39 21:32	05:43 20:19	06:49 18:53	06:55 16:32	9	15:29 (A0005) 15:38 (A0005)	08:04 15:28	09:07 (A0017) 13:55 (A0011)	08:43 15:16	11:42 (A0016) 14:10 (A0011)
26	04:41 21:31	05:45 20:17	06:51 18:50	06:57 16:30		08:06 15:27	09:07 (A0017) 13:56 (A0011)	08:43 15:16	11:43 (A0016) 14:10 (A0011)	
27	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:27		08:08 15:25	09:07 (A0017) 13:56 (A0011)	08:44 15:17	11:43 (A0016) 14:11 (A0011)	
28	04:44 21:27	05:50 20:11	06:55 18:45	07:01 16:25		08:10 15:24	09:08 (A0017) 13:58 (A0011)	08:44 15:18	09:30 (A0017) 14:11 (A0011)	
29	04:46 21:25	05:52 20:09	06:57 18:42	07:04 16:22		08:12 15:23	09:09 (A0017) 13:58 (A0011)	08:44 15:19	09:28 (A0017) 14:11 (A0011)	
30	04:48 21:22	05:54 20:06	07:00 18:39	07:06 16:20		08:14 15:22	09:09 (A0017) 13:59 (A0011)	08:44 15:20	09:28 (A0017) 14:12 (A0011)	
31	04:51 21:20	05:56 20:03		07:08 16:18	8	14:38 (A0006) 14:46 (A0006)		08:44 15:21	09:29 (A0017) 14:13 (A0011)	
Potential sun hours	538	474	386	321		241		207		
Total, worst case				575		1798		2218		
Sun reduction				0,26		0,17		0,13		
Oper. time red.				0,99		0,99		0,99		
Wind dir. red.				0,69		0,63		0,65		
Total reduction				0,18		0,11		0,09		
Total, real				102		194		189		

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: PASSAMÅLEN 1:8>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (853)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January			February			March			April	May	June
1	08:43	09:36 (A0017)	08:04		15:02 (A0006)	06:57		15:52 (A0005)	06:31	05:11	04:10
	15:23	93 14:18 (A0011)	16:23	21	15:23 (A0006)	17:29	31	16:51 (A0002)	19:38	20:44	21:46
2	08:43	09:35 (A0017)	08:02		15:03 (A0006)	06:54		15:53 (A0005)	06:28	05:09	04:09
	15:24	95 14:18 (A0011)	16:26	21	15:24 (A0006)	17:31	25	16:49 (A0002)	19:40	20:47	21:47
3	08:43	09:36 (A0017)	08:00		15:03 (A0006)	06:51		15:55 (A0005)	06:25	05:06	04:08
	15:26	96 14:19 (A0011)	16:28	21	15:24 (A0006)	17:34	14	16:09 (A0005)	19:43	20:49	21:49
4	08:42	09:37 (A0017)	07:58		15:03 (A0006)	06:48		15:58 (A0005)	06:23	05:04	04:07
	15:27	96 14:19 (A0011)	16:30	20	15:23 (A0006)	17:36	7	16:05 (A0005)	19:45	20:51	21:50
5	08:42	09:37 (A0017)	07:56		15:04 (A0006)	06:46			06:20	05:01	04:06
	15:28	97 14:20 (A0011)	16:33	19	15:23 (A0006)	17:38			19:47	20:53	21:51
6	08:41	09:37 (A0017)	07:53		15:05 (A0006)	06:43			06:17	04:59	04:05
	15:30	98 14:20 (A0011)	16:35	17	15:22 (A0006)	17:41			19:49	20:55	21:53
7	08:40	09:37 (A0017)	07:51		15:06 (A0006)	06:40			06:14	04:57	04:04
	15:32	98 14:20 (A0011)	16:38	16	15:22 (A0006)	17:43			19:51	20:58	21:54
8	08:40	09:38 (A0017)	07:49		15:08 (A0006)	06:38			06:11	04:54	04:03
	15:33	99 14:21 (A0011)	16:40	13	15:21 (A0006)	17:45			19:54	21:00	21:55
9	08:39	09:39 (A0017)	07:47		15:11 (A0006)	06:35			06:09	04:52	04:02
	15:35	97 14:21 (A0011)	16:42	7	15:18 (A0006)	17:47			19:56	21:02	21:56
10	08:38	09:39 (A0017)	07:44			06:32			06:06	04:50	04:01
	15:37	98 14:22 (A0011)	16:45			17:50			19:58	21:04	21:57
11	08:37	09:39 (A0017)	07:42			06:29			06:03	04:48	04:01
	15:38	98 14:21 (A0011)	16:47			17:52			20:00	21:06	21:58
12	08:36	09:40 (A0017)	07:40			06:27			06:01	04:45	04:00
	15:40	97 14:22 (A0011)	16:49			17:54			20:02	21:08	21:59
13	08:35	09:40 (A0017)	07:37			06:24			05:58	04:43	04:00
	15:42	95 14:21 (A0011)	16:52			17:56			20:05	21:10	22:00
14	08:34	09:41 (A0017)	07:35		15:59 (A0005)	06:21			05:55	04:41	03:59
	15:44	94 14:22 (A0011)	16:54	8	16:07 (A0005)	17:59			20:07	21:12	22:01
15	08:32	09:41 (A0017)	07:32		15:56 (A0005)	06:18			05:52	04:39	03:59
	15:46	91 14:21 (A0011)	16:57	14	16:10 (A0005)	18:01			20:09	21:14	22:01
16	08:31	09:43 (A0017)	07:30		15:54 (A0005)	06:16			05:50	04:37	03:59
	15:48	86 14:21 (A0011)	16:59	18	16:12 (A0005)	18:03			20:11	21:17	22:02
17	08:30	09:44 (A0017)	07:27		15:52 (A0005)	06:13			05:47	04:35	03:59
	15:50	82 14:20 (A0011)	17:01	21	16:13 (A0005)	18:05			20:14	21:19	22:03
18	08:28	09:45 (A0017)	07:25		15:52 (A0005)	06:10			05:44	04:33	03:58
	15:52	75 14:18 (A0011)	17:04	23	16:15 (A0005)	18:07			20:16	21:21	22:03
19	08:27	09:47 (A0017)	07:22		15:50 (A0005)	06:07			05:42	04:31	03:58
	15:54	64 13:21 (A0010)	17:06	26	16:16 (A0005)	18:10			20:18	21:23	22:04
20	08:26	09:49 (A0017)	07:20		15:49 (A0005)	06:04			05:39	04:29	03:58
	15:56	58 13:20 (A0010)	17:08	27	16:16 (A0005)	18:12			20:20	21:24	22:04
21	08:24	10:25 (A0015)	07:17		15:50 (A0005)	06:02			05:36	04:27	03:58
	15:58	48 13:19 (A0010)	17:11	27	16:17 (A0005)	18:14			20:22	21:26	22:04
22	08:22	10:25 (A0015)	07:15		15:49 (A0005)	05:59			05:34	04:26	03:59
	16:01	45 13:18 (A0010)	17:13	28	16:17 (A0005)	18:16			20:25	21:28	22:04
23	08:21	10:26 (A0015)	07:12		15:48 (A0005)	05:56			05:31	04:24	03:59
	16:03	41 13:17 (A0010)	17:15	31	16:44 (A0002)	18:18			20:27	21:30	22:05
24	08:19	10:27 (A0015)	07:10		15:49 (A0005)	05:53			05:29	04:22	03:59
	16:05	40 15:15 (A0006)	17:18	34	16:47 (A0002)	18:21			20:29	21:32	22:05
25	08:17	10:28 (A0015)	07:07		15:49 (A0005)	05:50			05:26	04:20	04:00
	16:07	35 15:17 (A0006)	17:20	37	16:49 (A0002)	18:23			20:31	21:34	22:05
26	08:16	10:30 (A0015)	07:04		15:49 (A0005)	05:48			05:23	04:19	04:00
	16:10	35 15:19 (A0006)	17:22	38	16:51 (A0002)	18:25			20:33	21:36	22:04
27	08:14	10:31 (A0015)	07:02		15:49 (A0005)	05:45			05:21	04:17	04:01
	16:12	35 15:20 (A0006)	17:25	39	16:52 (A0002)	18:27			20:36	21:37	22:04
28	08:12	10:32 (A0015)	06:59		15:51 (A0005)	05:42			05:18	04:16	04:01
	16:14	33 15:21 (A0006)	17:27	36	16:52 (A0002)	18:29			20:38	21:39	22:04
29	08:10	10:36 (A0015)				06:39			05:16	04:14	04:02
	16:16	27 15:22 (A0006)				19:32			20:40	21:41	22:04
30	08:08	15:03 (A0006)				06:36			05:13	04:13	04:03
	16:19	20 15:23 (A0006)				19:34			20:42	21:42	22:03
31	08:06	15:03 (A0006)				06:34				04:12	
	16:21	20 15:23 (A0006)				19:36				21:44	
Potential sun hours	228		262			366			429	515	539
Total, worst case	2186		562			77					
Sun reduction	0,19		0,16			0,22					
Oper. time red.	0,99		0,99			0,99					
Wind dir. red.	0,63		0,69			0,69					
Total reduction	0,12		0,11			0,15					
Total, real	253		62			12					

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

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



Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: PASSAMÄLEN 1:8>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (853)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	04:04 22:02	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:11	08:19 15:19
4	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	04:08 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:24 15:16
7	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:15
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	04:14 21:56	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	04:16 21:53	05:16 20:53	06:21 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:13
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:36 15:12
16	04:23 21:48	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:43	08:37 15:12
17	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:38 15:12
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:40	08:39 15:13
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	04:31 21:40	05:35 20:30	06:40 19:05	07:46 17:42	07:56 15:34	08:41 15:13
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	04:39 21:32	05:43 20:19	06:49 18:53	06:55 16:32	08:04 15:28	08:43 15:16
26	04:41 21:31	05:45 20:17	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:25	08:44 15:17
28	04:44 21:27	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:44 15:18
29	04:46 21:25	05:52 20:09	06:57 18:42	07:04 16:22	08:12 15:23	08:44 15:19
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:44 15:20
31	04:51 21:20	05:56 20:03		07:08 16:18		08:44 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case				485	1276	2877
Sun reduction				0,26	0,17	0,13
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,69	0,64	0,64
Total reduction				0,18	0,11	0,08
Total, real				86	138	238

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SKALJARYD 1:5>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (900)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:24	06:56 17:29	06:31 19:38	05:11 20:44	05:58 (A0022) 22 06:20 (A0022) 21:45 10 05:05 (A0021)
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:09 20:46	05:57 (A0022) 24 06:21 (A0022) 21:47 12 05:06 (A0021)
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:49	05:57 (A0022) 24 06:21 (A0022) 21:48 14 05:07 (A0021)
4	08:42 15:27	07:57 16:31	06:48 17:36	06:23 19:45	05:04 20:51	05:57 (A0022) 23 06:20 (A0022) 21:50 16 05:08 (A0021)
5	08:41 15:29	07:55 16:33	06:46 17:38	06:20 19:47	05:01 20:53	05:57 (A0022) 23 06:20 (A0022) 21:51 16 05:08 (A0021)
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	04:59 20:55	05:57 (A0022) 22 06:19 (A0022) 21:52 18 05:10 (A0021)
7	08:40 15:32	07:51 16:38	06:40 17:43	06:14 19:51	04:57 20:57	05:58 (A0022) 21 06:19 (A0022) 21:53 18 05:10 (A0021)
8	08:39 15:33	07:49 16:40	06:38 17:45	06:12 19:54	04:55 20:59	05:58 (A0022) 20 06:18 (A0022) 21:55 19 05:10 (A0021)
9	08:38 15:35	07:46 16:42	06:35 17:47	06:09 19:56	04:52 21:02	05:59 (A0022) 18 06:17 (A0022) 21:56 19 05:11 (A0021)
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	06:00 (A0022) 16 06:16 (A0022) 21:57 20 05:11 (A0021)
11	08:37 15:39	07:42 16:47	06:29 17:52	06:03 20:00	04:48 21:06	06:01 (A0022) 16 20:30 (A0023) 21:58 21 05:12 (A0021)
12	08:36 15:40	07:39 16:50	06:27 17:54	06:01 20:02	04:46 21:08	06:03 (A0022) 14 20:32 (A0023) 21:59 21 05:12 (A0021)
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	06:06 (A0022) 10 20:34 (A0023) 22:00 21 05:12 (A0021)
14	08:33 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:41 21:12	20:27 (A0023) 9 20:36 (A0023) 22:00 22 05:13 (A0021)
15	08:32 15:46	07:32 16:57	06:18 18:01	05:52 20:09	04:39 21:14	20:27 (A0023) 10 20:37 (A0023) 22:01 22 05:14 (A0021)
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:16	20:27 (A0023) 12 20:39 (A0023) 22:02 22 05:13 (A0021)
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:18	20:28 (A0023) 13 20:41 (A0023) 22:02 22 05:13 (A0021)
18	08:28 15:52	07:25 17:04	06:10 18:07	05:44 20:16	04:33 21:20	20:28 (A0023) 12 20:40 (A0023) 22:03 23 05:14 (A0021)
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:22	20:29 (A0023) 10 20:39 (A0023) 22:03 22 05:14 (A0021)
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	20:30 (A0023) 9 20:39 (A0023) 22:04 22 05:14 (A0021)
21	08:24 15:59	07:17 17:11	06:02 18:14	05:36 20:22	04:28 21:26	20:31 (A0023) 7 20:38 (A0023) 22:04 22 05:15 (A0021)
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04 22 05:15 (A0021)
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	03:59 22:04 22 05:15 (A0021)
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	04:22 21:32	03:59 22:04 23 05:16 (A0021)
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:21 21:34	04:00 22:04 22 05:15 (A0021)
26	08:15 16:10	07:04 17:22	05:48 18:25	05:24 20:33	06:03 (A0022) 14 06:17 (A0022) 21:35	04:19 22:04 22 05:15 (A0021)
27	08:13 16:12	07:02 17:25	05:45 18:27	05:21 20:35	06:01 (A0022) 17 06:18 (A0022) 21:37	04:18 22:04 22 05:16 (A0021)
28	08:12 16:14	06:59 17:27	05:42 18:29	05:19 20:38	06:00 (A0022) 19 06:19 (A0022) 21:39	04:16 22:04 21 05:16 (A0021)
29	08:10 16:17	06:39 19:32	05:16 20:40	05:15 21:40	05:59 (A0022) 21 06:20 (A0022) 21:40	04:15 22:03 22 05:16 (A0021)
30	08:08 16:19	06:36 19:34	05:14 20:42	05:13 21:42	05:58 (A0022) 22 06:20 (A0022) 21:42	04:13 22:03 21 05:16 (A0021)
31	08:06 16:21	06:34 19:36			04:12 21:44	04:57 (A0021) 6 05:03 (A0021) 538
Potential sun hours	228	263	366	429	515	
Total, worst case				103	341	599
Sun reduction				0,42	0,53	0,43
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,67	0,65	0,69
Total reduction				0,28	0,34	0,29
Total, real				29	116	175

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

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

Project:  
bruzaholm

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VATTENFALL AB IT  
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Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SKALJARYD 1:5>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (900)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:04 22:03 20	04:56 (A0021) 21:18 16	06:12 (A0022) 20:42 (A0023) 20:00	07:02 18:36 16:15	07:10 16:15 15:21	08:16 15:21 15:21
2	04:05 22:02 21	04:56 (A0021) 21:16 15	06:11 (A0022) 20:40 (A0023) 19:57	07:04 18:34 16:13	07:13 16:13 15:20	08:17 15:20 15:19
3	04:06 22:01 20	04:56 (A0021) 21:14 17	06:10 (A0022) 20:40 (A0023) 19:55	07:06 18:31 16:11	07:15 16:11 15:19	08:19 15:19 15:19
4	04:07 22:01 20	04:56 (A0021) 21:11 19	06:09 (A0022) 20:40 (A0023) 19:52	07:08 18:28 16:08	07:17 16:08 15:18	08:21 15:18 15:18
5	04:08 22:00 18	04:57 (A0021) 21:09 21	06:08 (A0022) 20:40 (A0023) 19:49	07:10 18:25 16:06	07:20 16:06 15:17	08:23 15:17 15:17
6	04:09 21:59 18	04:57 (A0021) 21:07 21	06:07 (A0022) 20:40 (A0023) 19:46	07:12 18:23 16:04	07:22 16:04 15:16	08:24 15:16 15:16
7	04:10 21:58 17	04:58 (A0021) 21:04 23	06:06 (A0022) 20:40 (A0023) 19:44	07:15 18:20 16:02	07:24 16:02 15:16	08:26 15:16 15:16
8	04:11 21:57 15	05:00 (A0021) 21:02 23	06:06 (A0022) 20:40 (A0023) 19:41	07:17 18:17 15:59	07:27 15:59 15:15	08:27 15:15 15:15
9	04:12 21:56 15	05:00 (A0021) 21:00 23	06:06 (A0022) 20:40 (A0023) 19:38	07:19 18:14 15:57	07:29 15:57 15:14	08:29 15:14 15:14
10	04:14 21:55 13	05:01 (A0021) 20:57 23	06:06 (A0022) 20:40 (A0023) 19:35	07:21 18:12 15:55	07:31 15:55 15:14	08:30 15:14 15:14
11	04:15 21:54 11	05:02 (A0021) 20:54 23	06:06 (A0022) 20:40 (A0023) 19:33	07:23 18:09 15:53	07:33 15:53 15:14	08:31 15:14 15:14
12	04:17 21:53 8	05:03 (A0021) 20:53 23	06:06 (A0022) 20:40 (A0023) 19:30	07:25 18:06 15:51	07:36 15:51 15:13	08:33 15:13 15:13
13	04:18 21:52 3	05:07 (A0021) 20:50 22	06:06 (A0022) 20:40 (A0023) 19:27	07:28 18:04 15:49	07:38 15:49 15:13	08:34 15:13 15:13
14	04:20 21:50 20	05:10 (A0021) 20:50 20	06:28 (A0022) 20:40 (A0023) 19:24	18:04 17:50 15:47	15:49 15:47 15:13	15:13 15:13 15:13
15	04:21 21:49 19	05:20 20:48 19	06:07 (A0022) 20:40 (A0023) 19:21	07:30 18:01 17:58	07:40 15:47 15:45	08:35 15:13 15:13
16	04:23 21:47 17	05:22 20:45 17	06:07 (A0022) 20:40 (A0023) 19:19	07:32 18:01 17:56	07:42 15:47 15:43	08:36 15:13 15:13
17	04:24 21:46 14	05:26 20:40 14	06:10 (A0022) 20:40 (A0023) 19:16	07:36 17:53 15:41	07:47 15:41 15:13	08:38 15:13 15:13
18	04:26 21:44 9	05:28 20:37 9	06:12 (A0022) 20:40 (A0023) 19:13	07:39 17:50 15:40	07:49 15:40 15:13	08:39 15:13 15:13
19	04:28 21:43 20	05:31 20:35 20	06:36 20:40 (A0023) 19:10	07:41 17:48 17:48	07:51 15:38 15:38	08:40 15:13 15:13
20	04:30 21:41 21	05:33 20:32 21	06:38 19:07 17:45	07:43 17:45 15:36	07:53 15:36 15:13	08:40 15:13 15:13
21	04:31 21:39 22	05:35 20:30 22	06:40 19:04 17:43	07:45 17:43 15:35	07:56 15:35 15:14	08:41 15:14 15:14
22	04:33 21:38 4	05:37 20:27 20:42 (A0023) 20:27	06:42 19:02 17:40	07:48 17:40 15:33	07:58 15:33 15:14	08:42 15:14 15:14
23	04:35 21:36 7	05:39 20:24 20:41 (A0023) 20:24	06:45 18:59 17:37	07:50 17:37 15:31	08:00 15:31 15:15	08:42 15:15 15:15
24	04:37 21:34 10	05:41 20:22 20:40 (A0023) 20:22	06:47 18:56 17:35	07:52 17:35 15:30	08:02 15:30 15:15	08:43 15:15 15:15
25	04:39 21:32 11	05:43 20:19 20:39 (A0023) 20:19	06:49 18:53 16:32	07:54 16:32 15:28	08:04 15:28 15:16	08:43 15:16 15:16
26	04:41 21:30 13	05:45 20:16 20:38 (A0023) 20:16	06:51 18:50 16:30	07:57 16:30 15:27	08:06 15:27 15:17	08:43 15:17 15:17
27	04:43 21:28 13	05:48 20:14 20:38 (A0023) 20:14	06:53 18:48 16:27	07:59 16:27 15:26	08:08 15:26 15:18	08:43 15:18 15:18
28	04:45 21:26 12	05:50 20:11 20:38 (A0023) 20:11	06:55 18:45 16:25	08:01 16:25 15:24	08:10 15:24 15:18	08:43 15:18 15:18
29	04:47 21:24 10	05:52 20:08 20:38 (A0023) 20:08	06:57 18:42 16:22	08:12 16:22 15:23	08:12 15:23 15:19	08:43 15:19 15:19
30	04:49 21:22 8	05:54 20:06 20:37 (A0023) 20:06	06:59 18:39 16:20	08:14 16:20 15:22	08:14 15:22 15:21	08:43 15:21 15:21
31	04:51 21:20 13	05:56 20:03 06:14 (A0022) 20:03	07:08 16:18 15:22	08:16 15:22 15:22	08:16 15:22 15:22	08:43 15:22 15:22
Potential sun hours	538	474	386	321	241	207
Total, worst case	300	348				
Sun reduction	0,38	0,35				
Oper. time red.	0,99	0,99				
Wind dir. red.	0,66	0,67				
Total reduction	0,25	0,23				
Total, real	75	81				

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT

Företagsenhet 1002

SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SPINKARP 1:1>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (901)

### Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

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

609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January		February		March	April	May	June
1	08:43	13:55 (A0015)	08:04	15:11 (A0010)	06:56	06:31	05:11	04:10
	15:23	30 14:25 (A0016)	16:23	15 15:26 (A0010)	17:29	19:38	20:44	21:46
2	08:43	13:55 (A0015)	08:02	15:12 (A0010)	06:54	06:28	05:08	04:09
	15:24	30 14:25 (A0016)	16:26	14 15:26 (A0010)	17:31	19:40	20:47	21:47
3	08:43	13:56 (A0015)	08:00	15:14 (A0010)	06:51	06:25	05:06	04:08
	15:25	31 14:27 (A0016)	16:28	11 15:25 (A0010)	17:34	19:43	20:49	21:48
4	08:42	13:56 (A0015)	07:58	15:15 (A0010)	06:48	06:22	05:04	04:07
	15:27	31 14:27 (A0016)	16:30	8 15:23 (A0010)	17:36	19:45	20:51	21:50
5	08:42	13:56 (A0015)	07:55		06:46	06:20	05:01	04:06
	15:28	31 14:27 (A0016)	16:33		17:38	19:47	20:53	21:51
6	08:41	13:57 (A0015)	07:53		06:43	06:17	04:59	04:05
	15:30	30 14:27 (A0016)	16:35		17:40	19:49	20:55	21:53
7	08:40	13:57 (A0015)	07:51		06:40	06:14	04:57	04:04
	15:31	31 14:28 (A0016)	16:37		17:43	19:51	20:57	21:54
8	08:40	13:57 (A0015)	07:49		06:38	06:11	04:54	04:03
	15:33	31 14:28 (A0016)	16:40		17:45	19:54	21:00	21:55
9	08:39	13:58 (A0015)	07:47		06:35	06:09	04:52	04:02
	15:35	30 14:28 (A0016)	16:42		17:47	19:56	21:02	21:56
10	08:38	13:58 (A0015)	07:44		06:32	06:06	04:50	04:01
	15:37	30 14:28 (A0016)	16:45		17:50	19:58	21:04	21:57
11	08:37	13:58 (A0015)	07:42		06:29	06:03	04:48	04:01
	15:38	30 14:28 (A0016)	16:47		17:52	20:00	21:06	21:58
12	08:36	13:59 (A0015)	07:40		06:27	06:00	04:45	04:00
	15:40	29 14:28 (A0016)	16:49		17:54	20:02	21:08	21:59
13	08:35	13:59 (A0015)	07:37		06:24	05:58	04:43	04:00
	15:42	28 14:27 (A0016)	16:52		17:56	20:05	21:10	22:00
14	08:34	14:00 (A0015)	07:35		06:21	05:55	04:41	03:59
	15:44	26 14:26 (A0016)	16:54		17:58	20:07	21:12	22:01
15	08:32	14:00 (A0015)	07:32		06:18	05:52	04:39	03:59
	15:46	20 14:20 (A0015)	16:56		18:01	20:09	21:14	22:01
16	08:31	14:01 (A0015)	07:30		06:15	05:50	04:37	03:59
	15:48	20 14:21 (A0015)	16:59		18:03	20:11	21:16	22:02
17	08:30	14:02 (A0015)	07:27		06:13	05:47	04:35	03:58
	15:50	19 14:21 (A0015)	17:01		18:05	20:13	21:18	22:03
18	08:28	14:03 (A0015)	07:25		06:10	05:44	04:33	03:58
	15:52	17 14:20 (A0015)	17:03		18:07	20:16	21:20	22:03
19	08:27	14:03 (A0015)	07:22		06:07	05:42	04:31	03:58
	15:54	17 14:20 (A0015)	17:06		18:10	20:18	21:22	22:04
20	08:25	14:05 (A0015)	07:20	16:32 (A0005)	06:04	05:39	04:29	03:58
	15:56	15 14:20 (A0015)	17:08	4 16:36 (A0005)	18:12	20:20	21:24	22:04
21	08:24	14:07 (A0015)	07:17	16:32 (A0005)	06:02	05:36	04:27	03:58
	15:58	12 14:19 (A0015)	17:11	7 16:39 (A0005)	18:14	20:22	21:26	22:04
22	08:22	14:09 (A0015)	07:15	16:31 (A0005)	05:59	05:34	04:26	03:59
	16:00	12 15:18 (A0010)	17:13	11 16:42 (A0005)	18:16	20:24	21:28	22:04
23	08:21	15:13 (A0010)	07:12	16:30 (A0005)	05:56	05:31	04:24	03:59
	16:03	8 15:21 (A0010)	17:15	13 16:43 (A0005)	18:18	20:27	21:30	22:04
24	08:19	15:12 (A0010)	07:10	16:30 (A0005)	05:53	05:29	04:22	03:59
	16:05	10 15:22 (A0010)	17:18	14 16:44 (A0005)	18:21	20:29	21:32	22:05
25	08:17	15:11 (A0010)	07:07	16:30 (A0005)	05:50	05:26	04:20	03:59
	16:07	13 15:24 (A0010)	17:20	13 16:43 (A0005)	18:23	20:31	21:34	22:05
26	08:15	15:11 (A0010)	07:04	16:31 (A0005)	05:48	05:23	04:19	04:00
	16:09	14 15:25 (A0010)	17:22	11 16:42 (A0005)	18:25	20:33	21:36	22:04
27	08:14	15:11 (A0010)	07:02	16:32 (A0005)	05:45	05:21	04:17	04:00
	16:12	15 15:26 (A0010)	17:24	9 16:41 (A0005)	18:27	20:36	21:37	22:04
28	08:12	15:10 (A0010)	06:59		05:42	05:18	04:16	04:01
	16:14	15 15:25 (A0010)	17:27		18:29	20:38	21:39	22:04
29	08:10	15:10 (A0010)			06:39	05:16	04:14	04:02
	16:16	16 15:26 (A0010)			19:32	20:40	21:41	22:04
30	08:08	15:10 (A0010)			06:36	05:13	04:13	04:02
	16:19	16 15:26 (A0010)			19:34	20:42	21:42	22:03
31	08:06	15:11 (A0010)			06:34		04:11	
	16:21	16 15:27 (A0010)			19:36		21:44	
Potential sun hours	228		262		366	429	515	539
Total, worst case	673		130					
Sun reduction	0,19		0,16					
Oper. time red.	0,99		0,99					
Wind dir. red.	0,69		0,69					
Total reduction	0,13		0,11					
Total, real	86		14					

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SPINKARP 1:1>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (901)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October		November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36		07:11 16:15	08:16 15:21 30 14:10 (A0016)
2	04:04 22:02	04:54 21:16	06:00 19:58	07:04 18:34		07:13 16:13	08:18 15:20 29 14:10 (A0016)
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31		07:15 16:10	08:19 15:19 30 14:11 (A0016)
4	04:06 22:01	04:59 21:12	06:04 19:52	07:08 18:28		07:17 16:08	08:21 15:18 31 14:12 (A0016)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25		07:20 16:06	08:23 15:17 31 14:13 (A0016)
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23		07:22 16:04	08:24 15:16 30 14:13 (A0016)
7	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20		07:24 16:01	14:46 (A0010) 08:26 15:15 30 14:14 (A0016)
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17		07:27 15:59 12	14:43 (A0010) 08:28 15:15 31 14:14 (A0016)
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14		07:29 15:57 14	14:43 (A0010) 08:29 15:14 31 14:15 (A0016)
10	04:13 21:55	05:11 20:58	06:17 19:35	07:21 18:12		07:31 15:55 15	14:42 (A0010) 08:30 15:14 31 14:16 (A0016)
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09		07:34 15:53 16	14:42 (A0010) 08:32 15:13 30 14:16 (A0016)
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06		07:36 15:51 16	14:42 (A0010) 08:33 15:13 30 14:17 (A0016)
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:04		07:38 15:49 16	14:42 (A0010) 08:34 15:13 30 14:17 (A0016)
14	04:19 21:50	05:20 20:48	06:26 19:24	07:30 18:01	6	17:06 (A0005) 07:40 17:12 (A0005) 15:47	14:43 (A0010) 08:35 14:58 (A0010) 15:12 29 14:17 (A0016)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	10	17:04 (A0005) 07:43 17:14 (A0005) 15:45	14:42 (A0010) 08:36 14:58 (A0010) 15:12 29 14:17 (A0016)
16	04:22 21:48	05:24 20:43	06:30 19:19	07:34 17:55	12	17:03 (A0005) 07:45 17:15 (A0005) 15:43	14:44 (A0010) 08:37 14:58 (A0010) 15:12 28 14:17 (A0016)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	14	17:01 (A0005) 07:47 17:15 (A0005) 15:41	14:44 (A0010) 08:38 14:57 (A0010) 15:12 29 14:18 (A0016)
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	14	17:01 (A0005) 07:49 17:15 (A0005) 15:39	14:46 (A0010) 08:39 14:56 (A0010) 15:12 28 14:18 (A0016)
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	13	17:01 (A0005) 07:51 17:14 (A0005) 15:38	14:47 (A0010) 08:40 14:55 (A0010) 15:13 28 14:19 (A0016)
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	10	17:02 (A0005) 07:54 17:12 (A0005) 15:36	13:44 (A0015) 08:41 14:53 (A0010) 15:13 28 14:20 (A0016)
21	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	7	17:02 (A0005) 07:56 17:09 (A0005) 15:34	13:42 (A0015) 08:41 13:54 (A0015) 15:13 29 14:20 (A0016)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	3	17:03 (A0005) 07:58 17:06 (A0005) 15:33	13:41 (A0015) 08:42 13:56 (A0015) 15:14 29 14:21 (A0016)
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37		08:00 15:31 17	13:40 (A0015) 08:42 13:57 (A0015) 15:14 29 14:21 (A0016)
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35		08:02 15:30 17	13:40 (A0015) 08:43 13:57 (A0015) 15:15 28 14:21 (A0016)
25	04:39 21:32	05:43 20:19	06:49 18:53	06:55 16:32		08:04 15:28 19	13:40 (A0015) 08:43 13:59 (A0015) 15:16 28 14:22 (A0016)
26	04:40 21:30	05:45 20:17	06:51 18:50	06:57 16:30		08:06 15:27 19	13:40 (A0015) 08:43 13:59 (A0015) 15:16 29 14:23 (A0016)
27	04:42 21:28	05:47 20:14	06:53 18:48	06:59 16:27		08:08 15:25 20	13:39 (A0015) 08:44 13:59 (A0015) 15:17 29 14:23 (A0016)
28	04:44 21:26	05:50 20:11	06:55 18:45	07:01 16:25		08:10 15:24 26	13:40 (A0015) 08:44 14:06 (A0016) 15:18 29 14:23 (A0016)
29	04:46 21:24	05:52 20:08	06:57 18:42	07:04 16:22		08:12 15:23 28	13:40 (A0015) 08:44 14:08 (A0016) 15:19 29 14:23 (A0016)
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20		08:14 15:22 29	13:40 (A0015) 08:44 14:09 (A0016) 15:20 29 14:24 (A0016)
31	04:50 21:20	05:56 20:03		07:08 16:18			08:43 15:21 29 14:25 (A0016)
Potential sun hours	538	474	386	321		241	207
Total, worst case				89		387	910
Sun reduction				0,26		0,17	0,13
Oper. time red.				0,99		0,99	0,99
Wind dir. red.				0,69		0,69	0,70
Total reduction				0,18		0,12	0,09
Total, real				16		45	83

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: STENSGÖL 1:11>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (879)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February		March	April	May	June	July	August	September	October		November		December	
1	08:44 15:23	08:04 16:24		06:57 17:29	06:31 19:39	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:19	05:58 20:01	07:02 18:37		07:11 16:15	15	07:53 (A0001) 08:08 (A0001)	08:16 15:21
2	08:43 15:24	08:02 16:26		06:54 17:32	06:28 19:41	05:09 20:47	04:09 21:47	04:05 22:03	04:55 21:16	06:01 19:58	07:04 18:34		07:13 16:13	14	07:53 (A0001) 08:07 (A0001)	08:18 15:20
3	08:43 15:26	08:00 16:28		06:51 17:34	06:26 19:43	05:06 20:49	04:08 21:49	04:05 22:02	04:57 21:14	06:03 19:55	07:06 18:31		07:16 16:11	12	07:55 (A0001) 08:07 (A0001)	08:20 15:19
4	08:43 15:27	07:58 16:31		06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28		07:18 16:09	10	07:55 (A0001) 08:05 (A0001)	08:22 15:18
5	08:42 15:29	07:56 16:33		06:46 17:39	06:20 19:47	05:02 20:54	04:06 21:52	04:08 22:01	05:01 21:10	06:07 19:50	07:11 18:26		07:20 16:06	8	07:58 (A0001) 08:04 (A0001)	08:23 15:17
6	08:41 15:30	07:54 16:35	08:28 (A0001)	06:43 17:41	06:17 19:50	04:59 20:56	04:05 21:53	04:09 22:00	05:03 21:07	06:09 19:47	07:13 18:23		07:23 16:04			08:25 15:16
7	08:41 15:32	07:51 16:38	08:25 (A0001)	06:41 17:43	06:15 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20		07:25 16:02			08:26 15:16
8	08:40 15:33	07:49 16:40	08:25 (A0001)	06:38 17:45	06:12 19:54	04:55 21:00	04:03 21:55	04:11 21:58	05:07 21:03	06:13 19:41	07:17 18:17		07:27 16:00			08:28 15:15
9	08:39 15:35	07:47 16:43	08:24 (A0001)	06:35 17:48	06:09 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	06:15 19:39	07:19 18:15		07:29 15:57			08:29 15:14
10	08:38 15:37	07:45 16:45	08:24 (A0001)	06:32 17:50	06:06 19:58	04:50 21:04	04:06 21:58	04:14 21:56	05:12 20:58	06:18 19:36	07:21 18:12		07:32 15:55			08:31 15:14
11	08:37 15:39	07:42 16:47	08:23 (A0001)	06:30 17:52	06:04 20:01	04:48 21:06	04:01 21:58	04:15 21:55	05:14 20:56	06:20 19:33	07:24 18:09		07:34 15:53			08:32 15:14
12	08:36 15:40	07:40 16:50	08:24 (A0001)	06:27 17:54	06:01 20:03	04:46 21:09	04:01 21:59	04:17 21:54	05:16 20:53	06:22 19:30	07:26 18:07		07:36 15:51			08:33 15:13
13	08:35 15:42	07:38 16:52	08:24 (A0001)	06:24 17:57	05:58 20:05	04:44 21:11	04:00 22:00	04:18 21:52	05:18 20:51	06:24 19:27	07:28 18:04		07:39 15:49			08:35 15:13
14	08:34 15:44	07:35 16:54	08:25 (A0001)	06:21 17:59	05:55 20:07	04:41 21:13	04:00 22:01	04:20 21:51	05:20 20:48	06:26 19:25	07:30 18:01		07:41 15:47			08:36 15:13
15	08:33 15:46	07:33 16:57	08:26 (A0001)	06:19 18:01	05:53 20:09	04:39 21:15	03:59 22:02	04:21 21:50	05:22 20:46	06:28 19:22	07:32 17:59		07:43 15:45			08:37 15:13
16	08:32 15:48	07:30 16:59	08:29 (A0001)	06:16 18:03	05:50 20:12	04:37 21:17	03:59 22:02	04:23 21:48	05:24 20:43	06:30 19:19	07:35 17:56		07:45 15:43			08:38 15:13
17	08:30 15:50	07:28 17:02	08:32 (A0001)	06:13 18:06	05:47 20:14	04:35 21:19	03:59 22:03	04:24 21:47	05:26 20:41	06:32 19:16	07:37 17:53		07:47 15:42			08:39 15:13
18	08:29 15:52	07:25 17:04		06:10 18:08	05:45 20:16	04:33 21:21	03:59 22:04	04:26 21:45	05:29 20:38	06:34 19:13	07:39 17:51		07:50 15:40			08:40 15:13
19	08:27 15:54	07:23 17:06		06:08 18:10	05:42 20:18	04:31 21:23	03:59 22:04	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48		07:52 15:38			08:41 15:13
20	08:26 15:57	07:20 17:09		06:05 18:12	05:39 20:20	04:30 21:25	03:59 22:04	04:30 21:42	05:33 20:33	06:39 19:08	07:44 17:45		07:54 15:36			08:42 15:13
21	08:24 15:59	07:18 17:11		06:02 18:14	05:37 20:23	04:28 21:27	03:59 22:05	04:31 21:40	05:35 20:30	06:41 19:05	07:46 17:43		07:56 15:35			08:43 15:14
22	08:23 16:01	07:15 17:13		05:59 18:17	05:34 20:25	04:26 21:29	03:59 22:05	04:33 21:38	05:37 20:28	06:43 19:02	07:48 17:40		07:58 15:33			08:44 15:14
23	08:21 16:03	07:13 17:16		05:56 18:19	05:31 20:27	04:24 21:31	03:59 22:05	04:35 21:37	05:39 20:25	06:45 18:59	07:50 17:38		08:00 15:31			08:43 15:15
24	08:19 16:05	07:10 17:18		05:54 18:21	05:29 20:29	04:22 21:32	03:59 22:05	04:37 21:35	05:41 20:22	06:47 18:56	07:53 17:35		08:03 15:30			08:43 15:15
25	08:18 16:08	07:07 17:20		05:51 18:23	05:26 20:32	04:21 21:34	04:00 22:05	04:39 21:33	05:44 20:20	06:49 18:54	06:55 16:33		08:05 15:28			08:44 15:16
26	08:16 16:10	07:05 17:23		05:48 18:25	05:24 20:34	04:19 21:36	04:00 22:05	04:41 21:31	05:46 20:17	06:51 18:51	06:57 16:30	07:58 (A0001)	08:07 15:27			08:44 15:17
27	08:14 16:12	07:02 17:25		05:45 18:28	05:21 20:36	04:18 21:38	04:01 22:05	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:28	08:03 (A0001)	08:09 15:26	5		08:44 15:18
28	08:12 16:14	06:59 17:27		05:42 18:30	05:19 20:38	04:16 21:39	04:01 22:04	04:45 21:27	05:50 20:12	06:56 18:45	07:02 16:25	07:55 (A0001)	08:11 15:24	10		08:44 15:18
29	08:10 16:17			06:40 19:32	05:16 20:40	04:15 21:41	04:02 22:04	04:47 21:25	05:52 20:09	06:58 18:42	07:04 16:23	08:07 (A0001)	08:13 15:23	12		08:44 15:19
30	08:08 16:19			06:37 19:34	05:14 20:43	04:13 21:43	04:03 22:04	04:49 21:23	05:54 20:06	07:00 18:40	07:06 16:20	07:53 (A0001)	08:14 15:22	14		08:44 15:21
31	08:06 16:21			06:34 19:36		04:12 21:44	04:51 21:21	05:56 20:03	07:09 18:18	07:53 (A0001)	07:09 16:18	08:08 (A0001)	15:22	15		08:44 15:22
Potential sun hours	228	262		366	429	515	539	538	474	386	321		241			207
Total, worst case			124									71			57	
Sun reduction			0,16									0,26			0,17	
Oper. time red.			0,99									0,99			0,99	
Wind dir. red.			0,58									0,58			0,58	
Total reduction			0,09									0,15			0,10	
Total, real			12									11			6	

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: STORA HESTER 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (867)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:46	04:03 22:03	04:52 21:18	05:58 20:00	07:02 18:36	07:11 16:15	08:16 15:20
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:08 20:47	04:09 21:47	04:04 22:02	04:54 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:19
3	08:43 15:25	08:00 16:28	06:51 17:34	06:25 19:43	05:06 20:51	04:08 21:49	04:05 22:02	04:56 21:14	06:02 19:55	07:06 18:31	07:15 16:10	08:20 15:18
4	08:42 15:27	07:58 16:30	06:48 17:36	06:22 19:45	05:04 20:51	04:07 21:50	04:06 22:01	04:59 21:12	06:04 19:52	07:08 18:28	07:18 16:08	08:21 15:17
5	08:42 15:28	07:56 16:33	06:46 17:38	06:20 19:47	05:01 20:53	04:05 21:51	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	04:59 20:55	04:04 21:53	04:08 22:00	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:25 15:16
7	08:40 15:31	07:51 16:37	06:40 17:43	06:14 19:51	04:56 20:58	04:04 21:54	04:09 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:01	08:26 15:15
8	08:40 15:33	07:49 16:40	06:38 17:45	06:11 19:54	04:54 21:00	04:03 21:55	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 16:01	08:28 15:15
9	08:39 15:35	07:47 16:42	06:35 17:47	06:09 19:56	04:52 21:02	04:02 21:56	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 16:01	08:29 15:14
10	08:38 15:36	07:44 16:44	06:32 17:50	06:06 19:58	04:50 21:04	04:01 21:57	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:12	07:31 16:01	08:30 15:13
11	08:37 15:38	07:42 16:47	06:29 17:52	06:03 20:00	04:47 21:06	04:01 21:58	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	07:34 16:01	08:32 15:13
12	08:36 15:40	07:40 16:49	06:27 17:54	06:00 20:02	04:45 21:08	04:00 21:59	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 16:01	08:33 15:13
13	08:35 15:42	07:37 16:52	06:24 17:56	05:58 20:05	04:43 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 16:01	08:34 15:12
14	08:34 15:44	07:35 16:54	06:21 17:58	05:55 20:07	04:41 21:12	03:59 22:01	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:40 16:01	08:35 15:12
15	08:33 15:46	07:32 16:56	06:18 18:01	05:52 20:09	04:39 21:14	03:59 22:01	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 16:01	08:36 15:12
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	04:37 21:17	03:58 22:02	04:22 21:48	05:24 20:43	06:30 19:19	07:34 17:55	07:45 16:01	08:38 15:12
17	08:30 15:50	07:27 17:01	06:13 18:05	05:47 20:13	04:35 21:19	03:58 22:03	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 16:01	08:39 15:12
18	08:29 15:52	07:25 17:03	06:10 18:07	05:44 20:16	04:33 21:21	03:58 22:03	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 16:01	08:40 15:12
19	08:27 15:54	07:22 17:06	06:07 18:10	05:42 20:18	04:31 21:23	03:58 22:04	04:27 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:52 16:01	08:41 15:13
20	08:26 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:25	03:58 22:04	04:29 21:41	05:32 20:32	06:38 19:07	07:43 17:45	07:54 16:01	08:41 15:13
21	08:24 15:58	07:17 17:10	06:02 18:14	05:36 20:22	04:27 21:26	03:58 22:04	04:31 21:40	05:35 20:30	06:40 19:04	07:45 17:42	07:56 16:01	08:41 15:13
22	08:22 16:00	07:15 17:13	05:59 18:16	05:34 20:25	04:25 21:28	03:58 22:04	04:33 21:38	05:37 20:27	06:10 (2) 06:15 (2)	07:42 19:02	07:48 17:40	08:42 15:33
23	08:21 16:03	07:12 17:15	05:56 18:18	05:31 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	06:11 (2) 06:17 (2)	07:45 18:59	07:50 17:37	08:43 15:31
24	08:19 16:05	07:10 17:17	05:53 18:21	05:28 20:29	04:22 21:32	03:59 22:05	04:37 21:34	05:41 20:22	06:13 (2) 06:18 (2)	07:47 18:56	07:52 17:35	08:43 15:29
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	04:20 21:34	03:59 22:05	04:38 21:32	05:43 20:19	06:15 (2) 06:18 (2)	07:49 18:53	07:55 17:32	08:43 15:28
26	08:16 16:09	07:04 17:22	05:48 18:25	05:23 20:33	04:19 21:36	04:00 22:05	04:40 21:31	05:45 20:17	06:17 (2) 06:18 (2)	07:51 18:50	07:57 17:30	08:44 15:27
27	08:14 16:12	07:02 17:24	05:45 18:27	05:21 20:36	04:17 21:37	04:00 22:04	04:42 21:29	05:47 20:14	06:18 (2) 06:53	07:54 18:48	07:59 17:27	08:44 15:25
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	04:01 22:04	04:44 21:27	05:50 20:11	06:55 18:45	07:01 16:25	07:08 15:24	08:44 15:18
29	08:10 16:16	06:39 19:32	05:16 17:44	05:16 20:40	04:14 21:41	04:02 22:04	04:46 21:25	05:52 20:08	06:57 18:42	07:04 16:22	07:12 15:23	08:44 15:19
30	08:08 16:19	06:36 19:34	05:13 17:44	05:13 20:42	04:13 21:42	04:02 22:03	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	07:14 15:22	08:44 15:20
31	08:06 16:21	06:34 19:36	05:13 17:44	05:13 20:42	04:11 21:44	04:00 22:03	04:50 21:20	05:56 20:03	07:08 16:17	07:14 15:21	07:22 15:21	08:44 15:21
Potential sun hours	227	262	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction			43	56				20	68	13		
Oper. time red.			0,22	0,42				0,35	0,31	0,26		
Wind dir. red.			0,99	0,99				0,99	0,65	0,59		
Total reduction			0,63	0,66				0,66	0,20	0,15		
Total, real			0,14	0,27				5	14	2		

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: Stora Gluggebo - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (805)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	08:43		14:06 (6)	08:04		15:26 (5)	06:56		16:25 (4)	06:31		18:39 (2)	05:11		04:10			
	15:22	16	14:22 (6)	16:23	15	15:41 (5)	17:29	26	16:51 (3)	19:38	11	18:50 (2)	20:44		21:45			
2	08:43		14:06 (6)	08:02		15:27 (5)	06:54		16:26 (4)	06:28		18:41 (2)	05:08		04:09			
	15:24	16	14:22 (6)	16:25	14	15:41 (5)	17:31	25	16:51 (3)	19:40	5	18:46 (2)	20:46		21:47			
3	08:42		14:07 (6)	08:00		15:27 (5)	06:51		16:28 (4)	06:25			05:06		04:07			
	15:25	16	14:23 (6)	16:28	13	15:40 (5)	17:33	24	16:52 (3)	19:42			20:49		21:48			
4	08:42		14:08 (6)	07:57		15:29 (5)	06:48		16:27 (3)	06:22			05:03		04:06			
	15:26	15	14:23 (6)	16:30	10	15:39 (5)	17:36	25	16:52 (3)	19:45			20:51		21:50			
5	08:41		14:08 (6)	07:55		15:31 (5)	06:45		16:27 (3)	06:19			05:01		04:05			
	15:28	15	14:23 (6)	16:32	7	15:38 (5)	17:38	25	16:52 (3)	19:47			20:53		21:51			
6	08:41		14:09 (6)	07:53			06:43		16:27 (3)	06:17			04:59		04:04			
	15:29	14	14:23 (6)	16:35			17:40	29	17:11 (1)	19:49			20:55		21:52			
7	08:40		14:10 (6)	07:51			06:40		16:27 (3)	06:14			04:56		04:03			
	15:31	14	14:24 (6)	16:37			17:42	32	17:13 (1)	19:51			20:57		21:54			
8	08:39		14:11 (6)	07:49			06:37		16:27 (3)	06:11			04:54		04:02			
	15:33	13	14:24 (6)	16:39			17:45	34	17:15 (1)	19:53			20:59		21:55			
9	08:39		14:12 (6)	07:46			06:35		16:27 (3)	06:08			04:52		04:02			
	15:34	12	14:24 (6)	16:42			17:47	36	17:17 (1)	19:56			21:02		21:56			
10	08:38		14:13 (6)	07:44			06:32		16:28 (3)	06:06			04:49		04:01			
	15:36	11	14:24 (6)	16:44			17:49	36	17:19 (1)	19:58			21:04		21:57			
11	08:37		14:14 (6)	07:42			06:29		16:30 (3)	06:03			04:47		04:00			
	15:38	8	14:22 (6)	16:47			17:52	32	17:19 (1)	20:00			21:06		21:58			
12	08:36		14:17 (6)	07:39			06:26		16:31 (3)	06:00			04:45		04:00			
	15:40	4	14:21 (6)	16:49			17:54	27	17:18 (1)	20:02			21:08		21:59			
13	08:35			07:37			06:24		16:34 (3)	05:57			04:43		03:59			
	15:42			16:51			17:56	18	17:16 (1)	20:04			21:10		22:00			
14	08:34			07:35			06:21			05:55			04:41		03:59			
	15:44			16:54			17:58			20:07			21:12		22:01			
15	08:32			07:32			06:18			05:52			04:39		03:58			
	15:45			16:56			18:00			20:09			21:14		22:01			
16	08:31			07:30			06:15			05:49			04:37		03:58			
	15:47			16:58			18:03			20:11			21:16		22:02			
17	08:30			07:27			06:12			05:47			04:35		03:58			
	15:50			17:01			18:05			20:13			21:18		22:03			
18	08:28			07:25			06:10			05:44			04:33		03:58			
	15:52			17:03			18:07			20:15			21:20		22:03			
19	08:27			07:22			06:07			05:41			04:31		03:58			
	15:54			17:06			18:09			20:18			21:22		22:03			
20	08:25			07:20			06:04			05:39			04:29		03:58			
	15:56			17:08			18:12			20:20			21:24		22:04			
21	08:24			07:17		16:29 (4)	06:01			05:36			04:27		03:58			
	15:58			17:10	7	16:36 (4)	18:14			20:22			21:26		22:04			
22	08:22			07:15		16:27 (4)	05:58		17:45 (2)	05:33			04:25		03:58			
	16:00			17:13	12	16:39 (4)	18:16	2	17:47 (2)	20:24			21:28		22:04			
23	08:21			07:12		16:26 (4)	05:56		17:41 (2)	05:31			04:23		03:58			
	16:02			17:15	14	16:40 (4)	18:18	8	17:49 (2)	20:27			21:30		22:04			
24	08:19			07:09		16:25 (4)	05:53		17:39 (2)	05:28			04:22		03:59			
	16:05			17:17	16	16:41 (4)	18:20	12	17:51 (2)	20:29			21:32		22:04			
25	08:17			07:07		16:25 (4)	05:50		17:37 (2)	05:26			04:20		03:59			
	16:07			17:20	17	16:42 (4)	18:23	16	17:53 (2)	20:31			21:34		22:04			
26	08:15		15:27 (5)	07:04		16:24 (4)	05:47		17:36 (2)	05:23			04:18		03:59			
	16:09	4	15:31 (5)	17:22	20	16:44 (3)	18:25	18	17:54 (2)	20:33			21:36		22:04			
27	08:14		15:25 (5)	07:02		16:24 (4)	05:44		17:36 (2)	05:20			04:17		04:00			
	16:11	8	15:33 (5)	17:24	23	16:47 (3)	18:27	18	17:54 (2)	20:35			21:37		22:04			
28	08:12		15:25 (5)	06:59		16:24 (4)	05:42		17:36 (2)	05:18			04:15		04:01			
	16:14	11	15:36 (5)	17:26	24	16:48 (3)	18:29	18	17:54 (2)	20:38			21:39		22:04			
29	08:10		15:25 (5)				06:39		18:36 (2)	05:15			04:14		04:01			
	16:16	13	15:38 (5)				19:31	17	18:53 (2)	20:40			21:41		22:04			
30	08:08		15:26 (5)				06:36		18:36 (2)	05:13			04:12		04:02			
	16:18	15	15:41 (5)				19:34	16	18:52 (2)	20:42			21:42		22:03			
31	08:06		15:25 (5)				06:33		18:37 (2)				04:11					
	16:21	15	15:40 (5)				19:36	14	18:51 (2)				21:44					
Potential sun hours	227			262			366		429				515		539			
Total, worst case	220			192			508		16									
Sun reduction	0,19			0,16			0,22		0,42									
Oper. time red.	0,99			0,99			0,99		0,99									
Wind dir. red.	0,69			0,69			0,67		0,65									
Total reduction	0,13			0,11			0,15		0,27									
Total, real	28			21			75		4									

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: Stora Gluggebo - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (805)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December			
1	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	17:11 (3) 17:56 (1)	07:10 16:15	08:16 15:20	13:57 (6) 7 14:04 (6)	
2	04:04 22:02	04:54 21:16	06:00 19:57	07:03 18:33	17:08 (3) 17:57 (1)	07:13 16:12	08:18 15:19	13:56 (6) 10 14:06 (6)	
3	04:05 22:02	04:56 21:14	06:02 19:55	07:06 18:31	17:06 (3) 17:57 (1)	07:15 16:10	08:19 15:18	13:55 (6) 12 14:07 (6)	
4	04:06 22:01	04:58 21:11	06:04 19:52	07:08 18:28	17:05 (3) 17:56 (1)	07:17 16:08	08:21 15:17	13:55 (6) 13 14:08 (6)	
5	04:07 22:00	05:00 21:09	06:06 19:49	07:10 18:25	17:04 (3) 17:54 (1)	07:20 16:06	08:23 15:16	13:55 (6) 14 14:09 (6)	
6	04:08 21:59	05:02 21:07	06:08 19:46	07:12 18:22	17:03 (3) 17:51 (1)	07:22 16:03	15:01 (5) 15:08 (5)	08:24 15:16	13:55 (6) 15 14:10 (6)
7	04:09 21:58	05:05 21:04	06:11 19:43	07:14 18:20	17:03 (3) 17:47 (1)	07:24 16:01	14:59 (5) 15:10 (5)	08:26 15:15	13:56 (6) 14 14:10 (6)
8	04:10 21:57	05:07 21:02	06:13 19:41	07:16 18:17	17:02 (3) 17:44 (1)	07:27 15:59	14:58 (5) 15:10 (5)	08:27 15:14	13:55 (6) 15 14:10 (6)
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	17:02 (3) 17:27 (3)	07:29 15:57	14:58 (5) 15:12 (5)	08:29 15:14	13:56 (6) 15 14:11 (6)
10	04:13 21:55	05:11 20:57	06:17 19:35	18:35 (2) 18:39 (2)	07:21 18:11	17:02 (3) 17:26 (3)	14:57 (5) 15:11 (5)	08:30 15:13	13:56 (6) 16 14:12 (6)
11	04:14 21:54	05:13 20:55	06:19 19:32	18:31 (2) 18:42 (2)	07:23 18:09	17:01 (4) 17:25 (3)	14:57 (5) 15:12 (5)	08:32 15:13	13:56 (6) 16 14:12 (6)
12	04:16 21:53	05:15 20:53	06:21 19:30	18:29 (2) 18:43 (2)	07:25 18:06	16:59 (4) 17:25 (3)	14:57 (5) 15:12 (5)	08:33 15:12	13:57 (6) 16 14:13 (6)
13	04:17 21:52	05:17 20:50	06:23 19:27	18:28 (2) 18:44 (2)	07:27 18:03	16:58 (4) 17:23 (3)	14:57 (5) 15:10 (5)	08:34 15:12	13:57 (6) 17 14:14 (6)
14	04:19 21:50	05:19 20:48	06:25 19:24	18:26 (2) 18:44 (2)	07:30 18:01	16:57 (4) 17:21 (3)	14:58 (5) 15:08 (5)	08:35 15:12	13:57 (6) 17 14:14 (6)
15	04:20 21:49	05:22 20:45	06:27 19:21	18:26 (2) 18:44 (2)	07:32 17:58	16:56 (4) 17:18 (3)	14:58 (5) 15:06 (5)	08:36 15:12	13:58 (6) 16 14:14 (6)
16	04:22 21:48	05:24 20:43	06:29 19:18	18:25 (2) 18:43 (2)	07:34 17:55	16:56 (4) 17:14 (4)	15:00 (5) 15:04 (5)	08:37 15:12	13:58 (6) 17 14:15 (6)
17	04:24 21:46	05:26 20:40	06:32 19:15	18:25 (2) 18:42 (2)	07:36 17:53	16:56 (4) 17:13 (4)	07:47 15:41	08:38 15:12	13:58 (6) 17 14:15 (6)
18	04:25 21:44	05:28 20:37	06:34 19:13	18:25 (2) 18:41 (2)	07:39 17:50	16:57 (4) 17:13 (4)	07:49 15:39	08:39 15:12	13:59 (6) 17 14:16 (6)
19	04:27 21:43	05:30 20:35	06:36 19:10	18:25 (2) 18:39 (2)	07:41 17:47	16:57 (4) 17:11 (4)	07:51 15:37	08:40 15:12	14:00 (6) 16 14:16 (6)
20	04:29 21:41	05:32 20:32	06:38 19:07	18:26 (2) 18:36 (2)	07:43 17:45	16:58 (4) 17:09 (4)	07:53 15:36	08:41 15:13	14:00 (6) 17 14:17 (6)
21	04:31 21:40	05:34 20:30	06:40 19:04	18:28 (2) 18:33 (2)	07:45 17:42	17:01 (4) 17:07 (4)	07:56 15:34	08:41 15:13	14:00 (6) 17 14:17 (6)
22	04:33 21:38	05:36 20:27	06:42 19:01	07:48 17:40	07:58 15:32	07:58 15:32	08:42 15:13	14:01 (6) 17 14:18 (6)	
23	04:34 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	08:00 15:31	08:42 15:14	14:01 (6) 17 14:18 (6)	
24	04:36 21:34	05:41 20:22	06:46 18:56	07:52 17:34	08:02 15:29	08:02 15:29	08:43 15:15	14:02 (6) 16 14:18 (6)	
25	04:38 21:32	05:43 20:19	06:49 18:53	06:54 16:32	08:04 15:28	08:04 15:28	08:43 15:15	14:02 (6) 17 14:19 (6)	
26	04:40 21:30	05:45 20:16	06:51 18:50	06:57 16:29	08:06 15:26	08:06 15:26	08:43 15:16	14:03 (6) 17 14:20 (6)	
27	04:42 21:28	05:47 20:14	06:53 18:47	06:59 16:27	08:08 15:25	08:08 15:25	08:43 15:17	14:04 (6) 16 14:20 (6)	
28	04:44 21:26	05:49 20:11	06:55 18:45	07:01 16:24	08:10 15:24	08:10 15:24	08:44 15:18	14:03 (6) 17 14:20 (6)	
29	04:46 21:24	05:51 20:08	06:57 18:42	07:03 16:22	08:12 15:22	08:12 15:22	08:44 15:19	14:04 (6) 17 14:21 (6)	
30	04:48 21:22	05:54 20:06	06:59 18:39	17:15 (3) 17:55 (1)	07:06 16:20	08:14 15:21	13:58 (6) 14:02 (6)	08:44 15:20	14:05 (6) 16 14:21 (6)
31	04:50 21:20	05:56 20:03		07:08 16:17			08:43 15:21	14:06 (6) 16 14:22 (6)	
Potential sun hours	538	474	386	321	241	207			
Total, worst case			174	505	127	480			
Sun reduction			0,31	0,26	0,17	0,13			
Oper. time red.			0,99	0,99	0,99	0,99			
Wind dir. red.			0,65	0,68	0,69	0,70			
Total reduction			0,20	0,17	0,12	0,09			
Total, real			35	88	15	44			

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:11>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (872)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	18:56 (A0019) 19:03 (A0019)	05:11 20:44
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	18:53 (A0019) 19:05 (A0019)	20:44 21:47
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:42	18:52 (A0019) 19:06 (A0019)	20:46 21:48
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	18:51 (A0019) 19:06 (A0019)	20:47 21:50
5	08:41 15:28	07:55 16:33	06:46 17:38	06:20 19:47	18:51 (A0019) 19:06 (A0019)	20:51 21:51
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	18:50 (A0019) 19:06 (A0019)	20:53 21:52
7	08:40 15:32	07:51 16:37	06:40 17:43	16:42 (A0021) 16:53 (A0021)	18:50 (A0019) 19:05 (A0019)	20:57 21:53
8	08:39 15:33	07:49 16:40	06:37 17:45	16:39 (A0021) 16:55 (A0021)	18:51 (A0019) 19:05 (A0019)	20:54 21:55
9	08:38 15:35	07:46 16:42	06:35 17:47	16:37 (A0021) 16:56 (A0021)	18:52 (A0019) 19:03 (A0019)	20:59 21:02
10	08:38 15:37	07:44 16:45	15:32 (A0022) 15:42 (A0022)	06:32 17:49	18:54 (A0019) 19:00 (A0019)	20:57 21:04
11	08:37 15:38	07:42 16:47	15:32 (A0022) 15:46 (A0022)	06:29 17:52	19:05 (A0019) 20:00	20:59 21:06
12	08:36 15:40	07:39 16:49	15:30 (A0022) 15:47 (A0022)	06:26 17:54	19:03 (A0019) 21:08	21:02 21:59
13	08:34 15:42	07:37 16:52	15:29 (A0022) 15:49 (A0022)	06:24 17:56	19:00 (A0019) 21:10	21:04 21:59
14	08:33 15:44	07:35 16:54	15:28 (A0022) 15:49 (A0022)	06:21 17:58	19:25 (A0018) 19:32 (A0018)	21:04 22:00
15	08:32 15:46	07:32 16:56	15:27 (A0022) 15:50 (A0022)	06:18 18:01	19:23 (A0018) 19:34 (A0018)	21:09 22:01
16	08:31 15:48	07:30 16:59	15:27 (A0022) 15:51 (A0022)	06:15 18:03	19:21 (A0018) 19:34 (A0018)	21:14 22:02
17	08:30 15:50	07:27 17:01	15:27 (A0022) 15:51 (A0022)	06:13 18:05	19:21 (A0018) 19:35 (A0018)	21:16 22:02
18	08:28 15:52	07:25 17:03	15:26 (A0022) 15:50 (A0022)	06:10 18:07	19:20 (A0018) 19:34 (A0018)	21:18 22:03
19	08:27 15:54	07:22 17:06	15:27 (A0022) 15:51 (A0022)	06:07 18:09	19:21 (A0018) 19:35 (A0018)	21:20 22:03
20	08:25 15:56	07:20 17:08	15:27 (A0022) 15:50 (A0022)	06:04 18:12	19:21 (A0018) 19:34 (A0018)	21:22 22:03
21	08:24 15:58	07:17 17:10	15:27 (A0022) 15:49 (A0022)	06:01 18:14	19:22 (A0018) 19:33 (A0018)	21:24 22:04
22	08:22 16:01	07:15 17:13	15:28 (A0022) 15:49 (A0022)	05:59 18:16	19:23 (A0018) 19:31 (A0018)	21:26 22:04
23	08:20 16:03	07:12 17:15	15:29 (A0022) 15:48 (A0022)	05:56 18:18	19:26 (A0018) 19:28 (A0018)	21:28 22:04
24	08:19 16:05	07:09 17:17	15:30 (A0022) 15:46 (A0022)	05:53 18:20	21:30 21:32	22:04 22:04
25	08:17 16:07	07:07 17:20	15:33 (A0022) 15:45 (A0022)	05:50 18:23	21:33 21:33	22:04 22:04
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	21:35 21:35	22:04 22:04
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	21:37 21:37	22:04 22:04
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	21:39 21:39	22:04 22:04
29	08:10 16:16		06:39 19:31	05:16 20:40	21:44 21:40	22:02 22:03
30	08:08 16:19		06:36 19:34	05:13 20:42	21:43 21:42	22:03 22:03
31	08:06 16:21		06:34 19:36		21:42 21:44	22:03 22:03
Potential sun hours	228	263	366	429	515	539
Total, worst case		312	279	232		
Sun reduction		0,16	0,22	0,42		
Oper. time red.		0,99	0,99	0,99		
Wind dir. red.		0,69	0,67	0,63		
Total reduction		0,11	0,15	0,27		
Total, real		35	42	62		

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:11>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (872)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:02	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	15:04 (A0022) 15:21
2	04:04 22:02	04:55 21:16	06:00 19:57	18:53 (A0019) 18:59 (A0019)	07:04 18:34	17:14 (A0021) 16:13
3	04:05 22:01	04:57 21:13	06:02 19:55	18:50 (A0019) 19:01 (A0019)	07:06 18:31	17:14 (A0021) 16:10
4	04:06 22:01	04:59 21:11	06:04 19:52	18:48 (A0019) 19:02 (A0019)	07:08 18:28	17:14 (A0021) 16:08
5	04:07 22:00	05:01 21:09	06:07 19:49	18:47 (A0019) 19:02 (A0019)	07:10 18:25	17:16 (A0021) 16:06
6	04:08 21:59	05:03 21:07	06:09 19:46	18:46 (A0019) 19:02 (A0019)	07:12 18:22	17:17 (A0021) 16:04
7	04:10 21:58	05:05 21:04	06:11 19:44	18:46 (A0019) 19:02 (A0019)	07:14 18:20	17:20 (A0021) 16:01
8	04:11 21:57	05:07 21:02	06:13 19:41	18:46 (A0019) 19:01 (A0019)	07:17 18:17	17:27 (A0021) 15:59
9	04:12 21:56	05:09 21:00	06:15 19:38	18:46 (A0019) 19:00 (A0019)	07:19 18:14	17:29 15:57
10	04:14 21:55	05:11 20:57	06:17 19:35	18:47 (A0019) 18:58 (A0019)	07:21 18:12	17:31 15:55
11	04:15 21:54	05:13 20:55	06:19 19:32	18:48 (A0019) 18:56 (A0019)	07:23 18:09	17:33 15:53
12	04:16 21:53	05:15 20:52	06:21 19:30	18:48 (A0019) 18:06	07:25 18:06	17:36 15:51
13	04:18 21:51	05:18 20:50	06:23 19:27	18:48 (A0019) 18:03	07:27 18:03	17:38 15:49
14	04:19 21:50	05:20 20:47	06:25 19:24	18:48 (A0019) 18:01	07:30 18:01	17:40 15:47
15	04:21 21:49	05:22 20:45	06:28 19:21	18:48 (A0019) 17:58	07:32 17:58	17:42 15:45
16	04:23 21:47	05:24 20:42	06:30 19:18	18:48 (A0019) 17:55	07:34 17:55	16:07 (A0022) 15:43
17	04:24 21:46	05:26 20:40	06:32 19:16	18:48 (A0019) 17:53	07:36 17:53	16:03 (A0022) 15:41
18	04:26 21:44	05:28 20:37	06:34 19:13	18:48 (A0019) 17:50	07:39 17:50	16:02 (A0022) 15:39
19	04:28 21:43	05:30 20:35	06:36 19:10	18:48 (A0019) 17:48	07:41 17:48	16:00 (A0022) 15:38
20	04:29 21:41	05:33 20:32	19:31 (A0018) 19:35 (A0018)	17:43 17:45	15:58 (A0022) 16:20 (A0022)	07:53 15:36
21	04:31 21:39	05:35 20:30	19:28 (A0018) 19:37 (A0018)	17:45 17:42	16:20 (A0022) 16:21 (A0022)	15:36 15:34
22	04:33 21:38	05:37 20:27	19:26 (A0018) 19:38 (A0018)	17:48 17:40	15:57 (A0022) 16:21 (A0022)	07:58 15:33
23	04:35 21:36	05:39 20:24	19:25 (A0018) 19:38 (A0018)	17:40 17:35	16:21 (A0022) 16:21 (A0022)	15:33 15:31
24	04:37 21:34	05:41 20:22	19:25 (A0018) 19:38 (A0018)	17:37 17:36	16:21 (A0022) 16:21 (A0022)	15:31 15:30
25	04:39 21:32	05:43 20:19	19:24 (A0018) 19:38 (A0018)	17:35 17:37	16:21 (A0022) 16:32	15:30 15:28
26	04:41 21:30	05:45 20:16	19:24 (A0018) 19:38 (A0018)	17:37 17:38	16:32 16:30	15:28 15:27
27	04:43 21:28	05:47 20:14	19:24 (A0018) 19:37 (A0018)	17:38 17:38	16:30 16:27	15:27 15:25
28	04:44 21:26	05:50 20:11	19:25 (A0018) 19:35 (A0018)	17:38 17:38	16:27 16:25	15:25 15:24
29	04:46 21:24	05:52 20:08	19:26 (A0018) 19:33 (A0018)	17:15 (A0021) 17:39 (A0021)	16:03 16:22	14:59 (A0022) 15:23
30	04:48 21:22	05:54 20:06	18:42 18:39	17:14 (A0021) 17:38 (A0021)	16:22 16:20	15:18 (A0022) 15:22
31	04:50 21:20	05:56 20:03		17:08 16:17	15:02 (A0022) 15:15 (A0022)	15:22 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case		109	284	441	7	
Sun reduction		0,35	0,31	0,26	0,17	
Oper. time red.		0,99	0,99	0,99	0,99	
Wind dir. red.		0,61	0,66	0,69	0,69	
Total reduction		0,22	0,21	0,18	0,12	
Total, real		23	58	78	1	

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:12>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (820)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	18:59 (A0019) 19:02 (A0019)	05:11 20:44
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	18:55 (A0019) 19:05 (A0019)	05:08 20:46
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:42	18:53 (A0019) 19:06 (A0019)	05:06 20:49
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	18:52 (A0019) 19:06 (A0019)	05:04 20:51
5	08:41 15:28	07:55 16:33	06:46 17:38	06:20 19:47	18:52 (A0019) 19:07 (A0019)	05:01 20:53
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	18:51 (A0019) 19:07 (A0019)	04:59 20:55
7	08:40 15:32	07:51 16:37	06:40 17:43	06:14 16:43 (A0021) 16:52 (A0021)	18:51 (A0019) 19:06 (A0019)	04:57 20:57
8	08:39 15:33	07:49 16:40	06:37 17:45	06:11 16:40 (A0021) 16:54 (A0021)	18:52 (A0019) 19:06 (A0019)	04:54 20:59
9	08:38 15:35	07:46 16:42	06:35 17:47	06:09 16:38 (A0021) 16:56 (A0021)	18:52 (A0019) 19:05 (A0019)	04:52 21:02
10	08:38 15:37	07:44 16:45	06:32 15:32 (A0022) 15:41 (A0022)	06:06 16:36 (A0021) 16:57 (A0021)	18:53 (A0019) 19:03 (A0019)	04:50 21:04
11	08:37 15:38	07:42 16:47	06:29 15:44 (A0022) 17:52	06:03 16:36 (A0021) 16:58 (A0021)	18:56 (A0019) 19:00 (A0019)	04:48 21:06
12	08:36 15:40	07:39 16:49	06:26 15:28 (A0022) 17:54	06:00 16:35 (A0021) 16:58 (A0021)	04:45 21:08	21:08
13	08:34 15:42	07:37 16:52	06:24 15:28 (A0022) 17:56	05:58 16:34 (A0021) 16:58 (A0021)	04:43 21:10	21:10
14	08:33 15:44	07:35 16:54	06:21 15:26 (A0022) 17:58	05:55 16:33 (A0021) 16:58 (A0021)	19:29 (A0018) 19:31 (A0018)	04:41 21:12
15	08:32 15:46	07:32 16:56	06:18 15:25 (A0022) 18:01	05:52 16:33 (A0021) 16:57 (A0021)	19:25 (A0018) 19:34 (A0018)	04:39 21:14
16	08:31 15:48	07:30 16:59	06:15 15:25 (A0022) 18:03	05:50 16:34 (A0021) 16:58 (A0021)	19:23 (A0018) 19:35 (A0018)	04:37 21:16
17	08:30 15:50	07:27 17:01	06:13 15:25 (A0022) 18:05	05:47 16:34 (A0021) 16:57 (A0021)	19:23 (A0018) 19:36 (A0018)	04:35 21:18
18	08:28 15:52	07:25 17:03	06:10 15:24 (A0022) 18:07	05:44 16:34 (A0021) 16:56 (A0021)	19:22 (A0018) 19:36 (A0018)	04:33 21:20
19	08:27 15:54	07:22 17:06	06:07 15:25 (A0022) 18:09	05:42 16:35 (A0021) 16:54 (A0021)	19:22 (A0018) 19:36 (A0018)	04:31 21:22
20	08:25 15:56	07:20 17:08	06:04 15:25 (A0022) 18:12	05:39 16:37 (A0021) 16:52 (A0021)	19:21 (A0018) 19:35 (A0018)	04:29 21:24
21	08:24 15:58	07:17 17:11	06:01 15:25 (A0022) 18:14	05:36 16:39 (A0021) 16:49 (A0021)	19:22 (A0018) 19:35 (A0018)	04:27 21:26
22	08:22 16:01	07:15 17:13	05:59 15:26 (A0022) 18:16	05:34 20:22 20:24	19:22 (A0018) 19:33 (A0018)	04:26 21:28
23	08:20 16:03	07:12 17:15	05:56 15:27 (A0022) 18:18	05:31 20:26	19:24 (A0018) 19:32 (A0018)	04:24 21:30
24	08:19 16:05	07:09 17:17	05:53 15:28 (A0022) 18:20	05:29 20:29	04:22 21:32	21:32
25	08:17 16:07	07:07 17:20	05:50 15:31 (A0022) 18:23	05:26 20:31	04:20 21:33	21:33
26	08:15 16:09	07:04 17:22	05:47 15:35 (A0022) 18:25	05:23 20:33	04:19 21:35	21:35
27	08:13 16:12	07:02 17:24	05:45 15:40 (A0022) 18:27	05:21 20:35	04:17 21:37	21:37
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 20:38	04:16 21:39	21:39
29	08:10 16:16		06:39 19:31	05:16 20:40	04:14 21:40	21:40
30	08:08 16:19		06:36 19:34	05:13 20:42	04:13 21:42	21:42
31	08:06 16:21		06:34 19:36		04:12 21:44	21:44
Potential sun hours	228	263	366	429	515	539
Total, worst case		327	293	237	1	375
Sun reduction		0,16	0,22	0,42	0,53	0,43
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,69	0,67	0,62	0,57	0,57
Total reduction		0,11	0,15	0,27	0,31	0,25
Total, real		37	44	63	0	92

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:12>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (820)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July	August	September	October	November	December
1	04:03 22:02 14	21:02 (A0017) 21:18 21:16 (A0017) 04:55	05:58 20:00 4	18:55 (A0019) 18:36 24	17:14 (A0021) 17:38 (A0021) 16:15	15:02 (A0022) 15:10 (A0022) 15:21
2	04:04 22:02 13	21:03 (A0017) 21:16 21:16 (A0017) 04:57	06:00 19:57 10	18:52 (A0019) 18:34 23	17:13 (A0021) 17:36 (A0021) 16:13	15:18 15:20 15:19
3	04:05 22:01 13	21:03 (A0017) 21:13 21:16 (A0017) 04:59	06:02 19:55 13	18:50 (A0019) 18:31 21	17:14 (A0021) 17:35 (A0021) 16:10	15:17 15:19 15:18
4	04:06 22:01 12	21:04 (A0017) 21:11 21:16 (A0017) 05:01	06:04 19:52 14	18:49 (A0019) 18:28 20	17:14 (A0021) 17:34 (A0021) 16:08	15:17 15:18 15:17
5	04:07 22:00 12	21:04 (A0017) 21:09 21:16 (A0017) 05:03	06:07 19:49 15	18:48 (A0019) 18:25 17	17:16 (A0021) 17:33 (A0021) 16:06	15:17 15:17 15:17
6	04:08 21:59 12	21:04 (A0017) 21:07 21:16 (A0017) 05:05	06:09 19:46 16	18:47 (A0019) 18:22 12	17:18 (A0021) 17:30 (A0021) 16:04	15:17 15:16 15:16
7	04:10 21:58 11	21:05 (A0017) 21:04 21:16 (A0017) 05:07	06:11 19:44 15	18:47 (A0019) 18:20 4	17:21 (A0021) 17:25 (A0021) 16:01	15:15 15:15 15:15
8	04:11 21:57 10	21:05 (A0017) 21:02 21:15 (A0017) 05:09	06:13 19:41 15	18:47 (A0019) 18:17 15	17:25 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
9	04:12 21:56 8	21:06 (A0017) 21:00 21:14 (A0017) 05:11	06:15 19:38 13	18:47 (A0019) 18:14 13	17:29 (A0021) 17:31 (A0021) 16:01	15:15 15:15 15:15
10	04:14 21:55 7	21:07 (A0017) 20:57 21:14 (A0017) 05:13	06:17 19:35 10	18:48 (A0019) 18:12 10	17:31 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
11	04:15 21:54 5	21:08 (A0017) 20:55 21:13 (A0017) 05:15	06:19 19:32 4	18:51 (A0019) 18:09 18:55 (A0019)	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
12	04:16 21:53 3	21:09 (A0017) 20:52 21:12 (A0017) 05:18	06:21 19:30 20:52	18:55 (A0019) 18:06 18:06	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
13	04:18 21:51 14	21:10 (A0017) 20:50 21:16 (A0017) 05:20	06:23 19:27 20:50	18:55 (A0019) 18:03 18:03	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
14	04:19 21:50 15	21:11 (A0017) 20:47 21:16 (A0017) 05:22	06:25 19:24 20:47	18:55 (A0019) 18:01 18:01	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
15	04:21 21:49 16	21:12 (A0017) 20:45 21:16 (A0017) 05:24	06:28 19:21 20:45	18:55 (A0019) 17:58 17:58	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
16	04:23 21:47 17	21:13 (A0017) 20:42 21:16 (A0017) 05:26	06:30 19:18 20:42	18:55 (A0019) 17:55 17:55	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
17	04:24 21:46 18	21:14 (A0017) 20:40 21:16 (A0017) 05:28	06:32 19:16 20:40	18:55 (A0019) 17:53 17:53	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
18	04:26 21:44 19	21:15 (A0017) 20:37 21:16 (A0017) 05:30	06:34 19:13 20:37	18:55 (A0019) 17:50 17:50	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
19	04:28 21:43 20	21:16 (A0017) 20:35 21:16 (A0017) 05:32	06:36 19:10 20:35	18:55 (A0019) 17:48 17:48	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
20	04:29 21:41 21	21:17 (A0017) 20:32 21:16 (A0017) 05:35	06:38 19:07 20:32	18:55 (A0019) 17:45 17:45	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
21	04:31 21:39 22	21:18 (A0017) 20:30 21:16 (A0017) 05:37	06:40 19:04 20:30	18:55 (A0019) 17:42 17:42	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
22	04:33 21:38 23	21:19 (A0017) 20:27 21:16 (A0017) 05:39	06:42 19:02 20:27	18:55 (A0019) 17:40 17:40	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
23	04:35 21:36 24	21:20 (A0017) 20:24 21:16 (A0017) 05:41	06:44 18:59 20:24	18:55 (A0019) 17:36 (A0021) 17:36	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
24	04:37 21:34 25	21:21 (A0017) 20:22 21:16 (A0017) 05:43	06:47 18:56 20:22	18:55 (A0019) 17:33 (A0021) 17:33	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
25	04:39 21:32 26	21:22 (A0017) 20:19 21:16 (A0017) 05:45	06:49 18:53 20:19	18:55 (A0019) 17:30 (A0021) 17:30	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
26	04:41 21:30 27	21:23 (A0017) 20:16 21:16 (A0017) 05:47	06:51 18:50 20:16	18:55 (A0019) 17:26 (A0021) 17:26	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
27	04:43 21:28 28	21:24 (A0017) 20:14 21:16 (A0017) 05:50	06:53 18:47 20:14	18:55 (A0019) 17:23 (A0021) 17:23	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
28	04:44 21:26 29	21:25 (A0017) 20:11 21:16 (A0017) 05:52	06:55 18:45 20:11	18:55 (A0019) 17:20 (A0021) 17:20	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
29	04:46 21:24 30	21:26 (A0017) 20:08 21:16 (A0017) 05:54	06:57 18:42 20:08	18:55 (A0019) 17:17 (A0021) 17:17	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
30	04:48 21:22 31	21:27 (A0017) 20:06 21:16 (A0017) 05:56	06:59 18:39 20:06	18:55 (A0019) 17:14 (A0021) 17:14	17:33 (A0021) 17:33 (A0021) 16:01	15:15 15:15 15:15
Potential sun hours	538	474	386	321	241	207
Total, worst case	120	107	306	443	8	
Sun reduction	0,38	0,35	0,31	0,26	0,17	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,57	0,61	0,66	0,69	0,69	
Total reduction	0,22	0,22	0,21	0,18	0,12	
Total, real	27	23	63	79	1	

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:6>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (821)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	19:25 (A0021) 20:11 (A0019)
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	18:38 (A0022) 18:44 (A0022)	19:25 (A0021) 20:12 (A0019)
3	08:42 15:26	07:59 16:28	06:51 17:34	06:25 19:42	18:34 (A0022) 18:47 (A0022)	19:25 (A0021) 20:12 (A0019)
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	18:31 (A0022) 18:49 (A0022)	19:25 (A0021) 20:12 (A0019)
5	08:41 15:28	07:55 16:33	06:46 17:38	06:20 19:47	18:30 (A0022) 18:51 (A0022)	19:26 (A0021) 20:12 (A0019)
6	08:41 15:30	07:53 16:35	06:43 17:40	06:17 19:49	18:28 (A0022) 18:52 (A0022)	19:26 (A0021) 20:12 (A0019)
7	08:40 15:32	07:51 16:37	06:40 17:43	06:14 19:51	18:27 (A0022) 18:52 (A0022)	19:27 (A0021) 20:12 (A0019)
8	08:39 15:33	07:49 16:40	06:37 17:45	06:11 19:53	18:27 (A0022) 18:53 (A0022)	19:28 (A0021) 20:11 (A0019)
9	08:38 15:35	07:46 16:42	06:35 17:47	06:09 19:56	18:26 (A0022) 18:53 (A0022)	19:30 (A0021) 20:10 (A0019)
10	08:37 15:37	07:44 16:45	06:32 17:49	06:06 19:58	18:25 (A0022) 18:52 (A0022)	19:32 (A0021) 20:09 (A0019)
11	08:36 15:38	07:42 16:47	06:29 17:52	06:03 20:00	18:26 (A0022) 18:53 (A0022)	04:48 21:06
12	08:35 15:40	07:39 16:49	06:26 17:54	06:00 20:02	18:25 (A0022) 18:52 (A0022)	04:45 21:08
13	08:34 15:42	07:37 16:52	06:24 17:56	05:58 20:04	18:25 (A0022) 18:51 (A0022)	04:43 21:10
14	08:33 15:44	07:34 16:54	06:21 17:58	05:55 20:07	18:26 (A0022) 18:51 (A0022)	04:41 21:12
15	08:32 15:46	07:32 16:56	06:18 18:01	05:52 20:09	18:26 (A0022) 18:50 (A0022)	04:39 21:14
16	08:31 15:48	07:30 16:59	06:15 18:03	05:50 20:11	18:26 (A0022) 18:48 (A0022)	04:37 21:16
17	08:29 15:50	07:27 17:01	06:13 18:05	05:47 20:13	18:28 (A0022) 18:48 (A0022)	04:35 21:18
18	08:28 15:52	07:25 17:03	06:10 18:07	05:44 20:15	18:29 (A0022) 18:45 (A0022)	04:33 21:20
19	08:27 15:54	07:22 17:06	06:07 18:09	05:42 20:18	18:32 (A0022) 18:43 (A0022)	04:31 21:22
20	08:25 15:56	07:20 17:08	06:04 18:12	05:39 20:20	04:29 21:24	03:58 22:03
21	08:24 15:58	07:17 17:11	06:01 18:14	05:36 20:22	04:27 21:26	03:59 22:04
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:24	04:26 21:28	03:59 22:04
23	08:20 16:03	07:12 17:15	05:56 18:18	05:31 20:26	19:35 (A0021) 19:41 (A0021)	04:24 21:30
24	08:19 16:05	07:09 17:17	05:53 18:20	05:29 20:29	19:31 (A0021) 19:43 (A0021)	04:22 21:32
25	08:17 16:07	07:07 17:20	05:50 18:23	05:26 20:31	19:29 (A0021) 19:45 (A0021)	04:21 21:33
26	08:15 16:09	07:04 17:22	05:47 18:25	05:23 20:33	19:28 (A0021) 19:47 (A0021)	04:19 21:35
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 20:35	19:27 (A0021) 19:47 (A0021)	04:17 21:37
28	08:11 16:14	06:59 17:27	05:42 18:29	05:18 20:37	19:26 (A0021) 19:48 (A0021)	04:16 21:39
29	08:10 16:16	06:39 19:31	05:16 20:40	05:16 20:40	19:25 (A0021) 19:47 (A0021)	04:14 21:40
30	08:08 16:19	06:36 19:34	05:13 20:42	05:13 20:42	19:25 (A0021) 20:08 (A0019)	04:13 21:42
31	08:06 16:21	06:34 19:36			04:12 21:44	22:03
Potential sun hours	228	263	366	429	515	538
Total, worst case				531		308
Sun reduction				0,42		0,53
Oper. time red.				0,99		0,99
Wind dir. red.				0,63		0,60
Total reduction				0,27		0,31
Total, real				142		97

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:6>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (821)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October	November	December	
1	04:04 22:02	04:53 21:18		05:58 20:00	27	18:25 (A0022) 18:52 (A0022)	07:01 18:36	07:10 16:15	08:15 15:21
2	04:04 22:02	04:55 21:16	11	19:44 (A0021) 20:18 (A0019)	27	18:24 (A0022) 18:51 (A0022)	07:04 18:34	07:13 16:13	08:17 15:20
3	04:05 22:01	04:57 21:13	20	19:41 (A0021) 20:20 (A0019)	27	18:24 (A0022) 18:51 (A0022)	07:06 18:31	07:15 16:10	08:19 15:19
4	04:06 22:01	04:59 21:11	25	19:39 (A0021) 20:20 (A0019)	26	18:24 (A0022) 18:50 (A0022)	07:08 18:28	07:17 16:08	08:21 15:18
5	04:07 22:00	05:01 21:09	30	19:37 (A0021) 20:21 (A0019)	25	18:24 (A0022) 18:49 (A0022)	07:10 18:25	07:20 16:06	08:22 15:17
6	04:09 21:59	05:03 21:07	32	19:36 (A0021) 20:21 (A0019)	24	18:24 (A0022) 18:48 (A0022)	07:12 18:22	07:22 16:04	08:24 15:16
7	04:10 21:58	05:05 21:04	34	19:35 (A0021) 20:21 (A0019)	21	18:25 (A0022) 18:46 (A0022)	07:14 18:20	07:24 16:01	08:26 15:15
8	04:11 21:57	05:07 21:02	35	19:35 (A0021) 20:21 (A0019)	18	18:26 (A0022) 18:44 (A0022)	07:17 18:17	07:26 15:59	08:27 15:15
9	04:12 21:56	05:09 21:00	36	19:34 (A0021) 20:21 (A0019)	14	18:28 (A0022) 18:42 (A0022)	07:19 18:14	07:29 15:57	08:29 15:14
10	04:14 21:55	05:11 20:57	36	19:34 (A0021) 20:21 (A0019)	7	18:31 (A0022) 18:38 (A0022)	07:21 18:12	07:31 15:55	08:30 15:14
11	04:15 21:54	05:13 20:55	35	19:34 (A0021) 20:20 (A0019)			07:23 18:09	07:33 15:53	08:31 15:13
12	04:16 21:53	05:16 20:52	32	19:34 (A0021) 20:19 (A0019)			07:25 18:06	07:36 15:51	08:33 15:13
13	04:18 21:51	05:18 20:50	27	19:34 (A0021) 20:16 (A0019)			07:27 18:03	07:38 15:49	08:34 15:13
14	04:19 21:50	05:20 20:47	22	19:34 (A0021) 19:56 (A0021)			07:30 18:01	07:40 15:47	08:35 15:13
15	04:21 21:49	05:22 20:45	21	19:34 (A0021) 19:55 (A0021)			07:32 17:58	07:42 15:45	08:36 15:12
16	04:23 21:47	05:24 20:42	20	19:34 (A0021) 19:54 (A0021)			07:34 17:55	07:45 15:43	08:37 15:12
17	04:24 21:46	05:26 20:40	18	19:35 (A0021) 19:53 (A0021)			07:36 17:53	07:47 15:41	08:38 15:13
18	04:26 21:44	05:28 20:37	15	19:36 (A0021) 19:51 (A0021)			07:39 17:50	07:49 15:40	08:39 15:13
19	04:28 21:43	05:30 20:35	11	19:38 (A0021) 19:49 (A0021)			07:41 17:48	07:51 15:38	08:40 15:13
20	04:29 21:41	05:33 20:32	4	19:41 (A0021) 19:45 (A0021)			07:43 17:45	07:53 15:36	08:40 15:13
21	04:31 21:39	05:35 20:30		06:40 19:04			07:45 17:42	07:55 15:34	08:41 15:14
22	04:33 21:38	05:37 20:27		06:42 19:02			07:47 17:40	07:58 15:33	08:41 15:14
23	04:35 21:36	05:39 20:24	3	18:40 (A0022) 18:43 (A0022)			07:50 17:37	08:00 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22	12	18:35 (A0022) 18:47 (A0022)			07:52 17:35	08:02 15:30	08:42 15:15
25	04:39 21:32	05:43 20:19	16	18:33 (A0022) 18:49 (A0022)			06:54 16:32	08:04 15:28	08:43 15:16
26	04:41 21:30	05:45 20:16	19	18:31 (A0022) 18:50 (A0022)			06:57 16:30	08:06 15:27	08:43 15:17
27	04:43 21:28	05:47 20:14	22	18:29 (A0022) 18:51 (A0022)			06:59 16:27	08:08 15:25	08:43 15:17
28	04:45 21:26	05:50 20:11	24	18:28 (A0022) 18:52 (A0022)			07:01 16:25	08:10 15:24	08:43 15:18
29	04:46 21:24	05:52 20:08	25	18:27 (A0022) 18:52 (A0022)			07:03 16:22	08:12 15:23	08:43 15:19
30	04:48 21:22	05:54 20:06	26	18:26 (A0022) 18:52 (A0022)			07:06 16:20	08:14 15:22	08:43 15:20
31	04:51 21:20	05:56 20:03	27	18:25 (A0022) 18:52 (A0022)			07:08 16:18	08:43 15:21	08:43 15:21
Potential sun hours	538	474		386			321	241	207
Total, worst case		638		216					
Sun reduction		0,35		0,31					
Oper. time red.		0,99		0,99					
Wind dir. red.		0,61		0,65					
Total reduction		0,21		0,20					
Total, real		137		43					

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

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

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (819)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	05:08 20:46	04:09 21:47
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:42	18:57 (A0019) 19:06 (A0019)	05:06 20:49
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	18:55 (A0019) 19:07 (A0019)	05:04 20:51
5	08:41 15:28	07:55 16:33	06:46 17:38	06:20 19:47	18:54 (A0019) 19:09 (A0019)	05:01 20:53
6	08:41 15:30	07:53 16:35	06:43 17:40	16:41 (A0021) 16:45 (A0021)	18:53 (A0019) 19:09 (A0019)	04:59 20:55
7	08:40 15:32	07:51 16:37	15:21 (A0022) 17:43	06:40 16:36 (A0021)	18:52 (A0019) 19:09 (A0019)	04:57 20:57
8	08:38 15:33	07:49 16:40	15:18 (A0022) 17:45	06:37 16:34 (A0021)	18:53 (A0019) 19:09 (A0019)	04:54 20:59
9	08:38 15:35	07:46 16:42	15:17 (A0022) 17:47	06:35 16:32 (A0021)	18:52 (A0019) 19:09 (A0019)	04:52 21:02
10	08:38 15:37	07:44 16:45	15:15 (A0022) 17:49	06:32 16:30 (A0021)	18:52 (A0019) 19:07 (A0019)	04:50 21:04
11	08:37 15:38	07:42 16:47	15:14 (A0022) 17:52	06:29 16:30 (A0021)	18:54 (A0019) 19:07 (A0019)	04:48 21:06
12	08:36 15:40	07:39 16:49	15:13 (A0022) 17:54	06:26 16:29 (A0021)	18:55 (A0019) 19:05 (A0019)	04:45 21:08
13	08:34 15:42	07:37 16:52	15:13 (A0022) 17:56	06:24 16:28 (A0021)	18:57 (A0019) 19:01 (A0019)	04:43 21:10
14	08:33 15:44	07:35 16:54	15:12 (A0022) 17:58	06:21 16:27 (A0021)	18:55 (A0019) 19:05 (A0019)	04:41 21:08
15	08:32 15:46	07:32 16:56	15:12 (A0022) 18:01	06:18 16:27 (A0021)	18:57 (A0019) 19:01 (A0019)	04:39 21:10
16	08:31 15:48	07:30 16:59	15:12 (A0022) 18:03	06:15 16:28 (A0021)	19:31 (A0018) 19:34 (A0018)	04:37 21:16
17	08:30 15:50	07:27 17:01	15:12 (A0022) 18:05	06:13 16:28 (A0021)	19:28 (A0018) 19:37 (A0018)	04:35 21:18
18	08:28 15:52	07:25 17:03	15:12 (A0022) 18:07	06:10 16:28 (A0021)	19:26 (A0018) 19:38 (A0018)	04:33 21:20
19	08:27 15:54	07:22 17:06	15:13 (A0022) 18:09	06:07 16:29 (A0021)	19:26 (A0018) 19:39 (A0018)	04:31 21:22
20	08:25 15:56	07:20 17:08	15:13 (A0022) 18:12	06:04 16:30 (A0021)	19:25 (A0018) 19:39 (A0018)	04:29 21:24
21	08:24 15:58	07:17 17:11	15:14 (A0022) 18:14	06:01 16:31 (A0021)	19:25 (A0018) 19:40 (A0018)	04:27 21:26
22	08:22 16:01	07:15 17:13	15:16 (A0022) 18:16	05:59 16:34 (A0021)	19:24 (A0018) 19:39 (A0018)	04:26 21:28
23	08:20 16:03	07:12 17:15	15:17 (A0022) 18:18	05:56 16:34 (A0021)	19:25 (A0018) 19:39 (A0018)	04:24 21:30
24	08:19 16:05	07:09 17:17	15:19 (A0022) 18:20	05:53 16:35 (A0021)	19:25 (A0018) 19:37 (A0018)	04:22 21:32
25	08:17 16:07	07:07 17:20	15:24 (A0022) 18:23	05:50 16:36 (A0021)	19:26 (A0018) 19:36 (A0018)	04:20 21:34
26	08:15 16:09	07:04 17:22	15:28 (A0022) 18:25	05:47 16:37 (A0021)	19:29 (A0018) 19:35 (A0018)	04:19 21:35
27	08:13 16:12	07:02 17:24	05:45 18:27	05:21 16:38 (A0021)	19:35 (A0018) 19:41 (A0018)	04:17 21:37
28	08:12 16:14	06:59 17:27	05:42 18:29	05:18 16:39 (A0021)	19:41 (A0018) 19:47 (A0018)	04:16 21:39
29	08:10 16:16		06:39 19:31	05:16 16:40 (A0021)	19:47 (A0018) 19:53 (A0018)	04:14 21:41
30	08:08 16:19		06:36 19:34	05:13 16:41 (A0021)	19:53 (A0018) 19:59 (A0018)	04:13 21:43
31	08:06 16:21		06:34 19:36	05:11 16:42 (A0021)	19:59 (A0018) 20:05 (A0018)	04:11 21:45
Potential sun hours	228	263	366	429	515	539
Total, worst case		393	352	267		199
Sun reduction		0,16	0,22	0,42		0,43
Oper. time red.		0,99	0,99	0,99		0,99
Wind dir. red.		0,69	0,67	0,62		0,57
Total reduction		0,11	0,15	0,27		0,24
Total, real		44	53	71		48

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (819)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:02 6	21:13 (A0017) 21:18 21:19 (A0017) 04:55	05:58 20:00 13	18:53 (A0019) 18:36 18:51 (A0019) 07:04	07:01 17:08 (A0021) 16:15 17:34 (A0021) 07:13	14:45 (A0022) 15:05 (A0022) 20 14:46 (A0022) 08:17
2	04:04 22:02 5	21:14 (A0017) 21:16 21:19 (A0017) 04:57	06:00 19:57 15	18:51 (A0019) 18:34 18:50 (A0019) 07:06	17:08 (A0021) 16:13 17:08 (A0021) 07:15	15:04 (A0022) 15:20 14:48 (A0022) 08:19
3	04:05 22:01 4	21:15 (A0017) 21:13 21:19 (A0017) 04:59	06:02 19:55 17	18:50 (A0019) 18:31 19:07 (A0019) 07:08	17:08 (A0021) 16:10 17:32 (A0021) 07:17	15:01 (A0022) 15:19 14:51 (A0022) 08:21
4	04:06 22:01 2	21:16 (A0017) 21:11 21:18 (A0017) 05:01	06:04 19:52 16	18:50 (A0019) 18:28 19:06 (A0019) 07:10	17:08 (A0021) 16:08 17:30 (A0021) 07:20	14:58 (A0022) 15:18 14:58 (A0022) 08:22
5	04:07 22:00 6	21:18 (A0017) 21:09 05:03	06:07 19:49 17	18:49 (A0019) 18:25 19:06 (A0019) 07:12	17:10 (A0021) 16:06 17:29 (A0021) 07:22	15:17 15:17 16:04 08:24
6	04:08 21:59 7	05:07 21:07 05:05	06:09 19:46 16	18:49 (A0019) 18:23 19:05 (A0019) 07:14	17:11 (A0021) 16:04 17:27 (A0021) 07:24	15:16 15:16 16:04 08:26
7	04:10 21:58 8	05:07 21:04 05:07	06:11 19:44 15	18:49 (A0019) 18:20 19:04 (A0019) 07:17	17:13 (A0021) 16:01 17:23 (A0021) 07:26	15:15 15:15 16:01 08:27
8	04:11 21:57 9	05:07 21:02 05:09	06:13 19:41 13	18:50 (A0019) 18:17 19:03 (A0019) 07:19	07:26 15:59 17:29 (A0021) 07:29	15:15 15:15 16:01 08:29
9	04:12 21:56 10	05:09 21:00 05:11	06:15 19:38 9	18:51 (A0019) 18:14 19:00 (A0019) 07:21	07:29 15:57 17:27 (A0021) 07:31	15:15 15:14 16:04 08:30
10	04:14 21:55 11	05:11 20:57 05:13	06:17 19:35 15	18:12 18:12 19:04 (A0019) 07:23	15:55 15:55 17:23 (A0021) 07:33	15:14 15:14 16:01 08:31
11	04:15 21:54 12	05:13 20:55 05:15	06:19 19:32 15	18:09 18:09 19:04 (A0019) 07:25	15:53 15:53 17:23 (A0021) 07:36	15:13 15:13 16:01 08:33
12	04:16 21:53 13	05:15 20:52 05:18	06:21 19:30 15	18:06 18:06 19:04 (A0019) 07:27	15:51 15:51 17:23 (A0021) 07:38	15:13 15:13 16:01 08:34
13	04:18 21:51 14	05:18 20:50 05:20	06:23 19:27 15	18:03 18:03 19:04 (A0019) 07:30	15:49 15:49 17:23 (A0021) 07:40	15:13 15:13 16:01 08:35
14	04:19 21:50 15	05:20 20:47 05:22	06:25 19:24 15	18:01 18:01 19:04 (A0019) 07:32	15:47 15:47 17:23 (A0021) 07:42	15:13 15:13 16:01 08:36
15	04:21 21:49 16	05:22 20:45 05:24	06:28 19:21 15	18:01 17:58 19:04 (A0019) 07:34	15:47 15:45 17:23 (A0021) 07:45	15:12 15:12 16:01 08:37
16	04:23 21:47 17	05:24 20:42 05:26	06:30 19:18 15	17:58 17:55 19:04 (A0019) 07:36	15:45 15:43 17:23 (A0021) 07:47	15:12 15:12 16:01 08:38
17	04:24 21:46 18	05:26 20:40 05:28	06:32 19:16 15	17:53 17:53 19:04 (A0019) 07:39	15:43 15:43 17:23 (A0021) 07:49	15:12 15:12 16:01 08:39
18	04:26 21:44 19	05:28 20:37 05:30	06:34 19:13 15	17:39 17:50 19:04 (A0019) 07:41	15:41 15:41 17:23 (A0021) 07:51	15:13 15:13 16:01 08:40
19	04:28 21:43 20	05:30 20:35 05:33	06:36 19:10 15	17:41 17:48 19:04 (A0019) 07:43	15:41 15:41 17:23 (A0021) 07:53	15:13 15:13 16:01 08:41
20	04:29 21:41 21	05:33 20:32 05:35	06:38 19:07 15	17:43 17:45 19:04 (A0019) 07:45	15:41 15:41 17:23 (A0021) 07:55	15:13 15:13 16:01 08:42
21	04:31 21:39 22	05:35 20:30 05:37	06:40 19:04 15	17:21 (A0021) 17:30 (A0021) 17:17 (A0021) 07:48	15:45 (A0022) 15:45 (A0022) 15:43 (A0022) 07:58	15:15 15:13 15:13 08:42
22	04:33 21:38 23	05:37 20:27 05:39	06:42 19:02 15	17:17 (A0021) 17:32 (A0021) 17:15 (A0021) 07:50	15:43 (A0022) 15:33 15:43 (A0022) 08:00	15:13 15:14 15:14 08:42
23	04:35 21:36 24	05:39 20:24 05:41	06:44 18:59 15	17:15 (A0021) 17:37 17:34 (A0021) 07:52	15:43 (A0022) 15:31 15:42 (A0022) 08:02	15:14 15:14 15:15 08:42
24	04:37 21:34 25	05:41 20:22 05:43	06:47 18:56 15	17:13 (A0021) 17:35 (A0021) 17:11 (A0021) 06:54	15:42 (A0022) 15:30 14:42 (A0022) 08:04	15:15 15:15 15:16 08:43
25	04:39 21:32 26	05:43 20:19 05:45	06:49 18:53 15	17:35 (A0021) 16:32 17:10 (A0021) 06:57	15:28 15:28 14:42 (A0022) 08:06	15:16 15:16 15:17 08:43
26	04:41 21:30 27	05:45 20:16 05:47	06:51 18:50 15	17:10 (A0021) 16:30 17:35 (A0021) 06:59	14:42 (A0022) 15:27 15:09 (A0022) 08:08	15:17 15:17 15:18 08:43
27	04:43 21:28 28	05:47 20:14 05:50	06:53 18:48 15	17:09 (A0021) 16:27 17:35 (A0021) 07:01	14:42 (A0022) 15:25 15:09 (A0022) 08:10	15:18 15:17 15:18 08:43
28	04:44 21:26 29	05:50 20:11 05:52	06:55 18:45 15	17:08 (A0021) 16:25 17:35 (A0021) 07:03	14:42 (A0022) 15:24 15:08 (A0022) 08:12	15:18 15:18 15:19 08:43
29	04:46 21:24 30	05:52 20:08 05:54	06:57 18:42 15	17:08 (A0021) 16:22 17:35 (A0021) 07:06	14:43 (A0022) 15:23 15:08 (A0022) 08:14	15:19 15:19 15:20 08:43
30	04:48 21:22 31	05:54 20:06 05:56	06:59 18:39 15	17:08 (A0021) 16:20 17:35 (A0021) 07:08	14:43 (A0022) 15:22 15:07 (A0022) 08:14	15:20 15:20 15:21 08:43
Potential sun hours	538	474	386	321	241	207
Total, worst case	17	141	352	485	58	
Sun reduction	0,38	0,35	0,31	0,26	0,17	
Oper. time red.	0,99	0,99	0,99	0,99	0,99	
Wind dir. red.	0,57	0,60	0,66	0,68	0,69	
Total reduction	0,22	0,22	0,21	0,18	0,12	
Total, real	4	30	73	86	7	

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (923)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	05:11 20:44	04:10 21:45
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	18:56 (A0019) 19:04 (A0019)	05:08 20:46
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:42	18:54 (A0019) 19:06 (A0019)	05:06 20:49
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	18:52 (A0019) 19:06 (A0019)	05:04 20:51
5	08:41 15:28	07:55 16:33	06:46 17:38	16:36 (A0021) 16:43 (A0021)	18:52 (A0019) 19:08 (A0019)	05:01 20:53
6	08:41 15:30	07:53 16:35	15:19 (A0022) 15:27 (A0022)	06:43 17:40	18:51 (A0019) 19:07 (A0019)	04:59 20:55
7	08:40 15:32	07:51 16:37	15:17 (A0022) 15:30 (A0022)	06:40 17:43	18:50 (A0019) 19:07 (A0019)	04:57 20:57
8	08:39 15:33	07:49 16:40	15:14 (A0022) 15:32 (A0022)	06:37 17:45	18:51 (A0019) 19:07 (A0019)	04:54 20:59
9	08:38 15:35	07:46 16:42	15:14 (A0022) 15:34 (A0022)	06:35 17:47	18:51 (A0019) 19:06 (A0019)	04:52 21:02
10	08:38 15:37	07:44 16:45	15:12 (A0022) 15:34 (A0022)	06:32 17:49	18:51 (A0019) 19:05 (A0019)	04:50 21:04
11	08:37 15:38	07:42 16:47	15:12 (A0022) 15:36 (A0022)	06:29 17:52	18:53 (A0019) 19:04 (A0019)	04:48 21:06
12	08:36 15:40	07:39 16:49	15:11 (A0022) 15:36 (A0022)	06:26 17:54	18:55 (A0019) 19:00 (A0019)	04:45 21:08
13	08:34 15:42	07:37 16:52	15:11 (A0022) 15:37 (A0022)	06:24 17:56	18:58 (A0019) 19:04 (A0019)	04:43 21:10
14	08:33 15:44	07:35 16:54	15:11 (A0022) 15:37 (A0022)	06:21 17:58	18:58 (A0019) 19:05 (A0019)	04:41 21:12
15	08:32 15:46	07:32 16:56	15:10 (A0022) 15:37 (A0022)	06:18 18:01	18:59 (A0019) 19:06 (A0019)	04:40 21:14
16	08:31 15:48	07:30 16:59	15:11 (A0022) 15:37 (A0022)	06:15 18:03	19:06 (A0018) 19:35 (A0018)	04:37 21:16
17	08:30 15:50	07:27 17:01	15:11 (A0022) 15:37 (A0022)	06:13 18:05	19:25 (A0018) 19:37 (A0018)	04:35 21:18
18	08:28 15:52	07:25 17:03	15:11 (A0022) 15:36 (A0022)	06:10 18:07	19:24 (A0018) 19:37 (A0018)	04:33 21:20
19	08:27 15:54	07:22 17:06	15:12 (A0022) 15:36 (A0022)	06:07 18:09	19:23 (A0018) 19:38 (A0018)	04:31 21:22
20	08:25 15:56	07:20 17:08	15:12 (A0022) 15:35 (A0022)	06:04 18:12	19:23 (A0018) 19:37 (A0018)	04:29 21:24
21	08:24 15:58	07:17 17:11	15:13 (A0022) 15:33 (A0022)	06:01 18:14	19:23 (A0018) 19:38 (A0018)	04:27 21:26
22	08:22 16:01	07:15 17:13	15:16 (A0022) 15:33 (A0022)	05:59 18:16	19:23 (A0018) 19:37 (A0018)	04:26 21:28
23	08:20 16:03	07:12 17:15	15:18 (A0022) 15:30 (A0022)	05:56 18:18	19:24 (A0018) 19:36 (A0018)	04:24 21:30
24	08:19 16:05	07:09 17:17	15:22 (A0022) 15:25 (A0022)	05:53 18:20	19:24 (A0018) 19:34 (A0018)	04:22 21:32
25	08:17 16:07	07:07 17:20		05:50 18:23	19:26 (A0018) 19:33 (A0018)	04:20 21:34
26	08:15 16:09	07:04 17:22		05:47 18:25		04:19 21:35
27	08:13 16:12	07:02 17:24		05:45 18:27		04:17 21:37
28	08:12 16:14	06:59 17:27		05:42 18:29		04:16 21:39
29	08:10 16:16			06:39 19:31		04:14 21:40
30	08:08 16:19			06:36 19:34		04:13 21:42
31	08:06 16:21			06:34 19:36		04:12 21:44
Potential sun hours	228	263	366	429	515	539
Total, worst case		385	350	265		252
Sun reduction		0,16	0,22	0,42		0,43
Oper. time red.		0,99	0,99	0,99		0,99
Wind dir. red.		0,69	0,68	0,62		0,57
Total reduction		0,11	0,15	0,27		0,24
Total, real		43	53	71		61

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

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



Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (923)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July			August			September			October			November			December		
1	04:03	21:10 (A0017)	04:53	05:58	18:52 (A0019)	07:01	17:05 (A0021)	07:10	14:42 (A0022)	08:16								
	22:02	9 21:19 (A0017)	21:18	20:00	11 19:03 (A0019)	18:36	26 17:31 (A0021)	16:15	22 15:04 (A0022)	15:21								
2	04:04	21:11 (A0017)	04:55	06:00	18:50 (A0019)	07:04	17:04 (A0021)	07:13	14:43 (A0022)	08:17								
	22:02	8 21:19 (A0017)	21:16	19:57	14 19:04 (A0019)	18:34	27 17:31 (A0021)	16:13	20 15:03 (A0022)	15:20								
3	04:05	21:12 (A0017)	04:57	06:02	18:49 (A0019)	07:06	17:04 (A0021)	07:15	14:44 (A0022)	08:19								
	22:01	7 21:19 (A0017)	21:13	19:55	15 19:04 (A0019)	18:31	26 17:30 (A0021)	16:10	17 15:01 (A0022)	15:19								
4	04:06	21:13 (A0017)	04:59	06:04	18:48 (A0019)	07:08	17:04 (A0021)	07:17	14:47 (A0022)	08:21								
	22:01	5 21:18 (A0017)	21:11	19:52	16 19:04 (A0019)	18:28	25 17:29 (A0021)	16:08	12 14:59 (A0022)	15:18								
5	04:07	21:13 (A0017)	05:01	06:07	18:47 (A0019)	07:10	17:06 (A0021)	07:20	14:49 (A0022)	08:22								
	22:00	5 21:18 (A0017)	21:09	19:49	17 19:04 (A0019)	18:25	22 17:28 (A0021)	16:06	7 14:56 (A0022)	15:17								
6	04:08	21:15 (A0017)	05:03	06:09	18:47 (A0019)	07:12	17:06 (A0021)	07:22		08:24								
	21:59	2 21:17 (A0017)	21:07	19:46	16 19:03 (A0019)	18:23	20 17:26 (A0021)	16:04		15:16								
7	04:10		05:05	06:11	18:47 (A0019)	07:14	17:08 (A0021)	07:24		08:26								
	21:58		21:04	19:44	16 19:03 (A0019)	18:20	16 17:24 (A0021)	16:01		15:15								
8	04:11		05:07	06:13	18:47 (A0019)	07:17	17:09 (A0021)	07:26		08:27								
	21:57		21:02	19:41	15 19:02 (A0019)	18:17	12 17:21 (A0021)	15:59		15:15								
9	04:12		05:09	06:15	18:48 (A0019)	07:19		07:29		08:29								
	21:56		21:00	19:38	12 19:00 (A0019)	18:14		15:57		15:14								
10	04:14		05:11	06:17	18:49 (A0019)	07:21		07:31		08:30								
	21:55		20:57	19:35	9 18:58 (A0019)	18:12		15:55		15:14								
11	04:15		05:13	06:19		07:23		07:33		08:31								
	21:54		20:55	19:32		18:09		15:53		15:13								
12	04:16		05:15	06:21		07:25		07:36		08:33								
	21:53		20:52	19:30		18:06		15:51		15:13								
13	04:18		05:18	06:23		07:27		07:38		08:34								
	21:51		20:50	19:27		18:03		15:49		15:13								
14	04:19		05:20	06:25		07:30		07:40		08:35								
	21:50		20:47	19:24		18:01		15:47		15:13								
15	04:21		05:22	06:28		07:32		07:42		08:36								
	21:49		20:45	19:21		17:58		15:45		15:12								
16	04:23		05:24	06:30		07:34		07:45		08:37								
	21:47		20:42	19:18		17:55		15:43		15:12								
17	04:24		05:26	06:32		07:36		07:47		08:38								
	21:46		20:40	19:16		17:53		15:41		15:12								
18	04:26		05:28	19:32 (A0018)	06:34	07:39	15:52 (A0022)	07:49		08:39								
	21:44	8	20:37	19:40 (A0018)	19:13	17:50	7 15:59 (A0022)	15:39		15:13								
19	04:28		05:30	19:30 (A0018)	06:36	07:41	15:48 (A0022)	07:51		08:40								
	21:43	11	20:35	19:41 (A0018)	19:10	17:48	14 16:02 (A0022)	15:38		15:13								
20	04:29		05:33	19:29 (A0018)	06:38	07:43	15:45 (A0022)	07:53		08:40								
	21:41	13	20:32	19:42 (A0018)	19:07	17:45	18 16:03 (A0022)	15:36		15:13								
21	04:31		05:35	19:28 (A0018)	06:40	07:45	15:44 (A0022)	07:56		08:41								
	21:39		20:30	19:42 (A0018)	19:04	17:42	21 16:05 (A0022)	15:34		15:13								
22	04:33		05:37	19:28 (A0018)	06:42	07:48	15:42 (A0022)	07:58		08:42								
	21:38		20:27	19:42 (A0018)	19:02	4 17:24 (A0021)	23 16:05 (A0022)	15:33		15:14								
23	04:35		05:39	19:27 (A0018)	06:44	17:15 (A0021)	23 15:42 (A0022)	08:00		08:42								
	21:36		20:24	19:42 (A0018)	18:59	13 17:28 (A0021)	24 16:06 (A0022)	15:31		15:14								
24	04:37		05:41	19:27 (A0018)	06:47	17:12 (A0021)	23 15:41 (A0022)	08:02		08:42								
	21:34		20:22	19:42 (A0018)	18:56	18 17:30 (A0021)	25 16:06 (A0022)	15:30		15:15								
25	04:39		05:43	19:27 (A0018)	06:49	17:10 (A0021)	26 14:41 (A0022)	08:04		08:43								
	21:32		20:19	19:41 (A0018)	18:53	21 17:31 (A0021)	26 15:07 (A0022)	15:28		15:16								
26	04:41		05:45	19:28 (A0018)	06:51	17:08 (A0021)	27 14:40 (A0022)	08:06		08:43								
	21:30		20:16	19:39 (A0018)	18:50	23 17:31 (A0021)	27 15:07 (A0022)	15:27		15:17								
27	04:43		05:47	19:29 (A0018)	06:53	17:07 (A0021)	26 14:41 (A0022)	08:08		08:43								
	21:28		20:14	8 19:37 (A0018)	18:48	25 17:32 (A0021)	26 15:07 (A0022)	15:25		15:17								
28	04:44		05:50	17:06 (A0021)	06:55	07:01	14:40 (A0022)	08:10		08:43								
	21:26		20:11	18:45	26 17:32 (A0021)	16:25	26 15:06 (A0022)	15:24		15:18								
29	04:46		05:52	17:06 (A0021)	06:57	07:03	14:41 (A0022)	08:12		08:43								
	21:24		20:08	18:42	26 17:32 (A0021)	16:22	25 15:06 (A0022)	15:23		15:19								
30	04:48		05:54	06:59	17:05 (A0021)	07:06	14:41 (A0022)	08:14		08:43								
	21:22		20:06	18:39	27 17:32 (A0021)	16:20	24 15:05 (A0022)	15:22		15:20								
31	04:50		05:56	18:55 (A0019)		07:08	14:42 (A0022)			08:43								
	21:20		20:03	5 19:00 (A0019)		16:18	23 15:05 (A0022)			15:21								
Potential sun hours	538		474		386		321		241		207							
Total, worst case	36		128		324		483		78									
Sun reduction	0,38		0,35		0,31		0,26		0,17									
Oper. time red.	0,99		0,99		0,99		0,99		0,99									
Wind dir. red.	0,57		0,60		0,66		0,68		0,69									
Total reduction	0,22		0,22		0,21		0,18		0,12									
Total, real	8		28		67		86		9									

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:8>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (904)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June
1	08:43	08:04	06:56	15:33 (A0022)	06:31	05:11
	15:23	16:23	17:29	6 15:39 (A0022)	19:38	20:44
2	08:43	08:02	06:54		06:28	05:08
	15:24	16:26	17:31		19:40	20:46
3	08:42	08:00	06:51		06:25	05:06
	15:26	16:28	17:34		19:42	20:49
4	08:42	07:57	06:48		06:22	05:04
	15:27	16:30	17:36		19:45	20:51
5	08:41	07:55	06:46		06:20	05:01
	15:28	16:33	17:38		19:47	20:53
6	08:41	07:53	06:43		06:17	05:02
	15:30	16:35	17:40		19:49	20:55
7	08:40	07:51	06:40		06:14	05:00
	15:32	16:37	17:43		19:51	20:57
8	08:39	07:49	06:37		06:11	05:00
	15:33	16:40	17:45		19:53	20:59
9	08:38	07:46	06:35		06:09	04:58
	15:35	16:42	17:47		19:56	21:02
10	08:38	07:44	06:32		06:06	04:50
	15:37	16:45	17:49		19:58	21:04
11	08:37	07:42	06:29	16:47 (A0021)	06:03	04:48
	15:38	16:47	17:52	11 16:58 (A0021)	20:00	21:06
12	08:36	07:39	15:30 (A0022)	06:26	16:44 (A0021)	06:00
	15:40	16:49	11 15:41 (A0022)	17:54	16 17:00 (A0021)	20:02
13	08:34	07:37	15:28 (A0022)	06:24	16:42 (A0021)	05:58
	15:42	16:52	16 15:44 (A0022)	17:56	20 17:02 (A0021)	20:04
14	08:33	07:35	15:26 (A0022)	06:21	16:40 (A0021)	05:55
	15:44	16:54	20 15:46 (A0022)	17:58	23 17:03 (A0021)	20:07
15	08:32	07:32	15:24 (A0022)	06:18	16:39 (A0021)	05:52
	15:46	16:56	22 15:46 (A0022)	18:01	24 17:03 (A0021)	20:09
16	08:31	07:30	15:24 (A0022)	06:15	16:39 (A0021)	05:50
	15:48	16:59	24 15:48 (A0022)	18:03	25 17:04 (A0021)	20:11
17	08:30	07:27	15:23 (A0022)	06:13	16:38 (A0021)	05:47
	15:50	17:01	25 15:48 (A0022)	18:05	26 17:04 (A0021)	20:13
18	08:28	07:25	15:22 (A0022)	06:10	16:37 (A0021)	05:44
	15:52	17:03	26 15:48 (A0022)	18:07	27 17:04 (A0021)	20:15
19	08:27	07:22	15:22 (A0022)	06:07	16:37 (A0021)	05:42
	15:54	17:06	27 15:49 (A0022)	18:09	27 17:04 (A0021)	20:18
20	08:25	07:20	15:22 (A0022)	06:04	16:37 (A0021)	05:39
	15:56	17:08	27 15:49 (A0022)	18:12	26 17:03 (A0021)	20:20
21	08:24	07:17	15:22 (A0022)	06:01	16:36 (A0021)	05:36
	15:58	17:11	27 15:49 (A0022)	18:14	26 17:02 (A0021)	20:22
22	08:22	07:15	15:22 (A0022)	05:59	16:38 (A0021)	05:34
	16:01	17:13	27 15:49 (A0022)	18:16	24 17:02 (A0021)	20:24
23	08:20	07:12	15:22 (A0022)	05:56	16:38 (A0021)	05:31
	16:03	17:15	27 15:49 (A0022)	18:18	23 17:01 (A0021)	20:26
24	08:19	07:09	15:23 (A0022)	05:53	16:39 (A0021)	05:29
	16:05	17:17	25 15:48 (A0022)	18:20	21 17:00 (A0021)	20:29
25	08:17	07:07	15:24 (A0022)	05:50	16:40 (A0021)	05:26
	16:07	17:20	23 15:47 (A0022)	18:23	18 16:58 (A0021)	20:31
26	08:15	07:04	15:25 (A0022)	05:47	16:42 (A0021)	05:23
	16:09	17:22	21 15:46 (A0022)	18:25	13 16:55 (A0021)	20:33
27	08:13	07:02	15:26 (A0022)	05:45	16:47 (A0021)	05:21
	16:12	17:24	18 15:44 (A0022)	18:27	4 16:51 (A0021)	20:35
28	08:12	06:59	15:28 (A0022)	05:42		05:18
	16:14	17:27	14 15:42 (A0022)	18:29		20:38
29	08:10			06:39		05:16
	16:16			19:31		20:40
30	08:08			06:36		05:13
	16:19			19:34		20:42
31	08:06			06:34		04:12
	16:21			19:36		21:44
Potential sun hours	228	263	366	429	515	539
Total, worst case		380	360	262		83
Sun reduction		0,16	0,22	0,42		0,43
Oper. time red.		0,99	0,99	0,99		0,99
Wind dir. red.		0,69	0,66	0,61		0,56
Total reduction		0,11	0,15	0,26		0,24
Total, real		43	53	69		20

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: SÄLDEFALL 1:8>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (904)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September			October			November	December
1	04:03 22:02	04:53 21:18			05:58 20:00	18:57 (A0019) 19:13 (A0019)	07:01 18:36	17:23 (A0021) 17:40 (A0021)	07:10 16:15	08:16 15:21
2	04:04 22:02	04:55 21:16			06:00 19:57	18:56 (A0019) 19:13 (A0019)	07:04 18:34	17:24 (A0021) 17:37 (A0021)	07:13 16:13	08:17 15:20
3	04:05 22:01	04:57 21:13			06:02 19:55	18:56 (A0019) 19:12 (A0019)	07:06 18:31	17:28 (A0021) 17:32 (A0021)	07:15 16:10	08:19 15:19
4	04:06 22:01	04:59 21:11			06:04 19:52	18:56 (A0019) 19:12 (A0019)	07:08 18:28		07:17 16:08	08:21 15:18
5	04:07 22:00	05:01 21:09			06:07 19:49	18:57 (A0019) 19:10 (A0019)	07:10 18:25		07:20 16:06	08:22 15:17
6	04:08 21:59	05:03 21:07			06:09 19:46	18:58 (A0019) 19:08 (A0019)	07:12 18:23		07:22 16:04	08:24 15:16
7	04:10 21:58	05:05 21:04			06:11 19:44	19:00 (A0019) 19:05 (A0019)	07:14 18:20		07:24 16:01	08:26 15:15
8	04:11 21:57	05:07 21:02			06:13 19:41		07:17 18:17		07:26 15:59	08:27 15:15
9	04:12 21:56	05:09 21:00			06:15 19:38		07:19 18:14		07:29 15:57	08:29 15:14
10	04:14 21:55	05:11 20:57			06:17 19:35		07:21 18:12		07:31 15:55	08:30 15:14
11	04:15 21:54	05:13 20:55			06:19 19:32		07:23 18:09		07:33 15:53	08:31 15:13
12	04:16 21:53	05:15 20:52			06:21 19:30		07:25 18:06		07:36 15:51	08:33 15:13
13	04:18 21:51	05:18 20:50			06:23 19:27		07:27 18:03	16:04 (A0022)	07:38 15:49	08:34 15:13
14	04:19 21:50	05:20 20:47			06:25 19:24		07:30 18:01	16:00 (A0022)	07:40 15:47	08:35 15:13
15	04:21 21:49	05:22 20:45		19:39 (A0018)	06:28 19:21		07:32 17:58	16:16 (A0022)	07:42 15:45	08:36 15:12
16	04:23 21:47	05:24 20:42		19:38 (A0018)	06:30 19:18		07:34 17:55	15:57 (A0022)	07:45 15:43	08:37 15:12
17	04:24 21:46	05:26 20:40		19:49 (A0018)	06:32 19:16	17:31 (A0021)	07:36 17:53	15:56 (A0022)	07:47 15:41	08:38 15:12
18	04:26 21:44	05:28 20:37		19:36 (A0018)	06:34 19:13	17:28 (A0021)	07:39 17:50	16:19 (A0022)	07:49 15:39	08:39 15:13
19	04:28 21:43	05:30 20:35		19:50 (A0018)	06:36 19:10	17:45 (A0021)	07:41 17:48	16:20 (A0022)	07:51 15:38	08:40 15:13
20	04:29 21:41	05:33 20:32		19:35 (A0018)	06:38 19:07	17:26 (A0021)	07:43 17:45	15:53 (A0022)	07:53 15:36	08:40 15:13
21	04:31 21:39	05:35 20:30		19:50 (A0018)	06:40 19:04	17:46 (A0021)	07:45 17:42	16:19 (A0022)	07:56 15:34	08:41 15:13
22	04:33 21:38	05:37 20:27		19:49 (A0018)	06:42 19:02	17:24 (A0021)	07:48 17:40	15:52 (A0022)	07:58 15:33	08:42 15:14
23	04:35 21:36	05:39 20:24		19:48 (A0018)	06:44 18:59	17:22 (A0021)	07:50 17:37	15:53 (A0022)	08:00 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22		19:37 (A0018)	06:47 18:56	17:48 (A0021)	07:52 17:35	16:20 (A0022)	08:02 15:30	08:42 15:15
25	04:39 21:32	05:43 20:19		19:45 (A0018)	06:49 18:53	17:47 (A0021)	06:54 16:32	14:54 (A0022)	08:04 15:28	08:43 15:16
26	04:41 21:30	05:45 20:16			06:51 18:50	17:20 (A0021)	06:57 16:30	15:18 (A0022)	08:06 15:27	08:43 15:17
27	04:43 21:28	05:47 20:14			06:53 18:47	17:46 (A0021)	06:59 16:27	14:55 (A0022)	08:08 15:25	08:43 15:17
28	04:44 21:26	05:50 20:11		19:02 (A0019)	06:55 18:45	17:21 (A0021)	07:01 16:25	15:16 (A0022)	08:10 15:24	08:43 15:18
29	04:46 21:24	05:52 20:08		19:11 (A0019)	06:57 18:42	17:44 (A0021)	07:03 16:22	14:56 (A0022)	08:12 15:23	08:43 15:19
30	04:48 21:22	05:54 20:06		19:00 (A0019)	06:59 18:39	17:22 (A0021)	07:06 16:20	15:15 (A0022)	08:14 15:22	08:43 15:20
31	04:50 21:20	05:56 20:03		18:59 (A0019)		17:42 (A0021)	07:08 16:18	15:00 (A0022)		08:43 15:21
Potential sun hours	538	474			386		321		241	207
Total, worst case		172			412		424			
Sun reduction		0,35			0,31		0,26			
Oper. time red.		0,99			0,99		0,99			
Wind dir. red.		0,61			0,66		0,69			
Total reduction		0,22			0,21		0,18			
Total, real		37			85		76			

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VASSEMÅLA 1:1>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (828)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June
1	08:43	09:48 (A0017)	08:04	14:43 (A0005)	06:57	06:31	05:11	04:10
	15:23	57 14:25 (A0006)	16:23	24 15:07 (A0005)	17:29	19:38	20:44	21:46
2	08:43	09:48 (A0017)	08:02	14:44 (A0005)	06:54	06:28	05:09	04:09
	15:24	54 14:25 (A0006)	16:26	23 15:07 (A0005)	17:31	19:40	20:47	21:47
3	08:43	09:50 (A0017)	08:00	14:46 (A0005)	06:51	06:25	05:06	04:08
	15:26	50 14:27 (A0006)	16:28	21 15:07 (A0005)	17:34	19:43	20:49	21:49
4	08:42	09:50 (A0017)	07:58	14:46 (A0005)	06:48	06:23	05:04	04:07
	15:27	49 14:27 (A0006)	16:30	20 15:06 (A0005)	17:36	19:45	20:51	21:50
5	08:42	09:51 (A0017)	07:56	14:48 (A0005)	06:46	06:20	05:01	04:06
	15:28	48 14:28 (A0006)	16:33	17 15:05 (A0005)	17:38	19:47	20:53	21:51
6	08:41	09:52 (A0017)	07:53	14:49 (A0005)	06:43	06:17	04:59	04:05
	15:30	46 14:28 (A0006)	16:35	14 15:03 (A0005)	17:41	19:49	20:55	21:53
7	08:40	09:53 (A0017)	07:51	14:53 (A0005)	06:40	06:14	04:57	04:04
	15:32	45 14:29 (A0006)	16:38	8 15:01 (A0005)	17:43	19:51	20:58	21:54
8	08:40	09:55 (A0017)	07:49		06:38	06:11	04:54	04:03
	15:33	42 14:29 (A0006)	16:40		17:45	19:54	21:00	21:55
9	08:39	10:28 (A0015)	07:47		06:35	06:09	04:52	04:02
	15:35	35 14:30 (A0006)	16:42		17:47	19:56	21:02	21:56
10	08:38	10:30 (A0015)	07:44	16:08 (A0002)	06:32	06:06	04:50	04:01
	15:37	34 14:31 (A0006)	16:45	3 16:11 (A0002)	17:50	19:58	21:04	21:57
11	08:37	10:30 (A0015)	07:42	16:07 (A0002)	06:29	06:03	04:48	04:01
	15:38	33 14:31 (A0006)	16:47	6 16:13 (A0002)	17:52	20:00	21:06	21:58
12	08:36	10:32 (A0015)	07:40	16:06 (A0002)	06:27	06:01	04:45	04:00
	15:40	31 14:32 (A0006)	16:49	10 16:16 (A0002)	17:54	20:02	21:08	21:59
13	08:35	10:34 (A0015)	07:37	16:06 (A0002)	06:24	05:58	04:43	04:00
	15:42	27 14:32 (A0006)	16:52	13 16:19 (A0002)	17:56	20:05	21:10	22:00
14	08:34	10:37 (A0015)	07:35	16:06 (A0002)	06:21	05:55	04:41	03:59
	15:44	21 14:32 (A0006)	16:54	13 16:19 (A0002)	17:59	20:07	21:12	22:01
15	08:32	14:14 (A0006)	07:32	16:07 (A0002)	06:18	05:52	04:39	03:59
	15:46	18 14:32 (A0006)	16:57	12 16:19 (A0002)	18:01	20:09	21:14	22:01
16	08:31	14:15 (A0006)	07:30	16:08 (A0002)	06:16	05:50	04:37	03:59
	15:48	23 14:54 (A0005)	16:59	9 16:17 (A0002)	18:03	20:11	21:17	22:02
17	08:30	14:16 (A0006)	07:27	16:10 (A0002)	06:13	05:47	04:35	03:58
	15:50	27 14:57 (A0005)	17:01	5 16:15 (A0002)	18:05	20:14	21:19	22:03
18	08:29	14:16 (A0006)	07:25		06:10	05:44	04:33	03:58
	15:52	29 14:58 (A0005)	17:04		18:07	20:16	21:21	22:03
19	08:27	14:18 (A0006)	07:22		06:07	05:42	04:31	03:58
	15:54	30 15:01 (A0005)	17:06		18:10	20:18	21:23	22:04
20	08:26	14:19 (A0006)	07:20		06:04	05:39	04:29	03:58
	15:56	31 15:02 (A0005)	17:08		18:12	20:20	21:25	22:04
21	08:24	14:21 (A0006)	07:17		06:02	05:36	04:27	03:58
	15:58	29 15:03 (A0005)	17:11		18:14	20:22	21:26	22:04
22	08:22	14:23 (A0006)	07:15		05:59	05:34	04:26	03:59
	16:01	27 15:04 (A0005)	17:13		18:16	20:25	21:28	22:04
23	08:21	14:42 (A0005)	07:12		05:56	05:31	04:24	03:59
	16:03	23 15:05 (A0005)	17:15		18:18	20:27	21:30	22:05
24	08:19	14:42 (A0005)	07:10		05:53	05:29	04:22	03:59
	16:05	24 15:06 (A0005)	17:18		18:21	20:29	21:32	22:05
25	08:17	14:42 (A0005)	07:07		05:50	05:26	04:20	04:00
	16:07	24 15:06 (A0005)	17:20		18:23	20:31	21:34	22:05
26	08:16	14:42 (A0005)	07:04		05:48	05:23	04:19	04:00
	16:10	25 15:07 (A0005)	17:22		18:25	20:33	21:36	22:05
27	08:14	14:43 (A0005)	07:02		05:45	05:21	04:17	04:01
	16:12	25 15:08 (A0005)	17:25		18:27	20:36	21:37	22:04
28	08:12	14:42 (A0005)	06:59		05:42	05:18	04:16	04:01
	16:14	25 15:07 (A0005)	17:27		18:29	20:38	21:39	22:04
29	08:10	14:42 (A0005)			06:39	05:16	04:14	04:02
	16:16	26 15:08 (A0005)			19:32	20:40	21:41	22:04
30	08:08	14:43 (A0005)			06:36	05:13	04:13	04:03
	16:19	25 15:08 (A0005)			19:34	20:42	21:42	22:03
31	08:06	14:44 (A0005)			06:34		04:12	
	16:21	24 15:08 (A0005)			19:36		21:44	
Potential sun hours	228		262		366	429	515	539
Total, worst case	1007		198					
Sun reduction	0,19		0,16					
Oper. time red.	0,99		0,99					
Wind dir. red.	0,66		0,69					
Total reduction	0,12		0,11					
Total, real	122		22					

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VASSEMÅLA 1:1>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (828)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
609	445	528	478	509	548	616	1 096	1 460	1 177	580	623	8 669

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

	July	August	September	October	November	December
1	04:03 22:03	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:15	08:16 15:21
2	04:04 22:02	04:55 21:16	06:00 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	04:05 22:02	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	04:06 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:08	08:21 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	08:23 15:17
6	04:08 21:59	05:03 21:07	06:09 19:47	07:12 18:23	07:22 16:04	08:25 15:16
7	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:24 16:02	08:26 15:15
8	04:11 21:58	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	08:28 15:15
9	04:12 21:57	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	08:29 15:14
10	04:13 21:56	05:11 20:58	06:17 19:35	07:21 18:12	07:31 15:55	08:30 15:14
11	04:15 21:54	05:13 20:55	06:19 19:33	07:23 18:09	07:34 15:53	08:32 15:13
12	04:16 21:53	05:16 20:53	06:21 19:30	07:26 18:06	07:36 15:51	08:33 15:13
13	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	04:19 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:40 15:47	08:35 15:12
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:43 15:45	08:36 15:12
16	04:23 21:48	05:24 20:43	06:30 19:19	07:34 17:56	07:45 15:43	08:37 15:12
17	04:24 21:46	05:26 20:40	06:32 19:16	07:37 17:53	07:47 15:41	08:38 15:12
18	04:26 21:45	05:28 20:38	06:34 19:13	07:39 17:50	07:49 15:40	08:39 15:13
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:54 15:36	08:41 15:13
21	04:31 21:40	05:35 20:30	06:40 19:05	07:46 17:42	07:56 15:34	08:41 15:13
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:37	08:00 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	04:39 21:32	05:43 20:19	06:49 18:53	07:55 16:32	08:04 15:28	08:43 15:16
26	04:41 21:31	05:45 20:17	06:51 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:27	08:08 15:25	08:44 15:17
28	04:44 21:27	05:50 20:11	06:55 18:45	07:01 16:25	08:10 15:24	08:44 15:18
29	04:46 21:25	05:52 20:09	06:57 18:42	07:04 16:22	08:12 15:23	08:44 15:19
30	04:48 21:22	05:54 20:06	07:00 18:39	07:06 16:20	08:14 15:22	08:44 15:20
31	04:50 21:20	05:56 20:03		07:08 16:18	08:16 15:20	08:44 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case				70	649	1733
Sun reduction				0,26	0,17	0,13
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,69	0,69	0,63
Total reduction				0,18	0,12	0,08
Total, real				12	76	141

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VASSEMÅLA 1:1>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (842)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June
1	08:43	09:44 (A0017)	08:04	14:42 (A0005)	06:57	06:31	05:11	04:10
	15:23	62 14:24 (A0006)	16:23	25 15:07 (A0005)	17:29	19:38	20:44	21:46
2	08:43	09:44 (A0017)	08:02	14:43 (A0005)	06:54	06:28	05:09	04:09
	15:24	60 14:24 (A0006)	16:26	24 15:07 (A0005)	17:31	19:40	20:47	21:47
3	08:43	09:46 (A0017)	08:00	14:44 (A0005)	06:51	06:25	05:06	04:08
	15:26	55 14:25 (A0006)	16:28	23 15:07 (A0005)	17:34	19:43	20:49	21:49
4	08:42	09:46 (A0017)	07:58	14:44 (A0005)	06:48	06:23	05:04	04:07
	15:27	53 14:26 (A0006)	16:30	22 15:06 (A0005)	17:36	19:45	20:51	21:50
5	08:42	09:47 (A0017)	07:56	14:46 (A0005)	06:46	06:20	05:01	04:06
	15:28	51 14:26 (A0006)	16:33	19 15:05 (A0005)	17:38	19:47	20:53	21:51
6	08:41	09:48 (A0017)	07:53	14:47 (A0005)	06:43	06:17	04:59	04:05
	15:30	50 14:27 (A0006)	16:35	16 15:03 (A0005)	17:41	19:49	20:55	21:53
7	08:40	09:49 (A0017)	07:51	14:50 (A0005)	06:40	06:14	04:57	04:04
	15:32	50 14:28 (A0006)	16:38	12 15:02 (A0005)	17:43	19:51	20:58	21:54
8	08:40	09:50 (A0017)	07:49	14:55 (A0005)	06:38	06:11	04:54	04:03
	15:33	48 14:28 (A0006)	16:40	3 14:58 (A0005)	17:45	19:54	21:00	21:55
9	08:39	09:51 (A0017)	07:47		06:35	06:09	04:52	04:02
	15:35	46 14:29 (A0006)	16:42		17:47	19:56	21:02	21:56
10	08:38	09:54 (A0017)	07:44	16:08 (A0002)	06:32	06:06	04:50	04:01
	15:37	41 14:30 (A0006)	16:45	3 16:11 (A0002)	17:50	19:58	21:04	21:57
11	08:37	10:24 (A0015)	07:42	16:07 (A0002)	06:29	06:03	04:48	04:01
	15:38	36 14:30 (A0006)	16:47	6 16:13 (A0002)	17:52	20:00	21:06	21:58
12	08:36	10:26 (A0015)	07:40	16:06 (A0002)	06:27	06:01	04:45	04:00
	15:40	34 14:30 (A0006)	16:49	10 16:16 (A0002)	17:54	20:02	21:08	21:59
13	08:35	10:28 (A0015)	07:37	16:06 (A0002)	06:24	05:58	04:43	04:00
	15:42	32 14:31 (A0006)	16:52	13 16:19 (A0002)	17:56	20:05	21:10	22:00
14	08:34	10:29 (A0015)	07:35	16:06 (A0002)	06:21	05:55	04:41	03:59
	15:44	30 14:31 (A0006)	16:54	13 16:19 (A0002)	17:59	20:07	21:12	22:01
15	08:33	10:30 (A0015)	07:32	16:07 (A0002)	06:18	05:52	04:39	03:59
	15:46	26 14:31 (A0006)	16:57	12 16:19 (A0002)	18:01	20:09	21:14	22:01
16	08:31	14:14 (A0006)	07:30	16:08 (A0002)	06:16	05:50	04:37	03:59
	15:48	22 14:53 (A0005)	16:59	10 16:18 (A0002)	18:03	20:11	21:17	22:02
17	08:30	14:14 (A0006)	07:27	16:09 (A0002)	06:13	05:47	04:35	03:58
	15:50	27 14:55 (A0005)	17:01	7 16:16 (A0002)	18:05	20:14	21:19	22:03
18	08:29	14:15 (A0006)	07:25		06:10	05:44	04:33	03:58
	15:52	29 14:57 (A0005)	17:04		18:07	20:16	21:21	22:03
19	08:27	14:17 (A0006)	07:22		06:07	05:42	04:31	03:58
	15:54	30 15:00 (A0005)	17:06		18:10	20:18	21:23	22:04
20	08:26	14:18 (A0006)	07:20		06:04	05:39	04:29	03:58
	15:56	31 15:01 (A0005)	17:08		18:12	20:20	21:25	22:04
21	08:24	14:19 (A0006)	07:17		06:02	05:36	04:27	03:58
	15:58	31 15:02 (A0005)	17:11		18:14	20:22	21:26	22:04
22	08:22	14:22 (A0006)	07:15		05:59	05:34	04:26	03:59
	16:01	27 15:03 (A0005)	17:13		18:16	20:25	21:28	22:04
23	08:21	14:41 (A0005)	07:12		05:56	05:31	04:24	03:59
	16:03	23 15:04 (A0005)	17:15		18:18	20:27	21:30	22:05
24	08:19	14:41 (A0005)	07:10		05:53	05:29	04:22	03:59
	16:05	24 15:05 (A0005)	17:18		18:21	20:29	21:32	22:05
25	08:17	14:41 (A0005)	07:07		05:50	05:26	04:20	04:00
	16:07	25 15:06 (A0005)	17:20		18:23	20:31	21:34	22:05
26	08:16	14:41 (A0005)	07:04		05:48	05:23	04:19	04:00
	16:10	25 15:06 (A0005)	17:22		18:25	20:33	21:36	22:05
27	08:14	14:41 (A0005)	07:02		05:45	05:21	04:17	04:01
	16:12	26 15:07 (A0005)	17:25		18:27	20:36	21:37	22:04
28	08:12	14:41 (A0005)	06:59		05:42	05:18	04:16	04:01
	16:14	25 15:06 (A0005)	17:27		18:29	20:38	21:39	22:04
29	08:10	14:41 (A0005)			06:39	05:16	04:14	04:02
	16:16	26 15:07 (A0005)			19:32	20:40	21:41	22:04
30	08:08	14:41 (A0005)			06:36	05:13	04:13	04:03
	16:19	26 15:07 (A0005)			19:34	20:42	21:42	22:03
31	08:06	14:42 (A0005)			06:34		04:12	
	16:21	26 15:08 (A0005)			19:36		21:44	
Potential sun hours	228		262		366	429	515	539
Total, worst case	1097		218					
Sun reduction	0,19		0,16					
Oper. time red.	0,99		0,99					
Wind dir. red.	0,66		0,69					
Total reduction	0,12		0,11					
Total, real	132		24					

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VASSEMÅLA 1:1>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (842)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03	04:53	05:58	07:02	07:11	15:37 (A0002) 08:16
	22:03	21:18	20:00	18:37	16:15	2 15:39 (A0002) 15:21 35 14:12 (A0006)
2	04:04	04:55	06:00	07:04	07:13	08:18 09:36 (A0017)
	22:02	21:16	19:58	18:34	16:13	15:20 41 14:12 (A0006)
3	04:05	04:57	06:02	07:06	07:15	14:24 (A0005) 08:20 09:35 (A0017)
	22:02	21:14	19:55	18:31	16:11	5 14:29 (A0005) 15:19 44 14:12 (A0006)
4	04:06	04:59	06:05	07:08	07:18	14:19 (A0005) 08:21 09:34 (A0017)
	22:01	21:12	19:52	18:28	16:08	13 14:32 (A0005) 15:18 49 14:13 (A0006)
5	04:07	05:01	06:07	07:10	07:20	14:18 (A0005) 08:23 09:34 (A0017)
	22:00	21:09	19:49	18:25	16:06	16 14:34 (A0005) 15:17 50 14:13 (A0006)
6	04:08	05:03	06:09	07:12	07:22	14:16 (A0005) 08:25 09:34 (A0017)
	21:59	21:07	19:47	18:23	16:04	19 14:35 (A0005) 15:16 50 14:13 (A0006)
7	04:10	05:05	06:11	07:15	07:24	14:15 (A0005) 08:26 09:34 (A0017)
	21:59	21:05	19:44	18:20	16:02	21 14:36 (A0005) 15:15 52 14:14 (A0006)
8	04:11	05:07	06:13	07:17	07:27	14:14 (A0005) 08:28 09:34 (A0017)
	21:58	21:02	19:41	18:17	15:59	23 14:37 (A0005) 15:15 52 14:14 (A0006)
9	04:12	05:09	06:15	07:19	07:29	14:14 (A0005) 08:29 09:34 (A0017)
	21:57	21:00	19:38	18:14	15:57	24 14:38 (A0005) 15:14 56 14:14 (A0006)
10	04:13	05:11	06:17	07:21	07:31	14:14 (A0005) 08:30 09:35 (A0017)
	21:56	20:58	19:35	18:12	15:55	25 14:39 (A0005) 15:14 59 14:14 (A0006)
11	04:15	05:13	06:19	07:23	07:34	14:13 (A0005) 08:32 09:34 (A0017)
	21:54	20:55	19:33	18:09	15:53	25 14:38 (A0005) 15:13 61 14:14 (A0006)
12	04:16	05:16	06:21	07:26	07:36	14:13 (A0005) 08:33 09:35 (A0017)
	21:53	20:53	19:30	18:06	15:51	26 14:39 (A0005) 15:13 64 14:15 (A0006)
13	04:18	05:18	06:24	07:28	07:38	14:13 (A0005) 08:34 09:35 (A0017)
	21:52	20:50	19:27	18:04	15:49	26 14:39 (A0005) 15:13 66 14:14 (A0006)
14	04:19	05:20	06:26	07:30	07:40	14:13 (A0005) 08:35 09:35 (A0017)
	21:51	20:48	19:24	18:01	15:47	26 14:39 (A0005) 15:12 65 14:14 (A0006)
15	04:21	05:22	06:28	07:32	07:43	14:13 (A0005) 08:36 09:36 (A0017)
	21:49	20:45	19:21	17:58	15:45	26 14:39 (A0005) 15:12 65 14:14 (A0006)
16	04:23	05:24	06:30	07:34	07:45	14:14 (A0005) 08:37 09:36 (A0017)
	21:48	20:43	19:19	17:56	15:43	25 14:39 (A0005) 15:12 67 14:15 (A0006)
17	04:24	05:26	06:32	07:37	07:47	14:14 (A0005) 08:38 09:36 (A0017)
	21:46	20:40	19:16	17:53	15:41	25 14:39 (A0005) 15:12 66 14:15 (A0006)
18	04:26	05:28	06:34	07:39	07:49	14:15 (A0005) 08:39 09:37 (A0017)
	21:45	20:38	19:13	17:50	15:40	24 14:39 (A0005) 15:13 65 14:15 (A0006)
19	04:28	05:30	06:36	07:41	07:52	14:15 (A0005) 08:40 09:38 (A0017)
	21:43	20:35	19:10	17:48	15:38	23 14:38 (A0005) 15:13 66 14:16 (A0006)
20	04:29	05:33	06:38	07:43	07:54	13:57 (A0006) 08:41 09:38 (A0017)
	21:41	20:32	19:07	17:45	15:36	27 14:38 (A0005) 15:13 67 14:16 (A0006)
21	04:31	05:35	06:40	07:46	07:56	13:54 (A0006) 08:41 09:38 (A0017)
	21:40	20:30	19:05	17:42	15:34	31 14:37 (A0005) 15:13 66 14:16 (A0006)
22	04:33	05:37	06:42	07:48	07:58	13:54 (A0006) 08:42 09:39 (A0017)
	21:38	20:27	19:02	17:40	15:33	31 14:37 (A0005) 15:14 66 14:17 (A0006)
23	04:35	05:39	06:45	07:50	08:00	13:53 (A0006) 08:42 09:39 (A0017)
	21:36	20:25	18:59	17:37	15:31	30 14:36 (A0005) 15:14 67 14:17 (A0006)
24	04:37	05:41	06:47	07:52	08:02	13:53 (A0006) 08:43 09:40 (A0017)
	21:34	20:22	18:56	17:35	15:30	30 14:36 (A0005) 15:15 67 14:18 (A0006)
25	04:39	05:43	06:49	06:55	15:39 (A0002) 08:04	13:52 (A0006) 08:43 09:41 (A0017)
	21:32	20:19	18:53	16:32	8 15:47 (A0002) 15:28	28 14:34 (A0005) 15:16 66 14:19 (A0006)
26	04:41	05:45	06:51	06:57	15:37 (A0002) 08:06	13:52 (A0006) 08:43 09:41 (A0017)
	21:31	20:17	18:50	16:30	11 15:48 (A0002) 15:27	23 14:31 (A0005) 15:16 66 14:20 (A0006)
27	04:43	05:48	06:53	06:59	15:37 (A0002) 08:08	10:10 (A0015) 08:44 09:42 (A0017)
	21:29	20:14	18:48	16:27	12 15:49 (A0002) 15:25	26 14:11 (A0006) 15:17 65 14:20 (A0006)
28	04:44	05:50	06:55	07:01	15:36 (A0002) 08:10	10:09 (A0015) 08:44 09:42 (A0017)
	21:27	20:11	18:45	16:25	13 15:49 (A0002) 15:24	29 14:11 (A0006) 15:18 66 14:21 (A0006)
29	04:46	05:52	06:57	07:04	15:36 (A0002) 08:12	10:08 (A0015) 08:44 09:42 (A0017)
	21:25	20:09	18:42	16:22	12 15:48 (A0002) 15:23	31 14:11 (A0006) 15:19 65 14:21 (A0006)
30	04:48	05:54	07:00	07:06	15:36 (A0002) 08:14	10:07 (A0015) 08:44 09:43 (A0017)
	21:22	20:06	18:39	16:20	9 15:45 (A0002) 15:22	34 14:12 (A0006) 15:20 65 14:22 (A0006)
31	04:50	05:56		07:08	15:37 (A0002)	08:44 09:44 (A0017)
	21:20	20:03		16:18	5 15:42 (A0002)	15:21 63 14:23 (A0006)
Potential sun hours	538	474	386	321	241	207
Total, worst case				70	694	1862
Sun reduction				0,26	0,17	0,13
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,69	0,69	0,63
Total reduction				0,18	0,12	0,08
Total, real				12	81	152

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:10>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (869)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	08:43			08:04	15:28 (A0019)	06:56		16:22 (A0018)	06:31	18:56 (A0016)	05:11		19:40 (A0015)	04:10				
	15:23			16:23	14 15:42 (A0019)	17:29	13	16:59 (A0013)	19:38	12	19:08 (A0016)	20:44	15	19:55 (A0015)	21:45			
2	08:43			08:02	15:28 (A0019)	06:54		16:49 (A0013)	06:28	18:55 (A0016)	05:08		19:41 (A0015)	04:09				
	15:24			16:26	15 15:43 (A0019)	17:31	12	17:01 (A0013)	19:40	14	19:09 (A0016)	20:46	13	19:54 (A0015)	21:47			
3	08:42			08:00	15:27 (A0019)	06:51		16:48 (A0013)	06:25	18:55 (A0016)	05:06		19:41 (A0015)	04:08				
	15:26			16:28	16 15:43 (A0019)	17:34	13	17:01 (A0013)	19:42	13	19:08 (A0016)	20:49	11	19:52 (A0015)	21:48			
4	08:42			07:57	15:27 (A0019)	06:48		16:48 (A0013)	06:22	18:55 (A0016)	05:04		19:43 (A0015)	04:07				
	15:27			16:30	17 15:44 (A0019)	17:36	13	17:01 (A0013)	19:45	14	19:09 (A0016)	20:51	8	19:51 (A0015)	21:50			
5	08:41			07:55	15:28 (A0019)	06:46		16:50 (A0013)	06:20	18:55 (A0016)	05:01			04:06				
	15:28			16:33	17 15:45 (A0019)	17:38	11	17:01 (A0013)	19:47	12	19:07 (A0016)	20:53		21:51				
6	08:41			07:53	15:27 (A0019)	06:43		16:51 (A0013)	06:17	18:56 (A0016)	04:59			04:05				
	15:30			16:35	17 15:44 (A0019)	17:40	8	16:59 (A0013)	19:49	10	19:06 (A0016)	20:55		21:52				
7	08:40			07:51	15:28 (A0019)	06:40			06:14	18:57 (A0016)	04:57			04:04				
	15:31			16:37	17 15:45 (A0019)	17:43			19:51	6 19:03 (A0016)	20:57			21:54				
8	08:39			07:49	15:28 (A0019)	06:37			06:11		04:54			04:03				
	15:33			16:40	16 15:44 (A0019)	17:45			19:53		20:59			21:55				
9	08:39			07:46	15:30 (A0019)	06:35			06:09	19:07 (A0017)	04:52			04:02				
	15:35			16:42	13 15:43 (A0019)	17:47			19:56	10 19:17 (A0017)	21:02			21:56				
10	08:38			07:44	15:31 (A0019)	06:32			06:06	19:04 (A0017)	04:50			04:01				
	15:37			16:45	11 15:42 (A0019)	17:49			19:58	15 19:19 (A0017)	21:04			21:57				
11	08:37			07:42	15:34 (A0019)	06:29			06:03	19:03 (A0017)	04:48			04:01				
	15:38			16:47	6 15:40 (A0019)	17:52			20:00	18 19:21 (A0017)	21:06			21:58				
12	08:36			07:39		06:26			06:00	19:01 (A0017)	04:45			04:00				
	15:40			16:49		17:54			20:02	20 19:21 (A0017)	21:08			21:59				
13	08:35			07:37		06:24			05:58	19:00 (A0017)	04:43			04:00				
	15:42			16:52		17:56			20:04	21 19:21 (A0017)	21:10			22:00				
14	08:33			07:35		06:21			05:55	19:00 (A0017)	04:41			03:59				
	15:44			16:54		17:58			20:07	22 19:22 (A0017)	21:12			22:00				
15	08:32			07:32		06:18			05:52	18:59 (A0017)	04:39			03:59				
	15:46			16:56		18:01			20:09	22 19:21 (A0017)	21:14			22:01				
16	08:31			07:30		06:15		17:29 (A0020)	05:50	18:59 (A0017)	04:37			03:59				
	15:48			16:59		18:03	5	17:34 (A0020)	20:11	22 19:21 (A0017)	21:16			22:02				
17	08:30			07:27		06:13		17:26 (A0020)	05:47	18:59 (A0017)	04:35			03:58				
	15:50			17:01		18:05	10	17:36 (A0020)	20:13	22 19:21 (A0017)	21:18			22:02				
18	08:28			07:25	16:24 (A0018)	06:10		17:24 (A0020)	05:44	18:59 (A0017)	04:33			03:58				
	15:52			17:03	2 16:26 (A0018)	18:07	13	17:37 (A0020)	20:16	21 19:20 (A0017)	21:20			22:03				
19	08:27			07:22	16:20 (A0018)	06:07		17:23 (A0020)	05:42	19:00 (A0017)	04:31			03:58				
	15:54			17:06	9 16:29 (A0018)	18:10	14	17:37 (A0020)	20:18	20 19:20 (A0017)	21:22			22:03				
20	08:25			07:20	16:18 (A0018)	06:04		17:22 (A0020)	05:39	19:00 (A0017)	04:29			03:58				
	15:56			17:08	13 16:31 (A0018)	18:12	15	17:37 (A0020)	20:20	18 19:18 (A0017)	21:24			22:04				
21	08:24			07:17	16:16 (A0018)	06:01		17:22 (A0020)	05:36	19:02 (A0017)	04:27			03:58				
	15:58			17:11	15 16:31 (A0018)	18:14	15	17:37 (A0020)	20:22	15 19:17 (A0017)	21:26			22:04				
22	08:22			07:15	16:16 (A0018)	05:59		17:22 (A0020)	05:34	19:03 (A0017)	04:26			03:59				
	16:01			17:13	16 16:32 (A0018)	18:16	15	17:37 (A0020)	20:24	12 19:15 (A0017)	21:28			22:04				
23	08:21			07:12	16:16 (A0018)	05:56		17:23 (A0020)	05:31	19:06 (A0017)	04:24			03:59				
	16:03			17:15	16 16:32 (A0018)	18:18	13	17:36 (A0020)	20:27	13 19:52 (A0015)	21:30			22:04				
24	08:19			07:09	16:15 (A0018)	05:53		17:24 (A0020)	05:28	19:42 (A0015)	04:22			03:59				
	16:05			17:17	17 16:32 (A0018)	18:21	10	17:34 (A0020)	20:29	11 19:53 (A0015)	21:32			22:04				
25	08:17			07:07	16:16 (A0018)	05:50		17:26 (A0020)	05:26	19:41 (A0015)	04:20			04:00				
	16:07			17:20	16 16:32 (A0018)	18:23	4	17:30 (A0020)	20:31	14 19:55 (A0015)	21:34			22:04				
26	08:15			07:04	16:16 (A0018)	05:47			05:23	19:41 (A0015)	04:19			04:00				
	16:09			17:22	16 16:32 (A0018)	18:25			20:33	15 19:56 (A0015)	21:35			22:04				
27	08:13			07:02	16:17 (A0018)	05:45			05:21	19:40 (A0015)	04:17			04:01				
	16:12			17:24	15 16:54 (A0013)	18:27			20:35	15 19:55 (A0015)	21:37			22:04				
28	08:12			06:59	16:18 (A0018)	05:42			05:18	19:40 (A0015)	04:16			04:01				
	16:14			17:27	16 16:56 (A0013)	18:29			20:38	16 19:56 (A0015)	21:39			22:04				
29	08:10					06:39			05:16	19:39 (A0015)	04:14			04:02				
	16:16					19:32			20:40	16 19:55 (A0015)	21:41			22:03				
30	08:08					06:36		19:00 (A0016)	05:13	16 19:39 (A0015)	04:13			04:03				
	16:19	8	15:31 (A0019)			19:34	4	19:04 (A0016)	20:42	16 19:55 (A0015)	21:42			22:03				
31	08:06					06:34		18:58 (A0016)			04:12							
	16:21	11	15:40 (A0019)			19:36	9	19:07 (A0016)			21:44							
Potential sun hours	228			262		366			429		515			539				
Total, worst case	19			310		197			455		47							
Sun reduction	0,19			0,16		0,22			0,42		0,53							
Oper. time red.	0,99			0,99		0,99			0,99		0,99							
Wind dir. red.	0,69			0,69		0,66			0,62		0,60							
Total reduction	0,13			0,11		0,15			0,27		0,32							
Total, real	2			35		29			121		15							

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:10>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (869)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	19:02 (A0017) 18:36	07:10 16:15	15:00 (A0019) 15:21
2	04:04 22:02	04:55 21:16	06:00 19:57	19:03 (A0017) 18:34	07:04 16:13	15:11 (A0019) 15:20
3	04:05 22:01	04:57 21:14	06:02 19:55	19:05 (A0017) 18:31	07:06 16:10	15:13 (A0019) 15:19
4	04:06 22:01	04:59 21:11	06:04 19:52	19:07 (A0017) 18:28	07:08 16:08	15:14 (A0019) 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	18:55 (A0016) 18:25	07:10 16:06	15:14 (A0019) 15:17
6	04:08 21:59	05:03 21:07	06:09 19:46	18:52 (A0016) 18:23	07:12 16:04	15:15 (A0019) 15:16
7	04:10 21:58	05:05 21:04	06:11 19:44	18:50 (A0016) 18:20	07:14 16:01	15:15 (A0019) 15:15
8	04:11 21:57	05:07 21:02	19:55 (A0015) 19:41	06:13 18:49 (A0016) 18:17	17:27 (A0013) 17:25 (A0013) 17:34 (A0013)	15:16 (A0019) 15:15 (A0019) 15:15
9	04:12 21:56	05:09 21:00	19:52 (A0015) 20:01 (A0015)	06:15 19:38	18:49 (A0016) 19:02 (A0016)	18:09 18:14
10	04:13 21:55	05:11 20:57	19:50 (A0015) 20:02 (A0015)	06:17 19:35	18:49 (A0016) 19:02 (A0016)	18:06 18:12
11	04:15 21:54	05:13 20:55	19:49 (A0015) 20:03 (A0015)	06:19 19:32	18:49 (A0016) 19:01 (A0016)	18:09 18:13
12	04:16 21:53	05:15 20:53	19:48 (A0015) 20:03 (A0015)	06:21 19:30	18:49 (A0016) 18:59 (A0016)	18:06 18:06
13	04:18 21:52	05:18 20:50	19:48 (A0015) 20:03 (A0015)	06:23 19:27	18:51 (A0016) 18:56 (A0016)	18:06 18:03
14	04:19 21:50	05:20 20:48	19:47 (A0015) 20:03 (A0015)	06:25 19:24	18:03 18:01	17:31 (A0013) 17:28 (A0013)
15	04:21 21:49	05:22 20:45	19:47 (A0015) 20:03 (A0015)	06:28 19:21	17:32 17:58	16:50 (A0018) 16:48 (A0018)
16	04:23 21:47	05:24 20:43	19:47 (A0015) 20:03 (A0015)	06:30 19:18	17:34 17:55	16:48 (A0018) 16:47 (A0018)
17	04:24 21:46	05:26 20:40	19:48 (A0015) 20:02 (A0015)	06:32 19:16	17:36 17:53	16:47 (A0018) 16:47 (A0018)
18	04:26 21:44	05:28 20:37	19:48 (A0015) 20:01 (A0015)	06:34 19:13	17:39 17:50	16:47 (A0018) 16:47 (A0018)
19	04:28 21:43	05:30 20:35	19:49 (A0015) 19:59 (A0015)	06:36 19:10	18:11 (A0020) 18:20 (A0020)	17:41 17:48
20	04:29 21:41	05:33 20:32	19:11 (A0017) 19:57 (A0015)	06:38 19:07	18:10 (A0020) 18:22 (A0020)	17:43 17:45
21	04:31 21:39	05:35 20:30	19:08 (A0017) 19:21 (A0017)	06:40 19:04	18:08 (A0020) 18:22 (A0020)	17:45 17:42
22	04:33 21:38	05:37 20:27	19:06 (A0017) 19:22 (A0017)	06:42 19:02	18:07 (A0020) 18:22 (A0020)	17:48 17:40
23	04:35 21:36	05:39 20:24	19:05 (A0017) 19:23 (A0017)	06:44 18:59	18:07 (A0020) 18:22 (A0020)	17:50 17:37
24	04:37 21:34	05:41 20:22	19:03 (A0017) 19:24 (A0017)	06:47 18:56	18:06 (A0020) 18:21 (A0020)	17:52 17:35
25	04:39 21:32	05:43 20:19	19:03 (A0017) 19:24 (A0017)	06:49 18:53	18:06 (A0020) 18:20 (A0020)	17:54 17:32
26	04:41 21:30	05:45 20:16	19:02 (A0017) 19:24 (A0017)	06:51 18:50	18:07 (A0020) 18:18 (A0020)	17:57 17:30
27	04:42 21:28	05:47 20:14	19:01 (A0017) 19:24 (A0017)	06:53 18:48	18:08 (A0020) 18:16 (A0020)	17:59 17:27
28	04:44 21:26	05:50 20:11	19:01 (A0017) 19:23 (A0017)	06:55 18:45	18:16 (A0020) 16:25	16:27 16:22
29	04:46 21:24	05:52 20:08	19:01 (A0017) 19:23 (A0017)	06:57 18:42	16:22 16:22	16:22 16:22
30	04:48 21:22	05:54 20:06	19:01 (A0017) 19:22 (A0017)	06:59 18:39	16:22 16:20	16:22 16:20
31	04:50 21:20	05:56 20:03	19:01 (A0017) 19:21 (A0017)	07:08 18:39	16:20 16:17	16:20 16:17
Potential sun hours	538	474	386	251	234	172
Total, worst case						
Sun reduction		0,35	0,31	0,26	0,17	0,13
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,61	0,64	0,68	0,69	0,68
Total reduction		0,22	0,20	0,18	0,12	0,09
Total, real		84	51	42	20	14

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÅS 1:10>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (921)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	08:43		13:32 (A0021)	08:04		15:33 (A0019)	06:56		16:23 (A0018)	06:31		18:58 (A0016)	05:11		19:41 (A0015)	04:10		
	15:23	6	13:38 (A0021)	16:23	11	15:44 (A0019)	17:29	15	16:59 (A0013)	19:38	11	19:09 (A0016)	20:44	13	19:54 (A0015)	21:45		
2	08:43		13:34 (A0021)	08:02		15:33 (A0019)	06:54		16:51 (A0013)	06:28		18:56 (A0016)	05:08		19:42 (A0015)	04:09		
	15:24	2	13:36 (A0021)	16:26	13	15:46 (A0019)	17:31	10	17:01 (A0013)	19:40	13	19:09 (A0016)	20:46	12	19:54 (A0015)	21:47		
3	08:42			08:00		15:31 (A0019)	06:51		16:50 (A0013)	06:25		18:56 (A0016)	05:06		19:42 (A0015)	04:08		
	15:26			16:28	15	15:46 (A0019)	17:34	13	17:03 (A0013)	19:42	13	19:09 (A0016)	20:49	9	19:51 (A0015)	21:48		
4	08:42			07:57		15:31 (A0019)	06:48		16:50 (A0013)	06:22		18:56 (A0016)	05:04		19:45 (A0015)	04:07		
	15:27			16:30	16	15:47 (A0019)	17:36	13	17:03 (A0013)	19:45	13	19:09 (A0016)	20:51	4	19:49 (A0015)	21:50		
5	08:41			07:55		15:32 (A0019)	06:46		16:51 (A0013)	06:20		18:56 (A0016)	05:01			04:06		
	15:28			16:33	16	15:48 (A0019)	17:38	12	17:03 (A0013)	19:47	12	19:08 (A0016)	20:53			21:51		
6	08:41			07:53		15:31 (A0019)	06:43		16:52 (A0013)	06:17		18:57 (A0016)	04:59			04:05		
	15:30			16:35	17	15:48 (A0019)	17:40	9	17:01 (A0013)	19:49	10	19:07 (A0016)	20:55			21:52		
7	08:40			07:51		15:32 (A0019)	06:40		16:54 (A0013)	06:14		18:58 (A0016)	04:57			04:04		
	15:31			16:37	16	15:48 (A0019)	17:43	5	16:59 (A0013)	19:51	6	19:04 (A0016)	20:57			21:54		
8	08:39			07:49		15:32 (A0019)	06:37			06:11			04:54			04:03		
	15:33			16:40	16	15:48 (A0019)	17:45			19:53			20:59			21:55		
9	08:39			07:46		15:33 (A0019)	06:35			06:09		19:08 (A0017)	04:52			04:02		
	15:35			16:42	15	15:48 (A0019)	17:47			19:56	10	19:18 (A0017)	21:02			21:56		
10	08:38			07:44		15:33 (A0019)	06:32			06:06		19:05 (A0017)	04:50			04:01		
	15:37			16:45	13	15:46 (A0019)	17:49			19:58	15	19:20 (A0017)	21:04			21:57		
11	08:37			07:42		15:36 (A0019)	06:29			06:03		19:04 (A0017)	04:48			04:01		
	15:38			16:47	10	15:46 (A0019)	17:52			20:00	18	19:22 (A0017)	21:06			21:58		
12	08:36			07:39		15:38 (A0019)	06:26			06:00		19:03 (A0017)	04:45			04:00		
	15:40			16:49	4	15:42 (A0019)	17:54			20:02	19	19:22 (A0017)	21:08			21:59		
13	08:35			07:37			06:24			05:58		19:01 (A0017)	04:43			04:00		
	15:42			16:52			17:56			20:04	21	19:22 (A0017)	21:10			22:00		
14	08:33			07:35			06:21			05:55		19:01 (A0017)	04:41			03:59		
	15:44			16:54			17:58			20:07	22	19:23 (A0017)	21:12			22:00		
15	08:32			07:32			06:18			05:52		19:01 (A0017)	04:39			03:59		
	15:46			16:56			18:01			20:09	21	19:22 (A0017)	21:14			22:01		
16	08:31			07:30			06:15			05:50		19:00 (A0017)	04:37			03:59		
	15:48			16:59			18:03			20:11	22	19:22 (A0017)	21:16			22:02		
17	08:30			07:27			06:13		17:28 (A0020)	05:47		19:01 (A0017)	04:35			03:58		
	15:50			17:01			18:05	8	17:36 (A0020)	20:13	21	19:22 (A0017)	21:18			22:02		
18	08:28			07:25			06:10		17:26 (A0020)	05:44		19:00 (A0017)	04:33			03:58		
	15:52			17:03			18:07	12	17:38 (A0020)	20:16	21	19:21 (A0017)	21:20			22:03		
19	08:27			07:22		16:25 (A0018)	06:07		17:25 (A0020)	05:42		19:02 (A0017)	04:31			03:58		
	15:54			17:06	5	16:30 (A0018)	18:10	14	17:39 (A0020)	20:18	18	19:20 (A0017)	21:22			22:03		
20	08:25			07:20		16:22 (A0018)	06:04		17:24 (A0020)	05:39		19:02 (A0017)	04:29			03:58		
	15:56			17:08	10	16:32 (A0018)	18:12	15	17:39 (A0020)	20:20	17	19:19 (A0017)	21:24			22:04		
21	08:24			07:17		16:20 (A0018)	06:01		17:23 (A0020)	05:36		19:04 (A0017)	04:27			03:58		
	15:58			17:11	13	16:33 (A0018)	18:14	15	17:38 (A0020)	20:22	14	19:18 (A0017)	21:26			22:04		
22	08:22			07:15		16:20 (A0018)	05:59		17:24 (A0020)	05:34		19:05 (A0017)	04:26			03:59		
	16:01			17:13	15	16:35 (A0018)	18:16	14	17:38 (A0020)	20:24	10	19:15 (A0017)	21:28			22:04		
23	08:21			07:12		16:19 (A0018)	05:56		17:24 (A0020)	05:31		19:44 (A0015)	04:24			03:59		
	16:03			17:15	16	16:35 (A0018)	18:18	13	17:37 (A0020)	20:27	9	19:53 (A0015)	21:30			22:04		
24	08:19			07:09		16:18 (A0018)	05:53		17:25 (A0020)	05:28		19:42 (A0015)	04:22			03:59		
	16:05			17:17	17	16:35 (A0018)	18:21	11	17:36 (A0020)	20:29	12	19:54 (A0015)	21:32			22:04		
25	08:17			07:07		16:19 (A0018)	05:50		17:27 (A0020)	05:26		19:41 (A0015)	04:20			04:00		
	16:07			17:20	16	16:35 (A0018)	18:23	6	17:33 (A0020)	20:31	14	19:55 (A0015)	21:34			22:04		
26	08:15			07:04		16:19 (A0018)	05:47			05:23		19:41 (A0015)	04:19			04:00		
	16:09			17:22	16	16:35 (A0018)	18:25			20:33	15	19:56 (A0015)	21:35			22:04		
27	08:13			07:02		16:19 (A0018)	05:45			05:21		19:40 (A0015)	04:17			04:01		
	16:12			17:24	15	16:34 (A0018)	18:27			20:35	15	19:55 (A0015)	21:37			22:04		
28	08:12			06:59		16:20 (A0018)	05:42			05:18		19:40 (A0015)	04:16			04:01		
	16:14			17:27	15	16:56 (A0013)	18:29			20:38	16	19:56 (A0015)	21:39			22:04		
29	08:10						06:39			05:16		19:39 (A0015)	04:14			04:02		
	16:16						19:32			20:40	16	19:55 (A0015)	21:41			22:03		
30	08:08						06:36		19:01 (A0016)	05:13		19:40 (A0015)	04:13			04:03		
	16:19						19:34	3	19:04 (A0016)	20:42	15	19:55 (A0015)	21:42			22:03		
31	08:06		15:34 (A0019)				06:34		18:59 (A0016)			04:12						
	16:21	8	15:42 (A0019)				19:36	8	19:07 (A0016)			21:44						
Potential sun hours	228			262			366			429		515				539		
Total, worst case	16			300			196			439		38						
Sun reduction	0,19			0,16			0,22			0,42		0,53						
Oper. time red.	0,99			0,99			0,99			0,99		0,99						
Wind dir. red.	0,69			0,69			0,66			0,62		0,60						
Total reduction	0,13			0,11			0,15			0,27		0,32						
Total, real	2			34			29			116		12						

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:10>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (921)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	19:03 (A0017) 18:36	07:10 16:15	15:03 (A0019) 15:21
2	04:04 22:02	04:55 21:16	06:00 19:57	19:04 (A0017) 18:34	07:04 16:13	15:02 (A0019) 15:20
3	04:05 22:01	04:57 21:14	06:02 19:55	19:06 (A0017) 18:31	07:06 16:10	15:01 (A0019) 15:19
4	04:06 22:01	04:59 21:11	06:04 19:52	19:16 (A0017) 18:28	07:08 16:08	15:01 (A0019) 15:18
5	04:07 22:00	05:01 21:09	06:07 19:49	18:55 (A0016) 18:25	07:10 16:06	15:01 (A0019) 15:17
6	04:08 21:59	05:03 21:07	06:09 19:46	18:53 (A0016) 18:23	07:12 16:04	15:01 (A0019) 15:16
7	04:10 21:58	05:05 21:04	06:11 19:44	18:51 (A0016) 18:20	07:14 16:01	17:28 (A0013) 15:02 (A0019)
8	04:11 21:57	05:07 21:02	06:13 19:41	19:03 (A0016) 18:17	8 17:36 (A0013) 11 17:37 (A0013)	16:01 15:59
9	04:12 21:56	05:09 21:00	19:53 (A0015) 19:38	06:15 13 18:50 (A0016)	17:26 (A0013) 12 17:38 (A0013)	15:03 (A0019) 14 15:17 (A0019)
10	04:13 21:55	05:11 20:57	6 19:59 (A0015) 10 20:01 (A0015)	13 18:50 (A0016) 13 19:03 (A0016)	17:25 (A0013) 13 17:38 (A0013)	07:31 11 15:55
11	04:15 21:54	05:13 20:55	12 19:50 (A0015) 12 20:02 (A0015)	13 18:50 (A0016) 11 19:01 (A0016)	17:24 (A0013) 12 17:36 (A0013)	07:33 8 15:53
12	04:16 21:53	05:15 20:53	14 19:49 (A0015) 14 20:03 (A0015)	06:21 9 18:50 (A0016)	17:25 13 17:34 (A0013)	07:36 15:51
13	04:18 21:52	05:18 20:50	15 19:48 (A0015) 15 20:03 (A0015)	06:23 4 18:56 (A0016)	17:28 16 17:31 (A0013)	07:38 15:49
14	04:19 21:50	05:20 20:48	15 19:48 (A0015) 15 20:03 (A0015)	06:25 18:01	16 17:31 (A0013) 15 17:28 (A0013)	15:49 15:47
15	04:21 21:49	05:22 20:45	16 19:47 (A0015) 16 20:03 (A0015)	06:28 17:58	15 17:28 (A0013) 15 17:07 (A0018)	15:47 15:45
16	04:23 21:47	05:24 20:43	16 19:47 (A0015) 16 20:03 (A0015)	06:30 17:55	15 16:51 (A0018) 16 17:07 (A0018)	07:45 15:43
17	04:24 21:46	05:26 20:40	16 19:48 (A0015) 14 20:02 (A0015)	06:32 17:53	16 17:07 (A0018) 17 17:07 (A0018)	07:47 15:41
18	04:26 21:44	05:28 20:37	13 19:48 (A0015) 13 20:01 (A0015)	06:34 5 18:15 (A0020)	17 16:50 (A0018) 17 17:07 (A0018)	07:49 15:39
19	04:28 21:43	05:30 20:35	11 19:49 (A0015) 11 20:00 (A0015)	06:36 10 18:22 (A0020)	16 16:50 (A0018) 16 17:06 (A0018)	07:51 15:38
20	04:29 21:41	05:33 20:32	12 19:14 (A0017) 12 19:58 (A0015)	06:38 13 18:24 (A0020)	15 16:50 (A0018) 15 17:05 (A0018)	07:53 15:36
21	04:31 21:39	05:35 20:30	11 19:10 (A0017) 11 19:21 (A0017)	06:40 14 18:24 (A0020)	12 16:52 (A0018) 12 17:04 (A0018)	07:56 15:34
22	04:33 21:38	05:37 20:27	15 19:08 (A0017) 15 19:23 (A0017)	06:42 15 18:24 (A0020)	9 16:53 (A0018) 9 17:02 (A0018)	07:58 15:33
23	04:35 21:36	05:39 20:24	18 19:06 (A0017) 18 19:24 (A0017)	06:44 15 18:08 (A0020)	15 17:02 (A0018) 15:31	08:00 15:14
24	04:37 21:34	05:41 20:22	19 19:05 (A0017) 19 19:24 (A0017)	06:47 14 18:08 (A0020)	15 17:02 (A0018) 15:30	08:02 15:15
25	04:39 21:32	05:43 20:19	21 19:04 (A0017) 21 19:25 (A0017)	06:49 13 18:08 (A0020)	15 17:02 (A0018) 15:28	08:04 15:16
26	04:41 21:30	05:45 20:16	22 19:03 (A0017) 22 19:25 (A0017)	06:51 10 18:09 (A0020)	15 17:02 (A0018) 15:27	08:06 15:16
27	04:42 21:28	05:47 20:14	22 19:03 (A0017) 22 19:25 (A0017)	06:53 5 18:16 (A0020)	15 17:02 (A0018) 15:25	08:08 15:17
28	04:44 21:26	05:50 20:11	22 19:02 (A0017) 22 19:24 (A0017)	06:55 18:45	15 17:02 (A0018) 15:24	08:10 15:18
29	04:46 21:24	05:52 20:08	22 19:02 (A0017) 22 19:24 (A0017)	06:57 18:42	15 17:02 (A0018) 15:22	08:12 15:19
30	04:48 21:22	05:54 20:06	21 19:02 (A0017) 21 19:23 (A0017)	06:59 18:39	15 17:02 (A0018) 6 15:13 (A0019)	08:14 15:22
31	04:50 21:20	05:56 20:03	19 19:03 (A0017) 19 19:22 (A0017)	07:08 16:17	10 15:05 (A0019) 10 15:15 (A0019)	08:43 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case		366	249	233	159	224
Sun reduction		0,35	0,31	0,26	0,17	0,13
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,61	0,64	0,68	0,69	0,68
Total reduction		0,22	0,20	0,18	0,12	0,09
Total, real		80	51	41	19	20

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:13>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (845)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April		May		June	
1	08:43	13:53 (A0021)	08:04	06:56	16:39 (A0018)	06:31	05:11	19:48 (A0015)	04:10		
	15:23	18 14:11 (A0021)	16:23	17:29	15 16:54 (A0018)	19:38	20:44	14 20:02 (A0015)	21:45		
2	08:43	13:53 (A0021)	08:02	06:54	16:39 (A0018)	06:28	05:08	19:48 (A0015)	04:09		
	15:24	18 14:11 (A0021)	16:26	17:31	15 16:54 (A0018)	19:40	20:46	13 20:01 (A0015)	21:47		
3	08:42	13:53 (A0021)	08:00	06:51	16:38 (A0018)	06:25	05:06	19:48 (A0015)	04:08		
	15:26	18 14:11 (A0021)	16:28	17:34	16 16:54 (A0018)	19:42	20:49	12 20:00 (A0015)	21:48		
4	08:42	13:55 (A0021)	07:57	06:48	16:38 (A0018)	06:22	05:04	19:49 (A0015)	04:07		
	15:27	18 14:13 (A0021)	16:30	17:36	15 16:53 (A0018)	19:45	20:51	10 19:59 (A0015)	21:50		
5	08:41	13:55 (A0021)	07:55	06:46	16:39 (A0018)	06:20	05:01	19:51 (A0015)	04:06		
	15:28	18 14:13 (A0021)	16:33	17:38	14 16:53 (A0018)	19:47	20:53	6 19:57 (A0015)	21:51		
6	08:41	13:56 (A0021)	07:53	06:43	16:39 (A0018)	06:17	04:59		04:05		
	15:30	17 14:13 (A0021)	16:35	17:40	13 16:52 (A0018)	19:49	20:55		21:52		
7	08:40	13:56 (A0021)	07:51	06:40	16:41 (A0018)	06:14	04:57		04:04		
	15:31	17 14:13 (A0021)	16:37	17:43	9 16:50 (A0018)	19:51	20:57		21:53		
8	08:39	13:57 (A0021)	07:49	06:37	16:45 (A0018)	06:11	04:54		04:03		
	15:33	16 14:13 (A0021)	16:40	17:45	1 16:46 (A0018)	19:53	20:59		21:55		
9	08:38	13:58 (A0021)	07:46	15:58 (A0019)		06:09	04:52		04:02		
	15:35	16 14:14 (A0021)	16:42	9 16:07 (A0019)		19:56	21:02		21:56		
10	08:38	13:58 (A0021)	07:44	15:57 (A0019)		06:06	04:50		04:01		
	15:37	15 14:13 (A0021)	16:45	11 16:08 (A0019)		19:58	21:04		21:57		
11	08:37	13:59 (A0021)	07:42	15:56 (A0019)		06:03	04:48		04:01		
	15:38	14 14:13 (A0021)	16:47	14 16:10 (A0019)		20:00	21:06		21:58		
12	08:36	14:01 (A0021)	07:39	15:55 (A0019)		06:00	04:45		04:00		
	15:40	12 14:13 (A0021)	16:49	15 16:10 (A0019)		20:02	21:08		21:59		
13	08:35	14:02 (A0021)	07:37	15:55 (A0019)		05:58	19:22 (A0017)	04:43	04:00		
	15:42	10 14:12 (A0021)	16:52	16 16:11 (A0019)		20:04	7 19:29 (A0017)	21:10	22:00		
14	08:33	14:04 (A0021)	07:35	15:55 (A0019)		05:55	19:20 (A0017)	04:41	03:59		
	15:44	8 14:12 (A0021)	16:54	16 16:11 (A0019)		20:07	12 19:32 (A0017)	21:12	22:00		
15	08:32	14:07 (A0021)	07:32	15:55 (A0019)		05:52	19:18 (A0017)	04:39	03:59		
	15:46	2 14:09 (A0021)	16:56	15 16:10 (A0019)		20:09	15 19:33 (A0017)	21:14	22:01		
16	08:31		07:30	15:56 (A0019)		05:50	19:16 (A0017)	04:37	03:59		
	15:48		16:59	15 16:11 (A0019)		20:11	17 19:33 (A0017)	21:16	22:02		
17	08:30		07:27	15:56 (A0019)		05:47	19:16 (A0017)	04:35	03:58		
	15:50		17:01	14 16:10 (A0019)		20:13	18 19:34 (A0017)	21:18	22:02		
18	08:28		07:25	15:57 (A0019)		05:44	19:15 (A0017)	04:33	03:58		
	15:52		17:03	11 16:08 (A0019)		20:15	19 19:34 (A0017)	21:20	22:03		
19	08:27		07:22	16:00 (A0019)		05:42	19:15 (A0017)	04:31	03:58		
	15:54		17:06	6 16:06 (A0019)		20:18	20 19:35 (A0017)	21:22	22:03		
20	08:25		07:20			05:39	19:15 (A0017)	04:29	03:58		
	15:56		17:08			20:20	19 19:34 (A0017)	21:24	22:04		
21	08:24		07:17			05:36	19:15 (A0017)	04:27	03:58		
	15:58		17:10			1 17:44 (A0020)	20:22	19 19:34 (A0017)	21:26	22:04	
22	08:22		07:15			05:59	17:40 (A0020)	05:34	19:15 (A0017)	04:26	03:59
	16:01		17:13			7 17:47 (A0020)	20:24	18 19:33 (A0017)	21:28	22:04	
23	08:21		07:12			05:56	17:38 (A0020)	05:31	19:16 (A0017)	04:24	03:59
	16:03		17:15			11 17:49 (A0020)	20:27	16 19:32 (A0017)	21:30	22:04	
24	08:19		07:09			05:53	17:37 (A0020)	05:28	19:17 (A0017)	04:22	03:59
	16:05		17:17			13 17:50 (A0020)	20:29	13 19:30 (A0017)	21:32	22:04	
25	08:17		07:07			05:50	17:36 (A0020)	05:26	19:19 (A0017)	04:20	04:00
	16:07		17:20			14 17:50 (A0020)	20:31	17 19:59 (A0015)	21:34	22:04	
26	08:15		07:04	16:46 (A0018)	05:47	17:36 (A0020)	05:23	19:22 (A0017)	04:19	04:00	
	16:09		17:22	2 16:48 (A0018)	18:25	14 17:50 (A0020)	20:33	15 20:01 (A0015)	21:35	22:04	
27	08:13		07:02	16:42 (A0018)	05:45	17:37 (A0020)	05:21	19:49 (A0015)	04:17	04:01	
	16:12		17:24	9 16:51 (A0018)	18:27	13 17:50 (A0020)	20:35	12 20:01 (A0015)	21:37	22:04	
28	08:12		06:59	16:40 (A0018)	05:42	17:38 (A0020)	05:18	19:48 (A0015)	04:16	04:01	
	16:14		17:27	12 16:52 (A0018)	18:29	10 17:48 (A0020)	20:38	14 20:02 (A0015)	21:39	22:04	
29	08:10				06:39	18:39 (A0020)	05:16	19:47 (A0015)	04:14	04:02	
	16:16				19:31	7 18:46 (A0020)	20:40	14 20:01 (A0015)	21:41	22:03	
30	08:08				06:36		05:13	19:47 (A0015)	04:13	04:03	
	16:19				19:34		20:42	15 20:02 (A0015)	21:42	22:03	
31	08:06				06:34				04:12		
	16:21				19:36				21:44		
Potential sun hours	228		262		366		429		515		539
Total, worst case	217		165		188		280		55		
Sun reduction	0,19		0,16		0,22		0,42		0,53		
Oper. time red.	0,99		0,99		0,99		0,99		0,99		
Wind dir. red.	0,69		0,69		0,67		0,61		0,60		
Total reduction	0,13		0,11		0,15		0,26		0,32		
Total, real	28		19		28		73		18		

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:13>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (845)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	15:26 (A0019) 15:38 (A0019)	08:16 15:21	13:42 (A0021) 13:55 (A0021)
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	15:28 (A0019) 15:36 (A0019)	08:17 15:20	13:41 (A0021) 13:56 (A0021)
3	04:05 22:01	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10		08:19 15:19	13:41 (A0021) 13:57 (A0021)
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08		08:21 15:18	13:41 (A0021) 13:58 (A0021)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06		08:23 15:17	13:41 (A0021) 13:58 (A0021)
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	17:18 (A0018) 17:25 (A0018)	07:22 16:04	08:24 15:16	13:42 (A0021) 13:59 (A0021)
7	04:10 21:58	05:05 21:04	06:11 19:44	07:14 18:20	17:15 (A0018) 17:27 (A0018)	07:24 16:01	08:26 15:15	13:41 (A0021) 13:59 (A0021)
8	04:11 21:57	05:07 21:02	20:00 (A0015) 20:07 (A0015)	06:13 19:41	17:14 (A0018) 17:27 (A0018)	07:27 15:59	08:27 15:15	13:42 (A0021) 14:00 (A0021)
9	04:12 21:56	05:09 21:00	19:58 (A0015) 20:09 (A0015)	06:15 19:38	17:13 (A0018) 17:28 (A0018)	07:29 15:57	08:29 15:14	13:42 (A0021) 14:01 (A0021)
10	04:13 21:55	05:11 20:57	19:57 (A0015) 20:09 (A0015)	06:17 19:35	17:13 (A0018) 17:28 (A0018)	07:31 15:55	08:30 15:14	13:42 (A0021) 14:01 (A0021)
11	04:15 21:54	05:13 20:55	19:56 (A0015) 20:10 (A0015)	06:19 19:32	17:12 (A0018) 17:28 (A0018)	07:33 15:53	08:31 15:13	13:43 (A0021) 14:02 (A0021)
12	04:16 21:53	05:15 20:52	19:56 (A0015) 20:10 (A0015)	06:21 19:30	17:13 (A0018) 17:28 (A0018)	07:36 15:51	08:33 15:13	13:43 (A0021) 14:02 (A0021)
13	04:18 21:52	05:18 20:50	19:56 (A0015) 20:10 (A0015)	06:23 19:27	17:13 (A0018) 17:26 (A0018)	07:38 15:49	08:34 15:13	13:44 (A0021) 14:03 (A0021)
14	04:19 21:50	05:20 20:48	19:56 (A0015) 20:10 (A0015)	06:25 19:24	18:30 (A0020) 18:36 (A0020)	07:40 18:01	08:35 15:12	13:44 (A0021) 14:03 (A0021)
15	04:21 21:49	05:22 20:45	19:56 (A0015) 20:09 (A0015)	06:28 19:21	18:27 (A0020) 18:38 (A0020)	07:42 17:58	08:36 15:12	13:45 (A0021) 14:03 (A0021)
16	04:23 21:47	05:24 20:43	19:56 (A0015) 20:08 (A0015)	06:30 19:18	18:26 (A0020) 18:38 (A0020)	07:34 17:55	08:37 15:12	13:45 (A0021) 14:04 (A0021)
17	04:24 21:46	05:26 20:40	19:28 (A0017) 20:07 (A0015)	06:32 19:16	18:25 (A0020) 18:38 (A0020)	07:36 17:53	08:38 15:12	13:46 (A0021) 14:04 (A0021)
18	04:26 21:44	05:28 20:37	19:25 (A0017) 20:05 (A0015)	06:34 19:13	18:24 (A0020) 18:38 (A0020)	07:39 17:50	08:39 15:13	13:46 (A0021) 14:05 (A0021)
19	04:28 21:43	05:30 20:35	19:23 (A0017) 19:37 (A0017)	06:36 19:10	18:24 (A0020) 18:37 (A0020)	07:41 17:48	08:40 15:13	13:47 (A0021) 14:05 (A0021)
20	04:29 21:41	05:33 20:32	19:22 (A0017) 19:38 (A0017)	06:38 19:07	18:25 (A0020) 18:37 (A0020)	07:43 17:45	08:40 15:13	13:47 (A0021) 14:05 (A0021)
21	04:31 21:39	05:35 20:30	19:21 (A0017) 19:38 (A0017)	06:40 19:04	18:26 (A0020) 18:34 (A0020)	07:45 17:42	08:41 15:13	13:48 (A0021) 14:06 (A0021)
22	04:33 21:38	05:37 20:27	19:20 (A0017) 19:39 (A0017)	06:42 19:02	18:27 (A0020) 18:31 (A0020)	07:48 17:40	08:42 15:14	13:48 (A0021) 14:06 (A0021)
23	04:35 21:36	05:39 20:24	19:19 (A0017) 19:39 (A0017)	06:44 18:59	07:50 17:37	16:29 (A0019) 16:37 (A0019)	08:00 15:31	13:49 (A0021) 14:07 (A0021)
24	04:37 21:34	05:41 20:22	19:19 (A0017) 19:38 (A0017)	06:47 18:56	07:52 17:35	16:27 (A0019) 16:39 (A0019)	08:02 15:30	13:49 (A0021) 14:07 (A0021)
25	04:39 21:32	05:43 20:19	19:19 (A0017) 19:38 (A0017)	06:49 18:53	06:54 16:32	15:26 (A0019) 15:40 (A0019)	08:04 15:28	13:49 (A0021) 14:08 (A0021)
26	04:41 21:30	05:45 20:16	19:19 (A0017) 19:37 (A0017)	06:51 18:50	06:57 16:30	15:25 (A0019) 15:40 (A0019)	08:06 15:27	13:49 (A0021) 14:08 (A0021)
27	04:42 21:28	05:47 20:14	19:19 (A0017) 19:36 (A0017)	06:53 18:48	06:59 16:27	15:25 (A0019) 15:41 (A0019)	08:08 15:25	13:50 (A0021) 14:08 (A0021)
28	04:44 21:26	05:50 20:11	19:20 (A0017) 19:35 (A0017)	06:55 18:45	07:01 16:25	15:24 (A0019) 15:40 (A0019)	08:10 15:24	13:51 (A0021) 14:09 (A0021)
29	04:46 21:24	05:52 20:08	19:21 (A0017) 19:33 (A0017)	06:57 18:42	07:04 16:22	15:25 (A0019) 15:41 (A0019)	08:12 15:23	13:51 (A0021) 14:10 (A0021)
30	04:48 21:22	05:54 20:06	19:23 (A0017) 19:30 (A0017)	06:59 18:39	07:06 16:20	15:25 (A0019) 15:40 (A0019)	08:14 15:22	13:52 (A0021) 14:10 (A0021)
31	04:50 21:20	05:56 20:03			07:08 16:17	15:26 (A0019) 15:39 (A0019)	08:43 15:21	13:52 (A0021) 14:10 (A0021)
Potential sun hours	538	474	386	321	241		207	
Total, worst case		337	93	250	50		556	
Sun reduction		0,35	0,31	0,26	0,17		0,13	
Oper. time red.		0,99	0,99	0,99	0,99		0,99	
Wind dir. red.		0,60	0,65	0,69	0,69		0,69	
Total reduction		0,22	0,21	0,18	0,12		0,09	
Total, real		73	19	45	6		51	

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÅS 1:14>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (890)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April		May		June	
1	08:43 15:23	17 13:39 (A0021)	08:04 16:23		06:56 17:29	16 16:49 (A0018)	06:31 19:38		05:11 20:44	15 19:50 (A0015)	04:10 21:45
2	08:43 15:24	17 13:39 (A0021)	08:02 16:26		06:54 17:31	16 16:49 (A0018)	06:28 19:40		05:08 20:46	16 19:50 (A0015)	04:09 21:47
3	08:42 15:26	17 13:39 (A0021)	08:00 16:28		06:51 17:34	17 16:49 (A0018)	06:25 19:42		05:06 20:49	15 19:50 (A0015)	04:08 21:48
4	08:42 15:27	16 13:41 (A0021)	07:57 16:30		06:48 17:36	17 16:32 (A0018)	06:22 19:45	6 19:09 (A0016)	05:04 20:51	15 19:50 (A0015)	04:07 21:50
5	08:41 15:28	15 13:42 (A0021)	07:55 16:33		06:46 17:38	20 16:34 (A0018)	06:20 19:47	10 19:07 (A0016)	05:01 20:53	14 19:50 (A0015)	04:06 21:51
6	08:41 15:30	15 13:42 (A0021)	07:53 16:35	15:51 (A0019)	06:43 17:40	20 16:35 (A0018)	06:17 19:49	12 19:06 (A0016)	04:59 20:55	13 19:51 (A0015)	04:05 21:52
7	08:40 15:32	14 13:57 (A0021)	07:51 16:37	6 15:57 (A0019)	06:40 17:43	12 16:37 (A0018)	06:14 19:51	12 19:18 (A0016)	04:57 20:57	13 19:52 (A0015)	04:04 21:53
8	08:39 15:33	13 13:44 (A0021)	07:49 16:40	11 16:00 (A0019)	17:43	18 17:13 (A0013)	06:11 19:53	13 19:18 (A0016)	04:54 20:59	11 19:54 (A0015)	04:03 21:55
9	08:39 15:35	13 13:57 (A0021)	07:46 16:42	13 16:01 (A0019)	17:45	12 17:13 (A0013)	06:09 19:56	13 19:18 (A0016)	04:52 21:02	7 20:01 (A0015)	04:02 21:56
10	08:38 15:37	11 13:47 (A0021)	07:44 16:45	15 16:02 (A0019)	17:47	12 17:13 (A0013)	06:06 19:58	12 19:17 (A0016)	04:50 21:04		04:01 21:57
11	08:37 15:38	8 13:55 (A0021)	07:42 16:47	16 16:02 (A0019)	17:49	11 17:12 (A0013)	06:03 20:00	10 19:16 (A0016)	04:48 21:06		04:01 21:58
12	08:36 15:40	4 13:54 (A0021)	07:39 16:49	16 16:03 (A0019)	17:52	8 17:11 (A0013)	06:00 20:02	7 19:15 (A0016)	04:45 21:08		04:00 21:59
13	08:35 15:42		07:37 16:52	17 16:04 (A0019)	17:54		05:58 20:04		04:43 21:10		04:00 22:00
14	08:33 15:44		07:35 16:54	17 16:04 (A0019)	17:56		05:55 20:07		04:41 21:12		03:59 22:00
15	08:32 15:46		07:32 16:56	16 16:03 (A0019)	17:58		05:52 20:09	19:24 (A0017)	04:39 21:14		03:59 22:01
16	08:31 15:48		07:30 16:59	15 16:02 (A0019)	18:01	7	05:50 20:11	19:31 (A0017)	04:37 21:16		03:59 22:02
17	08:30 15:50		07:27 17:01	12 16:01 (A0019)	18:03	12	05:47 20:13	19:33 (A0017)	04:35 21:18		03:59 22:02
18	08:28 15:52		07:25 17:03	9 15:59 (A0019)	18:05	16	05:44 20:16	19:35 (A0017)	04:35 21:20		03:58 22:03
19	08:27 15:54		07:22 17:06		18:07	17	05:42 20:18	19:37 (A0017)	04:31 21:22		03:58 22:03
20	08:25 15:56		07:20 17:08		18:10	20	05:39 20:20	19:37 (A0017)	04:29 21:24		03:58 22:04
21	08:24 15:58		07:17 17:11		18:12	20	05:36 20:22	19:36 (A0017)	04:27 21:26		03:58 22:04
22	08:22 16:01		07:15 17:13		18:14	21	05:34 20:24	19:35 (A0017)	04:26 21:28		03:59 22:04
23	08:21 16:03		07:12 17:15	8 17:47 (A0020)	18:16	21	05:31 20:27	19:34 (A0017)	04:24 21:30		03:59 22:04
24	08:19 16:05		07:09 17:17	12 17:49 (A0020)	18:18	20	05:28 20:29	19:36 (A0017)	04:22 21:32		03:59 22:04
25	08:17 16:07		07:07 17:20	13 17:49 (A0020)	18:21	20	05:26 20:31	19:35 (A0017)	04:20 21:34		04:00 22:04
26	08:15 16:09		07:04 17:22	5 16:44 (A0018)	18:23	19	05:23 20:33	19:36 (A0017)	04:19 21:35		04:00 22:04
27	08:13 16:12		07:02 17:24	11 16:47 (A0018)	18:25	18	05:21 20:35	19:35 (A0017)	04:17 21:37		04:01 22:04
28	08:12 16:14		06:59 17:27	14 16:48 (A0018)	18:27	21	05:18 20:38	19:34 (A0017)	04:16 21:39		04:01 22:04
29	08:10 16:16			15 16:48 (A0018)	18:29	23	05:16 20:40	19:33 (A0017)	04:14 21:41		04:02 22:04
30	08:08 16:19				19:31	10	05:13 20:42	19:32 (A0017)	04:13 21:42		04:03 22:03
31	08:06 16:21				06:34 19:36	5		20:05 (A0015)	04:12 21:44		04:03 22:03
Potential sun hours	228		262		366		429		515		539
Total, worst case	147		208		271		373		106		
Sun reduction	0,19		0,16		0,22		0,42		0,53		
Oper. time red.	0,99		0,99		0,99		0,99		0,99		
Wind dir. red.	0,69		0,69		0,66		0,61		0,60		
Total reduction	0,13		0,11		0,15		0,26		0,32		
Total, real	19		24		40		98		34		

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:14>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (890)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December	
1	04:03 22:03	04:52 21:18	05:58 20:00	19:07 (A0016) 18:36	07:01 16:15	15:16 (A0019) 15:21	08:16 13:32 (A0021)
2	04:04 22:02	04:55 21:16	06:00 19:57	19:05 (A0016) 18:34	07:04 16:13	15:17 (A0019) 15:20	08:17 13:30 (A0021)
3	04:05 22:01	04:57 21:14	06:02 19:55	19:03 (A0016) 18:31	07:06 16:10	15:17 (A0019) 15:19	08:19 13:29 (A0021)
4	04:06 22:01	04:59 21:11	20:05 (A0015) 20:09 (A0015)	19:02 (A0016) 18:28	07:08 16:08	15:19 (A0019) 15:18	08:21 13:29 (A0021)
5	04:07 22:00	05:01 21:09	20:03 (A0015) 20:11 (A0015)	19:02 (A0016) 19:49	07:10 18:25	15:21 (A0019) 15:29 (A0019)	08:23 13:28 (A0021)
6	04:08 21:59	05:03 21:07	20:01 (A0015) 20:12 (A0015)	19:02 (A0016) 19:46	07:12 18:23	15:26 (A0019) 16:04	08:24 13:28 (A0021)
7	04:10 21:58	05:05 21:04	20:00 (A0015) 20:13 (A0015)	19:02 (A0016) 19:44	07:14 18:20	17:11 (A0018) 17:48 (A0013)	07:24 16:01
8	04:11 21:57	05:07 21:02	20:00 (A0015) 20:14 (A0015)	19:03 (A0016) 19:41	07:17 18:17	17:09 (A0018) 17:45 (A0013)	07:27 15:59
9	04:12 21:56	05:09 21:00	19:59 (A0015) 20:14 (A0015)	19:06 (A0016) 19:38	07:19 18:14	17:08 (A0018) 17:42 (A0013)	07:29 15:57
10	04:13 21:55	05:11 20:57	19:59 (A0015) 20:14 (A0015)	06:17 19:35	07:21 18:12	17:07 (A0018) 17:23 (A0018)	07:31 15:55
11	04:15 21:54	05:13 20:55	19:59 (A0015) 20:14 (A0015)	06:19 19:32	07:23 18:09	17:06 (A0018) 17:23 (A0018)	07:33 15:53
12	04:16 21:53	05:15 20:52	19:59 (A0015) 20:14 (A0015)	06:21 19:30	07:25 18:06	17:06 (A0018) 17:23 (A0018)	07:36 15:51
13	04:18 21:52	05:18 20:50	19:59 (A0015) 20:13 (A0015)	06:23 19:27	07:28 18:30 (A0020)	17:06 (A0018) 17:22 (A0018)	07:38 15:49
14	04:19 21:50	05:20 20:48	19:29 (A0017) 20:12 (A0015)	06:25 19:24	07:30 18:36 (A0020)	17:06 (A0018) 18:01	07:40 15:47
15	04:21 21:49	05:22 20:45	19:27 (A0017) 20:10 (A0015)	06:28 19:21	07:32 18:37 (A0020)	17:08 (A0018) 17:58	07:42 15:45
16	04:23 21:47	05:24 20:43	19:25 (A0017) 20:08 (A0015)	06:30 19:18	07:34 18:37 (A0020)	17:09 (A0018) 17:18 (A0018)	07:45 15:43
17	04:24 21:46	05:26 20:40	19:24 (A0017) 19:41 (A0017)	06:32 19:16	07:36 18:37 (A0020)	07:47 15:41	07:47 15:41
18	04:26 21:44	05:28 20:37	19:23 (A0017) 19:42 (A0017)	06:34 19:13	07:39 18:37 (A0020)	07:49 17:50	07:49 15:39
19	04:28 21:43	05:30 20:35	19:22 (A0017) 19:42 (A0017)	06:36 19:10	07:41 18:36 (A0020)	07:51 17:48	07:51 15:38
20	04:29 21:41	05:33 20:32	19:21 (A0017) 19:42 (A0017)	06:38 19:07	07:43 18:36 (A0020)	07:53 17:45	07:53 15:36
21	04:31 21:39	05:35 20:30	19:21 (A0017) 19:42 (A0017)	06:40 19:04	07:45 18:34 (A0020)	07:56 17:42	07:56 15:34
22	04:33 21:38	05:37 20:27	19:21 (A0017) 19:42 (A0017)	06:42 19:02	07:48 18:31 (A0020)	07:58 17:40	07:58 15:33
23	04:35 21:36	05:39 20:24	19:21 (A0017) 19:41 (A0017)	06:44 18:59	07:50 17:37	08:00 15:31	08:00 15:31
24	04:37 21:34	05:41 20:22	19:21 (A0017) 19:40 (A0017)	06:47 18:56	07:52 17:35	16:23 (A0019) 16:27 (A0019)	08:02 15:30
25	04:39 21:32	05:43 20:19	19:21 (A0017) 19:39 (A0017)	06:49 18:53	06:54 16:32	15:20 (A0019) 15:30 (A0019)	08:04 15:28
26	04:41 21:30	05:45 20:16	19:22 (A0017) 19:38 (A0017)	06:51 18:50	06:57 16:30	15:18 (A0019) 15:31 (A0019)	08:06 15:27
27	04:42 21:28	05:47 20:14	19:24 (A0017) 19:36 (A0017)	06:53 18:48	06:59 16:27	15:17 (A0019) 15:32 (A0019)	08:08 15:25
28	04:44 21:26	05:50 20:11	19:26 (A0017) 19:33 (A0017)	06:55 18:45	07:01 16:25	15:16 (A0019) 15:32 (A0019)	08:10 15:24
29	04:46 21:24	05:52 20:08	06:57 18:42	06:57 18:42	07:04 16:22	15:16 (A0019) 15:33 (A0019)	08:12 15:23
30	04:48 21:22	05:54 20:06	06:59 18:39	06:59 18:39	07:06 16:20	15:15 (A0019) 15:33 (A0019)	08:14 15:22
31	04:50 21:20	05:56 20:03			07:08 16:17	15:16 (A0019) 15:33 (A0019)	08:43 15:21
Potential sun hours	538	474	386		321	241	207
Total, worst case		399	195		323	59	515
Sun reduction		0,35	0,31		0,26	0,17	0,13
Oper. time red.		0,99	0,99		0,99	0,99	0,99
Wind dir. red.		0,60	0,64		0,68	0,69	0,69
Total reduction		0,22	0,20		0,18	0,12	0,09
Total, real		86	40		58	7	47

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:15>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (920)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April		May		June	
1	08:43 15:23	13:33 (A0021) 13:49 (A0021)	08:04 16:23		06:56 17:29	16:30 (A0018) 19:38	06:31 19:38		05:11 20:44	19:24 (A0017) 20:07 (A0015)	04:10 21:45
2	08:43 15:24	13:33 (A0021) 13:49 (A0021)	08:02 16:26		06:54 17:31	16:30 (A0018) 19:40	06:28 19:40		05:08 20:46	19:52 (A0015) 20:07 (A0015)	04:09 21:47
3	08:42 15:26	13:34 (A0021) 13:49 (A0021)	08:00 16:28		06:51 17:34	16:30 (A0018) 19:42	06:25 19:42		05:06 20:49	19:51 (A0015) 20:07 (A0015)	04:08 21:48
4	08:42 15:27	13:35 (A0021) 13:49 (A0021)	07:57 16:30		06:48 17:36	16:30 (A0018) 19:45	06:22 19:45	19:10 (A0016)	05:04 20:51	19:51 (A0015) 20:07 (A0015)	04:07 21:50
5	08:41 15:28	13:36 (A0021) 13:49 (A0021)	07:55 16:33	15:47 (A0019)	06:46 17:38	16:32 (A0018) 19:47	06:20 19:47	19:07 (A0016)	05:01 20:53	19:51 (A0015) 20:07 (A0015)	04:06 21:51
6	08:41 15:30	13:37 (A0021) 13:49 (A0021)	07:53 16:35	15:44 (A0019)	06:43 17:40	16:33 (A0018) 19:49	06:17 19:49	19:06 (A0016)	04:59 20:55	19:52 (A0015) 20:06 (A0015)	04:05 21:52
7	08:40 15:32	13:38 (A0021) 13:49 (A0021)	07:51 16:37	15:44 (A0019)	06:40 17:43	16:59 (A0013) 19:51	06:14 19:51	19:05 (A0016)	04:57 20:57	19:52 (A0015) 20:06 (A0015)	04:04 21:53
8	08:39 15:33	13:40 (A0021) 13:48 (A0021)	07:49 16:40	15:43 (A0019)	06:37 17:45	16:59 (A0013) 19:53	06:11 19:53	19:05 (A0016)	04:54 20:59	19:53 (A0015) 20:05 (A0015)	04:03 21:55
9	08:39 15:35	13:42 (A0021) 13:47 (A0021)	07:46 16:42	15:43 (A0019)	06:35 17:47	16:59 (A0013) 19:56	06:09 19:56	19:05 (A0016)	04:52 21:02	19:55 (A0015) 20:04 (A0015)	04:02 21:56
10	08:38 15:37		07:44 16:45	15:42 (A0019)	06:32 17:49	17:00 (A0013) 19:58	06:06 19:58	19:05 (A0016)	04:50 21:04	19:57 (A0015) 20:02 (A0015)	04:01 21:57
11	08:37 15:38		07:42 16:47	15:42 (A0019)	06:29 17:52	17:02 (A0013) 20:00	06:03 20:00	19:07 (A0016)	04:48 21:06		04:01 21:58
12	08:36 15:40		07:39 16:49	15:42 (A0019)	06:26 17:54	17:09 (A0013) 20:02	06:00 20:02	19:09 (A0016)	04:45 21:08		04:00 21:59
13	08:35 15:42		07:37 16:52	15:43 (A0019)	06:24 17:56		05:58 20:04	19:12 (A0016)	04:43 21:10		04:00 22:00
14	08:33 15:44		07:35 16:54	15:43 (A0019)	06:21 17:58		05:55 20:07		04:41 21:12		03:59 22:00
15	08:32 15:46		07:32 16:56	15:44 (A0019)	06:18 18:01		05:52 20:09		04:39 21:14		03:59 22:01
16	08:31 15:48		07:30 16:59	15:46 (A0019)	06:15 18:03		05:50 20:11	19:24 (A0017)	04:37 21:16		03:59 22:02
17	08:30 15:50		07:27 17:01	15:50 (A0019)	06:13 18:05		05:47 20:13	19:32 (A0017)	04:35 21:18		03:59 22:02
18	08:28 15:52		07:25 17:03	15:52 (A0019)	06:10 18:07		05:44 20:16	19:22 (A0017)	04:33 21:20		03:58 22:03
19	08:27 15:54		07:22 17:06		06:07 18:10		05:42 20:18	19:19 (A0017)	04:31 21:22		03:58 22:03
20	08:25 15:56		07:20 17:08		06:04 18:12		05:39 20:20	19:37 (A0017)	04:29 21:24		03:58 22:04
21	08:24 15:58		07:17 17:11		06:01 18:14		05:36 20:22	19:37 (A0017)	04:27 21:26		03:58 22:04
22	08:22 16:01		07:15 17:13		05:59 18:16	17:38 (A0020)	05:34 20:24	19:16 (A0017)	04:26 21:28		03:59 22:04
23	08:21 16:03		07:12 17:15		05:56 18:18	17:47 (A0020)	05:31 20:27	19:36 (A0017)	04:24 21:30		03:59 22:04
24	08:19 16:05		07:09 17:17	16:38 (A0018)	05:53 18:21	17:49 (A0020)	05:28 20:29	19:38 (A0017)	04:22 21:32		03:59 22:04
25	08:17 16:07		07:07 17:20	16:39 (A0018)	05:50 18:23	17:49 (A0020)	05:26 20:31	19:37 (A0017)	04:20 21:34		04:00 22:04
26	08:15 16:09		07:04 17:22	16:44 (A0018)	05:47 18:25	17:49 (A0020)	05:23 20:33	19:37 (A0017)	04:19 21:35		04:00 22:04
27	08:13 16:12		07:02 17:24	16:45 (A0018)	05:45 18:27	17:48 (A0020)	05:21 20:35	19:37 (A0017)	04:17 21:37		04:01 22:04
28	08:12 16:14		06:59 17:27	16:31 (A0018)	05:42 18:29	17:49 (A0020)	05:18 20:38	19:36 (A0017)	04:16 21:39		04:01 22:04
29	08:10 16:16			16:30 (A0018)	05:42 18:29	17:48 (A0020)	05:16 20:40	19:37 (A0017)	04:14 21:41		04:02 22:04
30	08:08 16:19				06:39 19:34	18:35 (A0020)	05:13 20:42	20:03 (A0015)	21:39 21:41		04:03 22:03
31	08:06 16:21				06:34 19:36	18:43 (A0020)		19:21 (A0017)	04:13 21:42		04:03 22:03
Potential sun hours											
Total, worst case		228	262	366	429	515	539				
Sun reduction		110	229	279	383	136					
Oper. time red.		0,19	0,16	0,22	0,42	0,53					
Wind dir. red.		0,99	0,99	0,99	0,99	0,99					
Total reduction		0,68	0,69	0,66	0,61	0,60					
Total, real		0,13	0,11	0,15	0,26	0,32					
		14	26	42	100	44					

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:15>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (920)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	19:06 (A0016) 18:36	07:10 16:15	15:11 (A0019) 15:21
2	04:04 22:02	04:55 21:16	06:00 19:57	19:04 (A0016) 18:34	07:13 16:13	15:12 (A0019) 15:20
3	04:05 22:01	04:57 21:14	20:06 (A0015) 19:55	19:03 (A0016) 18:31	07:15 16:10	15:12 (A0019) 15:19
4	04:06 22:01	04:59 21:11	20:03 (A0015) 19:52	19:02 (A0016) 18:28	07:17 16:08	15:14 (A0019) 15:18
5	04:07 22:00	05:01 21:09	20:02 (A0015) 19:49	19:02 (A0016) 18:25	07:20 16:06	15:14 (A0019) 15:17
6	04:08 21:59	05:03 21:07	20:01 (A0015) 19:46	19:02 (A0016) 18:23	07:22 16:04	15:17 (A0019) 15:16
7	04:10 21:58	05:05 21:04	20:01 (A0015) 19:44	19:03 (A0016) 18:20	07:24 16:01	15:16 (A0019) 15:15
8	04:11 21:57	05:07 21:02	20:01 (A0015) 19:41	19:04 (A0016) 18:17	07:27 15:59	15:13 (A0019) 15:14
9	04:12 21:56	05:09 21:00	20:00 (A0015) 19:38	19:04 (A0016) 18:17	07:29 15:57	15:13 (A0019) 15:14
10	04:13 21:55	05:11 20:57	20:00 (A0015) 19:35	19:05 (A0016) 18:12	07:31 15:55	15:14 (A0019) 15:14
11	04:15 21:54	05:13 20:55	20:01 (A0015) 19:32	19:06 (A0016) 18:09	07:33 15:53	15:15 (A0019) 15:13
12	04:16 21:53	05:15 20:52	20:01 (A0015) 19:30	19:07 (A0016) 18:06	07:36 15:51	15:16 (A0019) 15:13
13	04:18 21:52	05:18 20:50	19:29 (A0017) 19:27	18:29 (A0020) 18:03	07:38 15:49	15:17 (A0019) 15:13
14	04:19 21:50	05:20 20:48	19:27 (A0017) 19:24	18:26 (A0020) 18:01	07:40 15:47	15:18 (A0019) 15:12
15	04:21 21:49	05:22 20:45	19:25 (A0017) 19:21	18:24 (A0020) 17:58	07:42 15:45	15:19 (A0019) 15:12
16	04:23 21:47	05:24 20:43	19:24 (A0017) 19:18	18:23 (A0020) 17:55	07:45 15:43	15:20 (A0019) 15:12
17	04:24 21:46	05:26 20:40	19:23 (A0017) 19:16	18:22 (A0020) 17:53	07:47 15:41	15:21 (A0019) 15:12
18	04:26 21:44	05:28 20:37	19:23 (A0017) 19:13	18:22 (A0020) 17:50	07:49 15:39	15:22 (A0019) 15:13
19	04:28 21:43	05:30 20:35	19:22 (A0017) 19:10	18:21 (A0020) 17:48	07:51 15:38	15:23 (A0019) 15:13
20	04:29 21:41	05:33 20:32	19:22 (A0017) 19:07	18:23 (A0020) 17:45	07:53 15:36	15:24 (A0019) 15:13
21	04:31 21:39	05:35 20:30	19:22 (A0017) 19:04	18:23 (A0020) 17:42	07:56 15:34	15:25 (A0019) 15:13
22	04:33 21:38	05:37 20:27	19:22 (A0017) 19:02	18:26 (A0020) 17:40	07:58 15:33	15:26 (A0019) 15:14
23	04:35 21:36	05:39 20:24	19:22 (A0017) 18:59	18:26 (A0020) 17:37	07:58 15:31	15:27 (A0019) 15:14
24	04:37 21:34	05:41 20:22	19:23 (A0017) 18:56	18:30 (A0020) 17:35	15:33 15:30	15:28 (A0019) 15:15
25	04:39 21:32	05:43 20:19	19:23 (A0017) 18:53	18:31 (A0020) 17:32	15:34 15:28	15:29 (A0019) 15:16
26	04:41 21:30	05:45 20:16	19:25 (A0017) 18:50	18:33 (A0020) 17:29	15:36 15:27	15:30 (A0019) 15:16
27	04:42 21:28	05:47 20:14	19:27 (A0017) 18:48	18:34 (A0020) 17:27	15:38 15:25	15:31 (A0019) 15:17
28	04:44 21:26	05:50 20:11	19:34 (A0017) 18:45	18:35 (A0020) 17:25	15:39 15:24	15:32 (A0019) 15:18
29	04:46 21:24	05:52 20:08	19:36 (A0017) 18:42	18:36 (A0020) 17:22	15:40 15:21	15:33 (A0019) 15:19
30	04:48 21:22	05:54 20:06	19:38 (A0017) 18:39	18:37 (A0020) 17:20	15:41 15:22	15:34 (A0019) 15:20
31	04:50 21:20	05:56 20:03	19:39 (A0016) 19:13 (A0016)	18:38 (A0020) 17:17	15:42 15:19	15:35 (A0019) 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case		435	203	324	81	464
Sun reduction		0,35	0,31	0,26	0,17	0,13
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,60	0,64	0,68	0,69	0,68
Total reduction		0,22	0,20	0,18	0,12	0,09
Total, real		94	41	58	10	42

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:15>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (922)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June	
1	08:43		13:35 (A0021)	08:04			06:56		16:31 (A0018)	06:31			05:11		19:50 (A0015)	04:10	
	15:23	16	13:51 (A0021)	16:23			17:29	16	16:47 (A0018)	19:38			20:44	15	20:05 (A0015)	21:45	
2	08:43		13:36 (A0021)	08:02			06:54		16:30 (A0018)	06:28			05:08		19:50 (A0015)	04:09	
	15:24	15	13:51 (A0021)	16:26			17:31	17	16:47 (A0018)	19:40			20:46	16	20:06 (A0015)	21:47	
3	08:42		13:36 (A0021)	08:00			06:51		16:30 (A0018)	06:25		19:10 (A0016)	05:06		19:49 (A0015)	04:08	
	15:26	15	13:51 (A0021)	16:28			17:34	16	16:46 (A0018)	19:42	3	19:13 (A0016)	20:49	16	20:05 (A0015)	21:48	
4	08:42		13:38 (A0021)	07:57			06:48		16:31 (A0018)	06:22		19:08 (A0016)	05:04		19:50 (A0015)	04:07	
	15:27	14	13:52 (A0021)	16:30			17:36	18	17:06 (A0013)	19:45	7	19:15 (A0016)	20:51	15	20:05 (A0015)	21:50	
5	08:41		13:38 (A0021)	07:55		15:48 (A0019)	06:46		16:32 (A0018)	06:20		19:06 (A0016)	05:01		19:50 (A0015)	04:06	
	15:28	14	13:52 (A0021)	16:33	7	15:55 (A0019)	17:38	21	17:09 (A0013)	19:47	11	19:17 (A0016)	20:53	15	20:05 (A0015)	21:51	
6	08:41		13:39 (A0021)	07:53		15:45 (A0019)	06:43		16:34 (A0018)	06:17		19:05 (A0016)	04:59		19:51 (A0015)	04:05	
	15:30	13	13:52 (A0021)	16:35	12	15:57 (A0019)	17:40	19	17:11 (A0013)	19:49	13	19:18 (A0016)	20:55	13	20:04 (A0015)	21:52	
7	08:40		13:41 (A0021)	07:51		15:45 (A0019)	06:40		16:59 (A0013)	06:14		19:04 (A0016)	04:57		19:52 (A0015)	04:04	
	15:32	10	13:51 (A0021)	16:37	13	15:58 (A0019)	17:43	13	17:12 (A0013)	19:51	13	19:17 (A0016)	20:57	11	20:03 (A0015)	21:53	
8	08:39		13:42 (A0021)	07:49		15:44 (A0019)	06:37		16:59 (A0013)	06:11		19:05 (A0016)	04:54		19:54 (A0015)	04:03	
	15:33	9	13:51 (A0021)	16:40	15	15:59 (A0019)	17:45	13	17:12 (A0013)	19:53	13	19:18 (A0016)	20:59	8	20:02 (A0015)	21:55	
9	08:39		13:45 (A0021)	07:46		15:44 (A0019)	06:35		16:59 (A0013)	06:09		19:05 (A0016)	04:52		19:56 (A0015)	04:02	
	15:35	5	13:50 (A0021)	16:42	16	16:00 (A0019)	17:47	12	17:11 (A0013)	19:56	12	19:17 (A0016)	21:02	3	19:59 (A0015)	21:56	
10	08:38			07:44		15:43 (A0019)	06:32		17:00 (A0013)	06:06		19:05 (A0016)	04:50			04:01	
	15:37			16:45	17	16:00 (A0019)	17:49	10	17:10 (A0013)	19:58	10	19:15 (A0016)	21:04			21:57	
11	08:37			07:42		15:43 (A0019)	06:29		17:03 (A0013)	06:03		19:08 (A0016)	04:48			04:01	
	15:38			16:47	18	16:01 (A0019)	17:52	5	17:08 (A0013)	20:00	6	19:14 (A0016)	21:06			21:58	
12	08:36			07:39		15:43 (A0019)	06:26			06:00			04:45			04:00	
	15:40			16:49	17	16:00 (A0019)	17:54			20:02			21:08			21:59	
13	08:35			07:37		15:44 (A0019)	06:24			05:58			04:43			04:00	
	15:42			16:52	16	16:00 (A0019)	17:56			20:04			21:10			22:00	
14	08:33			07:35		15:44 (A0019)	06:21			05:55			04:41			03:59	
	15:44			16:54	15	15:59 (A0019)	17:58			20:07			21:12			22:00	
15	08:32			07:32		15:45 (A0019)	06:18			05:52		19:23 (A0017)	04:39			03:59	
	15:46			16:56	13	15:58 (A0019)	18:01			20:09	8	19:31 (A0017)	21:14			22:01	
16	08:31			07:30		15:48 (A0019)	06:15			05:50		19:20 (A0017)	04:37			03:59	
	15:48			16:59	9	15:57 (A0019)	18:03			20:11	13	19:33 (A0017)	21:16			22:02	
17	08:30			07:27			06:13			05:47		19:18 (A0017)	04:35			03:59	
	15:50			17:01			18:05			20:13	17	19:35 (A0017)	21:18			22:02	
18	08:28			07:25			06:10			05:44		19:17 (A0017)	04:33			03:58	
	15:52			17:03			18:07			20:16	18	19:35 (A0017)	21:20			22:03	
19	08:27			07:22			06:07			05:42		19:16 (A0017)	04:31			03:58	
	15:54			17:06			18:10			20:18	20	19:36 (A0017)	21:22			22:03	
20	08:25			07:20			06:04			05:39		19:15 (A0017)	04:29			03:58	
	15:56			17:08			18:12			20:20	21	19:36 (A0017)	21:24			22:04	
21	08:24			07:17			06:01		17:39 (A0020)	05:36		19:15 (A0017)	04:27			03:58	
	15:58			17:11			18:14	5	17:44 (A0020)	20:22	22	19:37 (A0017)	21:26			22:04	
22	08:22			07:15			05:59		17:37 (A0020)	05:34		19:15 (A0017)	04:26			03:59	
	16:01			17:13			18:16	10	17:47 (A0020)	20:24	21	19:36 (A0017)	21:28			22:04	
23	08:21			07:12			05:56		17:35 (A0020)	05:31		19:15 (A0017)	04:24			03:59	
	16:03			17:15			18:18	13	17:48 (A0020)	20:27	21	19:36 (A0017)	21:30			22:04	
24	08:19			07:09		16:36 (A0018)	05:53		17:34 (A0020)	05:28		19:15 (A0017)	04:22			03:59	
	16:05			17:17	5	16:41 (A0018)	18:21	15	17:49 (A0020)	20:29	20	19:35 (A0017)	21:32			22:04	
25	08:17			07:07		16:34 (A0018)	05:50		17:33 (A0020)	05:26		19:15 (A0017)	04:20			04:00	
	16:07			17:20	11	16:45 (A0018)	18:23	15	17:48 (A0020)	20:31	20	19:35 (A0017)	21:34			22:04	
26	08:15			07:04		16:32 (A0018)	05:47		17:33 (A0020)	05:23		19:16 (A0017)	04:19			04:00	
	16:09			17:22	14	16:46 (A0018)	18:25	15	17:48 (A0020)	20:33	18	19:34 (A0017)	21:35			22:04	
27	08:13			07:02		16:31 (A0018)	05:45		17:34 (A0020)	05:21		19:17 (A0017)	04:17			04:01	
	16:12			17:24	15	16:46 (A0018)	18:27	14	17:48 (A0020)	20:35	22	20:01 (A0015)	21:37			22:04	
28	08:12			06:59		16:30 (A0018)	05:42		17:34 (A0020)	05:18		19:19 (A0017)	04:16			04:01	
	16:14			17:27	17	16:47 (A0018)	18:29	12	17:46 (A0020)	20:38	22	20:03 (A0015)	21:39			22:04	
29	08:10						06:39		18:36 (A0020)	05:16		19:20 (A0017)	04:14			04:02	
	16:16						19:32	8	18:44 (A0020)	20:40	21	20:04 (A0015)	21:41			22:03	
30	08:08						06:36			05:13		19:51 (A0015)	04:13			04:03	
	16:19						19:34			20:42	14	20:05 (A0015)	21:42			22:03	
31	08:06						06:34						04:12				
	16:21						19:36						21:44				
Potential sun hours	228			262			366			429		515				539	
Total, worst case		111			230			267			386			112			
Sun reduction		0,19			0,16			0,22			0,42			0,53			
Oper. time red.		0,99			0,99			0,99			0,99			0,99			
Wind dir. red.		0,69			0,69			0,66			0,61			0,60			
Total reduction		0,13			0,11			0,15			0,26			0,32			
Total, real		14			26			40			101			36			

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

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



Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:15>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (922)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	19:07 (A0016) 18:36	07:01 16:15	15:12 (A0019) 15:21
2	04:04 22:02	04:55 21:16	06:00 19:57	19:13 (A0016) 18:34	07:04 16:13	15:29 (A0019) 15:20
3	04:05 22:01	04:57 21:14	06:02 19:55	19:14 (A0016) 18:31	07:06 16:10	15:30 (A0019) 15:19
4	04:06 22:01	04:59 21:11	20:04 (A0015) 19:52	19:03 (A0016) 18:28	07:06 16:08	15:13 (A0019) 15:18
5	04:07 22:00	05:01 21:09	20:02 (A0015) 19:49	19:15 (A0016) 18:25	07:17 16:06	15:15 (A0019) 15:17
6	04:08 21:59	05:03 21:07	20:01 (A0015) 19:46	19:15 (A0016) 18:23	07:20 16:04	15:15 (A0019) 15:16
7	04:10 21:58	05:05 21:04	20:00 (A0015) 19:44	19:14 (A0016) 18:20	07:22 16:01	15:18 (A0019) 15:15
8	04:11 21:57	05:07 21:02	20:14 (A0015) 19:41	19:13 (A0016) 18:17	07:27 15:59	15:13 15:14
9	04:12 21:56	05:09 21:00	19:59 (A0015) 19:38	19:02 (A0016) 18:14	07:29 15:57	08:27 15:14
10	04:13 21:55	05:11 20:57	19:59 (A0015) 19:35	19:04 (A0016) 18:12	07:29 15:55	08:29 15:14
11	04:15 21:54	05:13 20:55	20:14 (A0015) 19:32	19:07 (A0016) 18:09	07:31 15:53	08:30 15:13
12	04:16 21:53	05:15 20:52	19:59 (A0015) 19:30	07:25 18:06	07:33 15:51	08:31 15:13
13	04:18 21:52	05:18 20:50	19:59 (A0015) 19:27	07:28 18:03	07:36 15:49	08:33 15:13
14	04:19 21:50	05:20 20:48	20:13 (A0015) 19:24	18:27 (A0020) 18:01	07:30 15:47	08:35 15:12
15	04:21 21:49	05:22 20:45	20:12 (A0015) 19:21	18:34 (A0020) 17:58	07:32 15:45	08:36 15:12
16	04:23 21:47	05:24 20:43	19:24 (A0017) 19:18	18:23 (A0020) 17:55	07:34 15:43	08:37 15:12
17	04:24 21:46	05:26 20:40	19:23 (A0017) 19:16	18:22 (A0020) 17:53	07:36 15:41	08:38 15:12
18	04:26 21:44	05:28 20:37	19:22 (A0017) 19:13	18:36 (A0020) 17:50	07:42 15:39	08:36 15:13
19	04:28 21:43	05:30 20:35	19:21 (A0017) 19:10	18:21 (A0020) 17:48	07:49 15:38	08:39 15:13
20	04:29 21:41	05:33 20:32	19:21 (A0017) 19:07	18:35 (A0020) 17:45	07:53 15:36	08:40 15:13
21	04:31 21:39	05:35 20:30	19:20 (A0017) 19:04	18:22 (A0020) 17:42	07:56 15:34	08:41 15:13
22	04:33 21:38	05:37 20:27	19:20 (A0017) 19:02	18:34 (A0020) 17:40	07:58 15:33	08:42 15:14
23	04:35 21:36	05:39 20:24	19:20 (A0017) 18:59	18:31 (A0020) 17:37	08:00 15:31	08:42 15:14
24	04:37 21:34	05:41 20:22	19:20 (A0017) 18:56	07:52 17:35	08:02 15:30	08:43 15:15
25	04:39 21:32	05:43 20:19	19:21 (A0017) 18:53	06:54 16:32	08:04 15:28	08:43 15:16
26	04:41 21:30	05:45 20:16	19:21 (A0017) 18:50	06:57 16:30	08:06 15:27	08:43 15:16
27	04:42 21:28	05:47 20:14	19:23 (A0017) 18:48	06:59 16:27	08:08 15:25	08:43 15:17
28	04:44 21:26	05:50 20:11	19:35 (A0017) 18:45	07:01 16:25	08:10 15:24	08:43 15:18
29	04:46 21:24	05:52 20:08	19:33 (A0017) 18:42	07:04 16:22	08:12 15:23	08:43 15:19
30	04:48 21:22	05:54 20:06	06:59 18:39	07:06 16:20	08:14 15:22	08:43 15:20
31	04:50 21:20	05:56 20:03		07:08 16:17	08:13 (A0019) 15:21	08:43 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case		411	198	312	79	463
Sun reduction		0,35	0,31	0,26	0,17	0,13
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,60	0,64	0,68	0,69	0,69
Total reduction		0,22	0,20	0,18	0,12	0,09
Total, real		89	40	56	9	42

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:16>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (870)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

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

609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January			February			March			April			May			June		
1	08:43		13:42 (A0021)	08:04			06:56		16:33 (A0018)	06:31			05:11		19:48 (A0015)	04:10		
	15:23	17	13:59 (A0021)	16:23			17:29	16	16:49 (A0018)	19:38			20:44	15	20:03 (A0015)	21:45		
2	08:43		13:42 (A0021)	08:02			06:54		16:32 (A0018)	06:28			05:08		19:48 (A0015)	04:09		
	15:24	17	13:59 (A0021)	16:26			17:31	17	16:49 (A0018)	19:40			20:46	15	20:03 (A0015)	21:47		
3	08:42		13:42 (A0021)	08:00			06:51		16:32 (A0018)	06:25		19:07 (A0016)	05:06		19:48 (A0015)	04:08		
	15:26	16	13:58 (A0021)	16:28			17:34	16	16:48 (A0018)	19:42	6	19:13 (A0016)	20:49	14	20:02 (A0015)	21:48		
4	08:42		13:44 (A0021)	07:57			06:48		16:33 (A0018)	06:22		19:06 (A0016)	05:04		19:48 (A0015)	04:07		
	15:27	15	13:59 (A0021)	16:30			17:36	17	17:06 (A0013)	19:45	10	19:16 (A0016)	20:51	13	20:01 (A0015)	21:50		
5	08:41		13:44 (A0021)	07:55			06:46		16:35 (A0018)	06:20		19:05 (A0016)	05:01		19:50 (A0015)	04:06		
	15:28	15	13:59 (A0021)	16:33			17:38	18	17:09 (A0013)	19:47	12	19:17 (A0016)	20:53	10	20:00 (A0015)	21:51		
6	08:41		13:45 (A0021)	07:53		15:51 (A0019)	06:43		16:36 (A0018)	06:17		19:04 (A0016)	04:59		19:51 (A0015)	04:05		
	15:30	14	13:59 (A0021)	16:35	7	15:58 (A0019)	17:40	18	17:11 (A0013)	19:49	13	19:17 (A0016)	20:55	8	19:59 (A0015)	21:52		
7	08:40		13:46 (A0021)	07:51		15:49 (A0019)	06:40		17:00 (A0013)	06:14		19:03 (A0016)	04:57			04:04		
	15:31	13	13:59 (A0021)	16:37	12	16:01 (A0019)	17:43	13	17:13 (A0013)	19:51	13	19:16 (A0016)	20:57			21:53		
8	08:39		13:47 (A0021)	07:49		15:48 (A0019)	06:37		17:00 (A0013)	06:11		19:04 (A0016)	04:54			04:03		
	15:33	12	13:59 (A0021)	16:40	13	16:01 (A0019)	17:45	13	17:13 (A0013)	19:53	12	19:16 (A0016)	20:59			21:55		
9	08:39		13:49 (A0021)	07:46		15:48 (A0019)	06:35		17:00 (A0013)	06:09		19:05 (A0016)	04:52			04:02		
	15:35	10	13:59 (A0021)	16:42	15	16:03 (A0019)	17:47	12	17:12 (A0013)	19:56	10	19:15 (A0016)	21:02			21:56		
10	08:38		13:50 (A0021)	07:44		15:47 (A0019)	06:32		17:01 (A0013)	06:06		19:06 (A0016)	04:50			04:01		
	15:37	7	13:57 (A0021)	16:45	16	16:03 (A0019)	17:49	9	17:10 (A0013)	19:58	6	19:12 (A0016)	21:04			21:57		
11	08:37		13:54 (A0021)	07:42		15:47 (A0019)	06:29		17:05 (A0013)	06:03			04:48			04:01		
	15:38	1	13:55 (A0021)	16:47	17	16:04 (A0019)	17:52	3	17:08 (A0013)	20:00			21:06			21:58		
12	08:36			07:39		15:47 (A0019)	06:26			06:00			04:45			04:00		
	15:40			16:49	16	16:03 (A0019)	17:54			20:02			21:08			21:59		
13	08:35			07:37		15:48 (A0019)	06:24			05:58		19:22 (A0017)	04:43			04:00		
	15:42			16:52	16	16:04 (A0019)	17:56			20:04	5	19:27 (A0017)	21:10			22:00		
14	08:33			07:35		15:48 (A0019)	06:21			05:55		19:20 (A0017)	04:41			03:59		
	15:44			16:54	15	16:03 (A0019)	17:58			20:07	11	19:31 (A0017)	21:12			22:00		
15	08:32			07:32		15:48 (A0019)	06:18			05:52		19:17 (A0017)	04:39			03:59		
	15:46			16:56	14	16:02 (A0019)	18:01			20:09	15	19:32 (A0017)	21:14			22:01		
16	08:31			07:30		15:50 (A0019)	06:15			05:50		19:15 (A0017)	04:37			03:59		
	15:48			16:59	11	16:01 (A0019)	18:03			20:11	18	19:33 (A0017)	21:16			22:02		
17	08:30			07:27		15:52 (A0019)	06:13			05:47		19:15 (A0017)	04:35			03:58		
	15:50			17:01	6	15:58 (A0019)	18:05			20:13	19	19:34 (A0017)	21:18			22:02		
18	08:28			07:25			06:10			05:44		19:14 (A0017)	04:33			03:58		
	15:52			17:03			18:07			20:16	20	19:34 (A0017)	21:20			22:03		
19	08:27			07:22			06:07			05:42		19:14 (A0017)	04:31			03:58		
	15:54			17:06			18:10			20:18	20	19:34 (A0017)	21:22			22:03		
20	08:25			07:20			06:04			05:39		19:13 (A0017)	04:29			03:58		
	15:56			17:08			18:12			20:20	21	19:34 (A0017)	21:24			22:04		
21	08:24			07:17			06:01		17:37 (A0020)	05:36		19:14 (A0017)	04:27			03:58		
	15:58			17:11			18:14	7	17:44 (A0020)	20:22	20	19:34 (A0017)	21:26			22:04		
22	08:22			07:15			05:59		17:36 (A0020)	05:34		19:13 (A0017)	04:26			03:59		
	16:01			17:13			18:16	11	17:47 (A0020)	20:24	20	19:33 (A0017)	21:28			22:04		
23	08:21			07:12			05:56		17:35 (A0020)	05:31		19:14 (A0017)	04:24			03:59		
	16:03			17:15			18:18	13	17:48 (A0020)	20:27	19	19:33 (A0017)	21:30			22:04		
24	08:19			07:09			05:53		17:34 (A0020)	05:28		19:14 (A0017)	04:22			03:59		
	16:05			17:17			18:21	14	17:48 (A0020)	20:29	17	19:31 (A0017)	21:32			22:04		
25	08:17			07:07		16:37 (A0018)	05:50		17:34 (A0020)	05:26		19:16 (A0017)	04:20			04:00		
	16:07			17:20	9	16:46 (A0018)	18:23	14	17:48 (A0020)	20:31	14	19:30 (A0017)	21:34			22:04		
26	08:15			07:04		16:35 (A0018)	05:47		17:33 (A0020)	05:23		19:18 (A0017)	04:19			04:00		
	16:09			17:22	12	16:47 (A0018)	18:25	14	17:47 (A0020)	20:33	19	20:00 (A0015)	21:35			22:04		
27	08:13			07:02		16:33 (A0018)	05:45		17:35 (A0020)	05:21		19:20 (A0017)	04:17			04:01		
	16:12			17:24	15	16:48 (A0018)	18:27	12	17:47 (A0020)	20:35	16	20:01 (A0015)	21:37			22:04		
28	08:12			06:59		16:32 (A0018)	05:42		17:35 (A0020)	05:18		19:49 (A0015)	04:16			04:01		
	16:14			17:27	16	16:48 (A0018)	18:29	10	17:45 (A0020)	20:38	13	20:02 (A0015)	21:39			22:04		
29	08:10						06:39		18:38 (A0020)	05:16		19:48 (A0015)	04:14			04:02		
	16:16						19:31	4	18:42 (A0020)	20:40	14	20:02 (A0015)	21:41			22:03		
30	08:08						06:36			05:13		19:48 (A0015)	04:13			04:03		
	16:19						19:34			20:42	15	20:03 (A0015)	21:42			22:03		
31	08:06						06:34						04:12					
	16:21						19:36						21:44					
Potential sun hours	228			262			366			429		515				539		
Total, worst case		137			210			251		378			75					
Sun reduction		0,19			0,16			0,22		0,42			0,53					
Oper. time red.		0,99			0,99			0,99		0,99			0,99					
Wind dir. red.		0,69			0,69			0,66		0,61			0,60					
Total reduction		0,13			0,11			0,15		0,26			0,32					
Total, real		18			24			37		99			24					

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:16>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (870)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONÖBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	15:16 (A0019) 15:32 (A0019)
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	15:17 (A0019) 15:32 (A0019)
3	04:05 22:01	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10	15:17 (A0019) 15:31 (A0019)
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	15:19 (A0019) 15:30 (A0019)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	15:21 (A0019) 15:27 (A0019)
6	04:08 21:59	05:03 21:07	06:09 20:02 (A0015)	07:12 19:00 (A0016)	07:22 17:37 (A0013)	15:17 15:27 (A0019)
7	04:10 21:58	05:05 21:04	06:11 20:07 (A0015)	07:14 19:13 (A0016)	07:24 17:49 (A0013)	15:16 16:04
8	04:11 21:57	05:07 21:02	06:13 20:09 (A0015)	07:17 19:12 (A0016)	07:27 17:48 (A0013)	15:15 16:01
9	04:12 21:56	05:09 21:00	06:15 19:59 (A0015)	07:19 19:00 (A0016)	07:29 17:50 (A0013)	15:13 16:02
10	04:13 21:55	05:11 20:57	06:17 20:11 (A0015)	07:21 19:01 (A0016)	07:31 17:42 (A0013)	15:14 15:57
11	04:15 21:54	05:13 20:55	06:19 19:57 (A0015)	07:23 18:09	07:33 17:06 (A0018)	15:14 15:55
12	04:16 21:53	05:15 20:52	06:21 20:11 (A0015)	07:25 18:06	07:36 17:23 (A0018)	15:13 15:51
13	04:18 21:52	05:18 20:50	06:23 20:11 (A0015)	07:28 18:03	07:38 17:06 (A0018)	15:13 15:49
14	04:19 21:50	05:20 20:48	06:25 19:56 (A0015)	07:30 18:29 (A0020)	07:40 17:05 (A0018)	15:12 15:47
15	04:21 21:49	05:22 20:45	06:28 20:11 (A0015)	07:32 18:25 (A0020)	07:42 17:07 (A0018)	15:12 15:45
16	04:23 21:47	05:24 20:43	06:30 20:10 (A0015)	07:34 18:34 (A0020)	07:45 17:21 (A0018)	15:12 15:43
17	04:24 21:46	05:26 20:40	06:32 19:26 (A0017)	07:36 18:23 (A0020)	07:47 17:07 (A0018)	15:12 15:41
18	04:26 21:44	05:28 20:37	06:34 19:24 (A0017)	07:39 18:22 (A0020)	07:49 17:16 (A0018)	15:12 15:41
19	04:28 21:43	05:30 20:35	06:36 19:22 (A0017)	07:41 18:21 (A0020)	07:51 17:09 (A0018)	15:13 15:41
20	04:29 21:41	05:33 20:32	06:38 19:37 (A0017)	07:43 18:35 (A0020)	07:53 15:36	15:13 15:38
21	04:31 21:39	05:35 20:30	06:40 19:38 (A0017)	07:45 18:22 (A0020)	07:56 15:34	15:13 15:38
22	04:33 21:38	05:37 20:27	06:42 19:39 (A0017)	07:48 18:34 (A0020)	07:58 15:33	15:13 15:38
23	04:35 21:36	05:39 20:24	06:44 19:18 (A0017)	07:50 18:25 (A0020)	08:00 15:31	15:14 15:38
24	04:37 21:34	05:41 20:22	06:47 19:38 (A0017)	07:52 18:28 (A0020)	08:02 15:30	15:14 15:38
25	04:39 21:32	05:43 20:19	06:49 19:37 (A0017)	07:54 16:32	08:04 15:29 (A0019)	15:15 15:38
26	04:41 21:30	05:45 20:16	06:51 19:18 (A0017)	07:56 16:30	08:06 15:19 (A0019)	15:16 15:38
27	04:42 21:28	05:47 20:14	06:53 19:37 (A0017)	07:59 16:27	08:08 15:32 (A0019)	15:16 15:38
28	04:44 21:26	05:50 20:11	06:55 19:35 (A0017)	08:01 16:25	08:10 15:17 (A0019)	15:17 15:38
29	04:46 21:24	05:52 20:08	06:57 19:21 (A0017)	08:03 16:22	08:12 15:32 (A0019)	15:18 15:38
30	04:48 21:22	05:54 20:06	06:59 19:24 (A0017)	08:05 16:20	08:14 15:16 (A0019)	15:19 15:38
31	04:50 21:20	05:56 20:03	18:39	07:08 16:17	08:43 15:17 (A0019)	15:20 15:38
Potential sun hours	538	474	386	321	241	207
Total, worst case		377	184	303	62	494
Sun reduction		0,35	0,31	0,26	0,17	0,13
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,61	0,64	0,68	0,69	0,69
Total reduction		0,22	0,20	0,18	0,12	0,09
Total, real		82	37	54	7	45

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:17>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (833)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:23	06:56 17:29	06:31 19:38	18:18 (A0017) 21 18:39 (A0017)	05:11 20:44
2	08:43 15:24	08:02 16:26	06:54 17:31	06:28 19:40	18:19 (A0017) 19 18:38 (A0017)	05:08 20:46
3	08:42 15:26	08:00 16:28	06:51 17:34	06:25 19:42	18:20 (A0017) 21 19:13 (A0010)	05:06 20:49
4	08:42 15:27	07:57 16:30	06:48 17:36	06:22 19:45	18:22 (A0017) 21 19:16 (A0010)	05:04 20:51
5	08:41 15:28	07:55 16:33	15:48 (A0018) 17:38	16:57 (A0020) 19:47	18:26 (A0017) 15 19:17 (A0010)	05:01 20:53
6	08:41 15:30	07:53 16:35	15:45 (A0018) 17:40	16:56 (A0020) 19:49	18:27 (A0017) 13 19:17 (A0010)	05:01 20:55
7	08:40 15:31	07:51 16:37	15:45 (A0018) 17:43	16:54 (A0020) 19:51	18:28 (A0017) 13 19:16 (A0010)	05:01 20:57
8	08:39 15:33	07:49 16:40	15:43 (A0018) 17:45	16:54 (A0020) 19:53	18:29 (A0017) 12 19:14 (A0010)	05:01 20:59
9	08:39 15:35	07:46 16:42	15:43 (A0018) 17:47	16:53 (A0020) 19:56	18:30 (A0017) 10 19:15 (A0010)	05:01 21:02
10	08:38 15:37	07:44 16:45	15:43 (A0018) 17:49	16:54 (A0020) 19:58	18:31 (A0017) 7 19:13 (A0010)	05:01 21:04
11	08:37 15:38	07:42 16:47	15:43 (A0018) 17:52	16:55 (A0020) 20:00	18:32 (A0017) 9 19:25 (A0015)	05:01 21:06
12	08:36 15:40	07:39 16:49	15:43 (A0018) 17:54	16:56 (A0020) 20:02	18:33 (A0017) 13 19:26 (A0015)	05:01 21:08
13	08:35 15:42	07:37 16:52	15:44 (A0018) 17:56	16:59 (A0020) 20:04	18:34 (A0017) 15 19:27 (A0015)	05:01 21:10
14	08:33 15:44	14:59 (A0019) 15:01 (A0019)	15:45 (A0018) 17:58	17:02 (A0020) 20:07	18:35 (A0017) 16 19:28 (A0015)	22:00 21:12
15	08:32 15:46	14:56 (A0019) 15:03 (A0019)	15:46 (A0018) 18:01	17:06 (A0020) 20:09	18:36 (A0017) 17 19:29 (A0015)	22:00 21:14
16	08:31 15:48	14:56 (A0019) 15:06 (A0019)	15:49 (A0018) 18:03	17:10 (A0020) 20:11	18:37 (A0017) 17 19:30 (A0015)	22:00 21:16
17	08:30 15:50	14:55 (A0019) 15:07 (A0019)	16:25 (A0013) 18:05	17:14 (A0020) 20:13	18:38 (A0017) 17 19:31 (A0015)	22:00 21:18
18	08:28 15:52	14:55 (A0019) 15:08 (A0019)	16:24 (A0013) 18:07	17:18 (A0020) 20:16	18:39 (A0017) 16 19:32 (A0015)	22:00 21:20
19	08:27 15:54	14:54 (A0019) 15:08 (A0019)	16:23 (A0013) 18:10	17:22 (A0020) 20:18	18:40 (A0017) 15 19:33 (A0015)	22:00 21:22
20	08:25 15:56	14:54 (A0019) 15:09 (A0019)	16:23 (A0013) 18:12	17:26 (A0017) 20:20	18:41 (A0017) 12 19:34 (A0015)	22:00 21:24
21	08:24 15:58	14:55 (A0019) 15:10 (A0019)	16:23 (A0013) 18:14	17:30 (A0016) 20:22	18:42 (A0017) 9 19:35 (A0015)	22:00 21:26
22	08:22 16:01	14:55 (A0019) 15:11 (A0019)	16:23 (A0013) 18:16	17:34 (A0016) 20:24	18:43 (A0017) 18 19:36 (A0015)	22:00 21:28
23	08:21 16:03	14:55 (A0019) 15:11 (A0019)	16:24 (A0013) 18:18	17:38 (A0016) 20:27	18:44 (A0017) 20 19:37 (A0015)	22:00 21:30
24	08:19 16:05	14:56 (A0019) 15:11 (A0019)	16:25 (A0013) 18:21	17:42 (A0016) 20:29	18:45 (A0017) 23 19:38 (A0015)	22:00 21:32
25	08:17 16:07	14:56 (A0019) 15:11 (A0019)	16:32 (A0013) 18:23	17:46 (A0016) 20:31	18:46 (A0017) 23 19:39 (A0015)	22:00 21:34
26	08:15 16:09	14:56 (A0019) 15:10 (A0019)	16:36 (A0013) 18:25	17:50 (A0016) 20:33	18:47 (A0017) 22 19:40 (A0015)	22:00 21:36
27	08:14 16:12	14:57 (A0019) 15:10 (A0019)	16:36 (A0013) 18:27	17:54 (A0016) 20:35	18:48 (A0017) 23 19:41 (A0015)	22:00 21:38
28	08:12 16:14	14:58 (A0019) 15:10 (A0019)	16:37 (A0013) 18:29	17:58 (A0016) 20:38	18:49 (A0017) 23 19:42 (A0015)	22:00 21:40
29	08:10 16:16	15:00 (A0019) 15:09 (A0019)	16:38 (A0013) 18:31	18:02 (A0016) 20:40	18:50 (A0017) 23 19:43 (A0015)	22:00 21:42
30	08:08 16:19	15:04 (A0019) 15:06 (A0019)	16:39 (A0013) 18:33	18:06 (A0016) 20:42	18:51 (A0017) 23 19:44 (A0015)	22:00 21:44
31	08:06 16:21		16:40 (A0013) 18:36	18:10 (A0016) 20:44	18:52 (A0017) 22 19:45 (A0015)	22:00 21:46
Potential sun hours	228	262	366	429	515	539
Total, worst case	200	232	362	308		
Sun reduction	0,19	0,16	0,22	0,42		
Oper. time red.	0,99	0,99	0,99	0,99		
Wind dir. red.	0,69	0,69	0,66	0,63		
Total reduction	0,13	0,11	0,15	0,27		
Total, real	26	26	53	83		

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÅS 1:17>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (833)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONBERG G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	19:15 (A0015) 18:36	07:01 17:36 (A0020)	07:10 15:12 (A0018)
2	04:04 22:02	04:55 21:16	06:00 19:57	19:24 (A0015) 18:34	8 17:44 (A0020)	16 15:28 (A0018)
3	04:05 22:01	04:57 21:14	06:02 19:55	19:05 (A0010) 18:31	10 17:34 (A0020)	16 15:13 (A0018)
4	04:06 22:01	04:59 21:11	06:04 19:52	19:12 (A0010) 18:28	11 17:45 (A0020)	16 15:29 (A0018)
5	04:07 22:00	05:01 21:09	06:07 19:49	19:03 (A0010) 18:25	14 17:32 (A0020)	16 15:13 (A0018)
6	04:08 21:59	05:03 21:07	06:09 19:46	19:13 (A0010) 18:23	15 17:46 (A0020)	14 15:27 (A0018)
7	04:10 21:58	05:05 21:04	06:11 19:44	19:01 (A0010) 18:20	16 17:31 (A0020)	13 15:15 (A0018)
8	04:11 21:57	05:07 21:02	06:13 19:41	19:13 (A0010) 18:17	15 17:46 (A0020)	10 15:25 (A0018)
9	04:12 21:56	05:09 21:00	06:15 19:38	19:00 (A0010) 18:12	16 17:31 (A0020)	15 15:18 (A0018)
10	04:13 21:55	05:11 20:57	06:17 19:35	19:13 (A0010) 18:23	15 17:46 (A0020)	5 15:23 (A0018)
11	04:15 21:54	05:13 20:55	06:19 19:32	19:13 (A0010) 18:23	15 17:46 (A0020)	16 15:27 (A0018)
12	04:16 21:53	05:15 20:53	06:21 19:30	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
13	04:18 21:52	05:18 20:50	06:23 19:27	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
14	04:19 21:50	05:20 20:48	06:25 19:24	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
15	04:21 21:49	05:22 20:45	06:28 19:21	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
16	04:23 21:47	05:24 20:43	06:30 19:18	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
17	04:24 21:46	05:26 20:40	06:32 19:16	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
18	04:26 21:44	05:28 20:37	06:34 19:13	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
19	04:28 21:43	05:30 20:35	06:36 19:10	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
20	04:29 21:41	05:33 20:32	06:38 19:07	19:13 (A0010) 18:23	15 17:46 (A0020)	13 15:27 (A0018)
21	04:31 21:39	05:35 20:30	19:22 (A0015) 19:04	18:11 (A0017) 17:42	13 17:06 (A0013)	15 14:45 (A0019)
22	04:33 21:38	05:37 20:27	19:18 (A0015) 19:02	18:08 (A0017) 17:40	13 17:06 (A0013)	15 14:45 (A0019)
23	04:35 21:36	05:39 20:24	19:16 (A0015) 18:59	18:17 (A0016) 17:37	13 17:06 (A0013)	15 14:45 (A0019)
24	04:37 21:34	05:41 20:22	19:15 (A0015) 18:56	18:28 (A0016) 17:37	10 17:04 (A0013)	14 14:45 (A0019)
25	04:39 21:32	05:43 20:19	19:14 (A0015) 18:53	18:19 (A0016) 17:52	6 17:00 (A0013)	13 14:45 (A0019)
26	04:41 21:30	05:45 20:16	19:13 (A0015) 18:50	18:25 (A0016) 17:35	6 17:00 (A0013)	13 14:45 (A0019)
27	04:42 21:28	05:47 20:14	19:13 (A0015) 18:48	18:25 (A0016) 17:35	6 17:00 (A0013)	13 14:45 (A0019)
28	04:44 21:26	05:50 20:11	19:12 (A0015) 18:45	18:25 (A0016) 17:35	6 17:00 (A0013)	13 14:45 (A0019)
29	04:46 21:24	05:52 20:08	19:12 (A0015) 18:42	18:25 (A0016) 17:35	6 17:00 (A0013)	13 14:45 (A0019)
30	04:48 21:22	05:54 20:06	19:13 (A0015) 18:39	18:25 (A0016) 17:35	6 17:00 (A0013)	13 14:45 (A0019)
31	04:50 21:20	05:56 20:03	19:13 (A0015) 19:26 (A0015)	18:25 (A0016) 17:35	6 17:00 (A0013)	13 14:45 (A0019)
Potential sun hours	538	474	386	321	241	207
Total, worst case		152	410	272	277	
Sun reduction		0,35	0,31	0,26	0,17	
Oper. time red.		0,99	0,99	0,99	0,99	
Wind dir. red.		0,62	0,65	0,68	0,69	
Total reduction		0,22	0,20	0,18	0,12	
Total, real		33	83	48	33	

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

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

Project:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:18>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (834)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

January		February		March		April		May		June	
1	08:43 15:23 13	13:34 (A0021) 13:47 (A0021) 13:35 (A0021)	08:04 16:23 08:02		06:56 17:29 15:45 (A0019)	16:27 (A0018) 19:38 16:27 (A0018)	06:31 19:09 (A0016) 19:04 (A0016)	05:11 20:44 05:08		19:46 (A0015) 20:01 (A0015) 19:46 (A0015)	04:10 21:45 04:09
2	08:43 15:24 11	13:36 (A0021) 13:46 (A0021) 13:36 (A0021)	08:00 16:26 08:00	3	15:48 (A0019) 15:42 (A0019) 15:51 (A0019)	17:31 19:40 17:04 (A0013)	06:51 19:25 19:42	05:06 20:46 20:49	15	20:01 (A0015) 19:46 (A0015) 20:00 (A0015)	21:47 04:08 21:48
3	08:42 15:26 10	13:46 (A0021) 13:38 (A0021) 13:46 (A0021)	08:00 16:28 07:57	9	15:51 (A0019) 15:41 (A0019) 15:53 (A0019)	17:34 16:48 17:36	11	20:49 05:04 20:51	14	20:00 (A0015) 19:47 (A0015) 19:59 (A0015)	21:48 04:07 21:50
4	08:42 15:27 8	13:46 (A0021) 13:40 (A0021) 13:40 (A0021)	07:55 16:30 07:55	12	15:40 (A0019) 15:54 (A0019) 15:39 (A0019)	16:46 17:38 16:56 (A0013)	13	20:51 05:01 20:53	12	19:48 (A0015) 19:58 (A0015) 19:50 (A0015)	04:06 21:51 04:05
5	08:41 15:28 5	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:53 16:33 07:53	14	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:43 17:40 16:56 (A0013)	13	20:55 04:59 19:01 (A0016)	6	19:56 (A0015) 20:01 (A0016) 19:01 (A0016)	04:05 21:52 04:04
6	08:41 15:30 7	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:53 16:35 07:51	16	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:40 17:49 16:56 (A0013)	13	20:57 04:57 19:01 (A0016)		19:56 (A0015) 20:01 (A0016) 19:01 (A0016)	04:04 21:54 04:03
7	08:40 15:31 8	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:49 16:37 07:49	17	15:38 (A0019) 15:55 (A0019) 15:39 (A0019)	16:37 17:45 16:59 (A0013)	12	20:59 04:54 19:03 (A0016)		19:56 (A0015) 20:01 (A0016) 19:03 (A0016)	04:03 21:55 04:02
8	08:39 15:33 9	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:46 16:40 07:46	17	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:35 17:45 16:59 (A0013)	10	20:59 04:52 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:02 21:56 04:01
9	08:38 15:35 10	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:44 16:42 07:44	17	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:32 17:47 16:56 (A0013)	6	21:02 04:50 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:01 21:57 04:01
10	08:37 15:37 11	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:42 16:45 07:42	16	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:29 17:49 16:56 (A0013)		21:04 04:48 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:01 21:57 04:01
11	08:37 15:38 12	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:42 16:47 07:39	16	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:29 17:52 16:26		21:06 04:48 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:01 21:58 04:00
12	08:36 15:40 13	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:39 16:49 07:37	14	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:26 17:54 16:24		21:08 04:45 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:00 21:59 04:00
13	08:35 15:42 14	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:37 16:52 07:35	12	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:24 17:56 16:21		21:10 04:43 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:00 22:00 03:59
14	08:33 15:44 15	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:35 16:54 07:32	8	15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:21 17:58 16:18		21:12 04:41 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:59 22:00 03:59
15	08:32 15:46 16	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:32 16:56 07:30		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:18 18:01 16:15		21:14 04:39 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:59 22:01 03:59
16	08:31 15:48 17	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:30 16:59 07:27		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:15 18:03 16:13		21:16 04:37 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:59 22:02 03:58
17	08:30 15:50 18	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:27 17:01 07:25		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:13 18:05 16:10		21:18 04:35 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:58 22:02 03:58
18	08:28 15:52 19	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:25 17:03 07:22		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:10 18:07 16:07		21:20 04:33 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:58 22:03 03:58
19	08:27 15:54 20	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:22 17:06 07:20		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:07 18:10 16:04		21:22 04:31 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:58 22:03 03:58
20	08:25 15:56 21	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:20 17:08 07:17		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:04 18:12 16:01		21:24 04:29 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:58 22:04 03:58
21	08:24 15:58 22	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:17 17:11 07:15		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:01 18:14 16:07		21:26 04:27 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:58 22:04 03:59
22	08:22 16:01 23	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:15 17:13 07:12		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:07 18:16 16:05		21:28 04:26 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:59 22:04 03:59
23	08:21 16:03 24	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:12 17:15 07:09		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:05 18:18 16:04		21:30 04:24 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:59 22:04 03:59
24	08:19 16:05 25	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:09 17:17 07:07		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:04 18:21 16:03		21:32 04:22 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	03:59 22:04 04:00
25	08:17 16:07 26	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:07 17:20 07:04		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:03 18:23 16:02		21:34 04:20 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:00 22:04 04:00
26	08:15 16:09 27	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:04 17:22 07:02		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:02 18:25 16:01		21:36 04:19 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:00 22:04 04:01
27	08:13 16:12 28	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	07:02 17:24 06:59		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:01 18:27 16:00		21:38 04:17 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:01 22:04 04:01
28	08:12 16:14 29	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	06:59 17:27 16:56		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:00 18:29 16:00		21:40 04:16 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:01 22:04 04:02
29	08:10 16:16 30	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	16:56 17:27 16:54		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:00 18:32 16:00		21:42 04:14 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:02 22:04 04:03
30	08:08 16:19 31	13:45 (A0021) 13:45 (A0021) 13:45 (A0021)	16:54 17:27 16:52		15:39 (A0019) 15:55 (A0019) 15:39 (A0019)	16:00 18:34 16:00		21:44 04:13 19:04 (A0016)		19:56 (A0015) 20:01 (A0016) 19:04 (A0016)	04:03 22:04 04:03
Potential sun hours	228		262		366		429		515		539
Total, worst case	47		268		220		412		72		
Sun reduction	0,19		0,16		0,22		0,42		0,53		
Oper. time red.	0,99		0,99		0,99		0,99		0,99		
Wind dir. red.	0,68		0,69		0,66		0,62		0,60		
Total reduction	0,13		0,11		0,15		0,26		0,32		
Total, real	6		30		33		109		23		

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)



## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:18>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (834)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	15:08 (A0019) 15:21 (A0019)
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	15:09 (A0019) 15:20 (A0019)
3	04:05 22:01	04:57 21:14	06:02 19:55	19:02 (A0016) 19:08 (A0016)	07:06 18:31	15:08 (A0019) 15:19 (A0019)
4	04:06 22:01	04:59 21:11	06:04 19:52	19:00 (A0016) 19:10 (A0016)	07:08 18:28	15:09 (A0019) 15:18 (A0019)
5	04:07 22:00	05:01 21:09	06:07 19:49	18:58 (A0016) 19:10 (A0016)	07:10 18:25	15:09 (A0019) 15:17 (A0019)
6	04:08 21:59	05:03 21:07	06:09 19:46	18:57 (A0016) 19:10 (A0016)	07:12 18:23	15:10 (A0019) 15:16 (A0019)
7	04:10 21:58	05:05 21:04	19:59 (A0015) 20:07 (A0015)	06:11 19:44	17:32 (A0013) 17:44 (A0013)	15:11 (A0019) 15:15 (A0019)
8	04:11 21:57	05:07 21:02	06:13 20:08 (A0015)	13 19:41	17:43 (A0013) 17:31 (A0013)	15:12 (A0019) 15:15 (A0019)
9	04:12 21:56	05:09 21:00	06:15 20:09 (A0015)	13 19:38	17:31 (A0013) 17:42 (A0013)	15:12 (A0019) 15:17 (A0019)
10	04:13 21:55	05:11 20:57	19:55 (A0015) 20:10 (A0015)	06:17 19:35	17:04 (A0018) 17:39 (A0013)	07:31 15:55
11	04:15 21:54	05:13 20:55	19:55 (A0015) 20:10 (A0015)	06:19 19:32	17:01 (A0018) 17:36 (A0013)	07:33 15:53
12	04:16 21:53	05:15 20:52	19:54 (A0015) 20:10 (A0015)	06:21 19:30	17:01 (A0018) 17:15 (A0018)	07:36 15:51
13	04:18 21:52	05:18 20:50	19:54 (A0015) 20:10 (A0015)	06:23 19:27	16:59 (A0018) 17:15 (A0018)	07:38 15:49
14	04:19 21:50	05:20 20:48	19:54 (A0015) 20:09 (A0015)	06:25 19:24	16:58 (A0018) 17:15 (A0018)	07:40 15:47
15	04:21 21:49	05:22 20:45	19:55 (A0015) 20:09 (A0015)	06:28 19:21	16:59 (A0018) 17:15 (A0018)	07:42 15:45
16	04:23 21:47	05:24 20:43	19:55 (A0015) 20:08 (A0015)	06:30 19:18	18:22 (A0020) 18:29 (A0020)	07:45 15:43
17	04:24 21:46	05:26 20:40	19:22 (A0017) 20:06 (A0015)	06:32 19:16	18:19 (A0020) 18:30 (A0020)	07:47 15:41
18	04:26 21:44	05:28 20:37	19:20 (A0017) 20:04 (A0015)	06:34 19:13	18:18 (A0020) 18:31 (A0020)	07:49 15:39
19	04:28 21:43	05:30 20:35	19:18 (A0017) 19:33 (A0017)	06:36 19:10	18:17 (A0020) 18:31 (A0020)	07:51 15:38
20	04:29 21:41	05:33 20:32	19:16 (A0017) 19:34 (A0017)	06:38 19:07	18:17 (A0020) 18:32 (A0020)	07:53 15:36
21	04:31 21:39	05:35 20:30	19:15 (A0017) 19:35 (A0017)	06:40 19:04	18:16 (A0020) 18:31 (A0020)	07:56 15:34
22	04:33 21:38	05:37 20:27	19:14 (A0017) 19:35 (A0017)	06:42 19:02	18:16 (A0020) 18:30 (A0020)	07:58 15:33
23	04:35 21:36	05:39 20:24	19:14 (A0017) 19:35 (A0017)	06:44 18:59	18:17 (A0020) 18:28 (A0020)	08:00 15:31
24	04:37 21:34	05:41 20:22	19:13 (A0017) 19:35 (A0017)	06:47 18:56	18:18 (A0020) 18:25 (A0020)	08:02 15:30
25	04:39 21:32	05:43 20:19	19:13 (A0017) 19:34 (A0017)	06:49 18:53	06:54 16:32	08:04 15:28
26	04:41 21:30	05:45 20:16	19:13 (A0017) 19:34 (A0017)	06:51 18:50	06:57 16:30	08:06 15:27
27	04:42 21:28	05:47 20:14	19:13 (A0017) 19:33 (A0017)	06:53 18:48	06:59 16:27	08:08 15:25
28	04:44 21:26	05:50 20:11	19:13 (A0017) 19:32 (A0017)	06:55 18:45	07:01 16:25	08:10 15:22
29	04:46 21:24	05:52 20:08	19:14 (A0017) 19:31 (A0017)	06:57 18:42	07:04 16:22	08:12 15:24
30	04:48 21:22	05:54 20:06	19:15 (A0017) 19:29 (A0017)	06:59 18:39	07:06 16:20	08:14 15:22
31	04:50 21:20	05:56 20:03	19:17 (A0017) 19:26 (A0017)		07:08 16:17	08:43 15:21
Potential sun hours	538	474	386	321	241	207
Total, worst case		410	193	263	117	341
Sun reduction		0,35	0,31	0,26	0,17	0,13
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,61	0,65	0,68	0,69	0,68
Total reduction		0,22	0,20	0,18	0,12	0,09
Total, real		89	39	47	14	31

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:19>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (844)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June	
1	08:43	10	13:34 (A0021)	08:04	9	15:40 (A0019)	06:56	14	16:25 (A0018)	06:31	5	19:04 (A0016)	05:11	16	19:44 (A0015)	04:10	
	15:23		13:44 (A0021)	16:23		17:29	16:39 (A0018)		19:38	19:09 (A0016)		20:44	20:00 (A0015)		21:45		
2	08:43	9	13:35 (A0021)	08:02	15:49 (A0019)	06:54	17	16:26 (A0018)	06:28	9	19:02 (A0016)	05:08	14	19:45 (A0015)	04:09		
	15:24		13:44 (A0021)	16:26		17:31		17:01 (A0013)	19:40		19:11 (A0016)	20:46		19:59 (A0015)	21:47		
3	08:42	7	13:36 (A0021)	08:00	15:38 (A0019)	06:51	16	16:28 (A0018)	06:25	13	19:00 (A0016)	05:06	13	19:45 (A0015)	04:08		
	15:26		13:43 (A0021)	16:28		17:34		17:04 (A0013)	19:42		19:13 (A0016)	20:49		19:58 (A0015)	21:48		
4	08:42	5	13:38 (A0021)	07:57	15:52 (A0019)	06:48	12	16:54 (A0013)	06:22	14	19:00 (A0016)	05:04	11	19:46 (A0015)	04:07		
	15:27		13:43 (A0021)	16:30		17:36		17:06 (A0013)	19:45		19:14 (A0016)	20:51		19:57 (A0015)	21:50		
5	08:41			07:55	15:37 (A0019)	06:46	13	16:55 (A0013)	06:20	13	19:00 (A0016)	05:01	7	19:48 (A0015)	04:06		
	15:28			16:33		17:38		17:08 (A0013)	19:47		19:13 (A0016)	20:53		19:55 (A0015)	21:51		
6	08:41			07:53	15:37 (A0019)	06:43	12	16:55 (A0013)	06:17	12	19:00 (A0016)	04:59			04:05		
	15:30			16:35		17:40		17:07 (A0013)	19:49		19:12 (A0016)	20:55			21:52		
7	08:40			07:51	15:37 (A0019)	06:40	11	16:55 (A0013)	06:14	11	19:00 (A0016)	04:57			04:04		
	15:31			16:37		17:43		17:06 (A0013)	19:51		19:11 (A0016)	20:57			21:54		
8	08:39			07:49	15:36 (A0019)	06:37	7	16:57 (A0013)	06:11	8	19:02 (A0016)	04:54			04:03		
	15:33			16:40		17:45		17:04 (A0013)	19:53		19:10 (A0016)	20:59			21:55		
9	08:39			07:46	15:37 (A0019)	06:35			06:09			04:52			04:02		
	15:35			16:42		17:47			19:56			21:02			21:56		
10	08:38			07:44	15:37 (A0019)	06:32			06:06			04:50			04:01		
	15:37			16:45		17:49			19:58			21:04			21:57		
11	08:37			07:42	15:39 (A0019)	06:29			06:03	9	19:15 (A0017)	04:48			04:01		
	15:38			16:47		17:52			20:00		19:24 (A0017)	21:06			21:58		
12	08:36			07:39	15:39 (A0019)	06:26			06:00	14	19:12 (A0017)	04:45			04:00		
	15:40			16:49		17:54			20:02		19:26 (A0017)	21:08			21:59		
13	08:35			07:37	15:42 (A0019)	06:24			05:58	17	19:10 (A0017)	04:43			04:00		
	15:42			16:52		17:56			20:04		19:27 (A0017)	21:10			22:00		
14	08:33			07:35	15:50 (A0019)	06:21			05:55	18	19:10 (A0017)	04:41			03:59		
	15:44			16:54		17:58			20:07		19:28 (A0017)	21:12			22:00		
15	08:32			07:32	16:01	17:58			05:52	20	19:08 (A0017)	04:39			03:59		
	15:46			16:56		18:01			20:09		19:28 (A0017)	21:14			22:01		
16	08:31			07:30	16:15	18:03			05:50	21	19:07 (A0017)	04:37			03:59		
	15:48			16:59		18:03			20:11		19:28 (A0017)	21:16			22:02		
17	08:30			07:27	16:13	18:05			05:47	22	19:07 (A0017)	04:35			03:58		
	15:50			17:01		18:05			20:13		19:29 (A0017)	21:18			22:02		
18	08:28			07:25	16:10	18:07	4	17:34 (A0020)	05:44	21	19:07 (A0017)	04:33			03:58		
	15:52			17:03		18:07			20:16		19:28 (A0017)	21:20			22:03		
19	08:27			07:22	16:07	18:10	9	17:31 (A0020)	05:42	21	19:07 (A0017)	04:31			03:58		
	15:54			17:06		18:10			20:18		19:28 (A0017)	21:22			22:03		
20	08:25			07:20	16:04	18:12	12	17:30 (A0020)	05:39	20	19:07 (A0017)	04:29			03:58		
	15:56			17:08		18:12			20:20		19:27 (A0017)	21:24			22:04		
21	08:24			07:17	16:29 (A0018)	18:14	14	17:29 (A0020)	05:36	19	19:08 (A0017)	04:27			03:58		
	15:58			17:11		18:14			20:22		19:27 (A0017)	21:26			22:04		
22	08:22			07:15	16:27 (A0018)	18:16	15	17:29 (A0020)	05:34	17	19:08 (A0017)	04:26			03:59		
	16:01			17:13		18:16			20:24		19:25 (A0017)	21:28			22:04		
23	08:21			07:12	16:26 (A0018)	18:18	15	17:28 (A0020)	05:31	15	19:10 (A0017)	04:24			03:59		
	16:03			17:15		18:18			20:27		19:25 (A0017)	21:30			22:04		
24	08:19			07:09	16:24 (A0018)	18:21	14	17:28 (A0020)	05:28	16	19:11 (A0017)	04:22			03:59		
	16:05			17:17		18:21			20:29		19:11 (A0017)	21:32			22:04		
25	08:17			07:07	16:25 (A0018)	18:23	12	17:29 (A0020)	05:26	15	19:14 (A0017)	04:20			04:00		
	16:07			17:20		18:23			20:31		19:58 (A0015)	21:34			22:04		
26	08:15			07:04	16:24 (A0018)	18:25	9	17:30 (A0020)	05:23	12	19:15 (A0015)	04:19			04:00		
	16:09			17:22		18:25			20:33		19:59 (A0015)	21:35			22:04		
27	08:13			07:02	16:24 (A0018)	18:27	2	17:34 (A0020)	05:21	14	19:15 (A0015)	04:17			04:01		
	16:12			17:24		18:27			20:35		19:59 (A0015)	21:37			22:04		
28	08:12			06:59	16:24 (A0018)	18:29			05:18	15	19:44 (A0015)	04:16			04:01		
	16:14			17:27		18:29			20:38		20:00 (A0015)	21:39			22:04		
29	08:10				16:39 (A0018)	18:32			05:16	16	19:44 (A0015)	04:14			04:02		
	16:16					19:32			20:40		19:59 (A0015)	21:41			22:03		
30	08:08				16:36 (A0018)	19:34			05:13	20	19:44 (A0015)	04:13			04:03		
	16:19					19:34			20:42		20:00 (A0015)	21:42			22:03		
31	08:06				16:34 (A0018)	19:36						04:12					
	16:21					19:36						21:44					
Potential sun hours	228		262			366			429			515			539		
Total, worst case	31		279			208			422			61					
Sun reduction	0,19		0,16			0,22			0,42			0,53					
Oper. time red.	0,99		0,99			0,99			0,99			0,99					
Wind dir. red.	0,68		0,69			0,66			0,62			0,60					
Total reduction	0,13		0,11			0,15			0,26			0,32					
Total, real	4		31			31			112			20					

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:19>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (844)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	19:14 (A0017) 19:23 (A0017)	07:01 18:36	07:10 16:15
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	15:23 (A0019) 15:20
3	04:05 22:01	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10	15:06 (A0019) 15:19
4	04:06 22:01	04:59 21:11	06:04 19:52	18:59 (A0016) 19:07 (A0016)	07:08 18:28	07:17 16:08
5	04:07 22:00	05:01 21:09	06:07 19:49	18:57 (A0016) 19:08 (A0016)	07:10 18:25	07:20 16:06
6	04:08 21:59	05:03 21:07	06:09 19:46	18:56 (A0016) 19:08 (A0016)	07:12 18:23	07:22 16:04
7	04:10 21:58	05:05 21:04	06:11 19:44	18:55 (A0016) 19:08 (A0016)	07:14 18:20	07:24 16:01
8	04:11 21:57	05:07 21:02	06:13 19:41	18:55 (A0016) 19:08 (A0016)	07:17 18:17	07:27 15:59
9	04:12 21:56	05:09 21:00	06:15 19:38	18:55 (A0016) 19:07 (A0016)	07:19 18:14	07:29 15:57
10	04:13 21:55	05:11 20:57	06:17 19:35	18:55 (A0016) 19:04 (A0016)	07:21 18:12	07:31 15:55
11	04:15 21:54	05:13 20:55	06:19 19:32	18:56 (A0016) 19:01 (A0016)	07:23 18:09	07:33 15:53
12	04:16 21:53	05:15 20:53	06:21 19:30	07:25 18:06	07:36 16:59 (A0018)	07:36 15:51
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 16:58 (A0018)	07:38 15:49
14	04:19 21:50	05:20 20:48	06:25 19:24	07:30 18:01	07:40 16:57 (A0018)	07:40 15:47
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 17:58	07:42 16:57 (A0018)	07:42 15:45
16	04:23 21:47	05:24 20:43	06:30 19:18	07:34 17:55	07:45 16:56 (A0018)	07:45 15:43
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 18:19 (A0020)	07:47 16:56 (A0018)	07:47 15:41
18	04:26 21:44	05:28 20:37	06:34 19:13	07:39 18:28 (A0020)	07:49 16:57 (A0018)	07:49 15:39
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 18:29 (A0020)	07:51 16:57 (A0018)	07:51 15:38
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 18:15 (A0020)	07:53 16:58 (A0018)	07:53 15:36
21	04:31 21:39	05:35 20:30	06:40 19:04	07:45 18:14 (A0020)	07:56 17:02 (A0018)	07:56 15:34
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 18:14 (A0020)	07:58 17:05 (A0018)	07:58 15:33
23	04:35 21:36	05:39 20:24	06:44 19:32 (A0017)	07:50 18:14 (A0020)	08:00 17:37	08:00 15:31
24	04:37 21:34	05:41 20:22	06:47 19:32 (A0017)	07:52 18:15 (A0020)	08:02 17:35	08:02 15:30
25	04:39 21:32	05:43 20:19	06:49 19:32 (A0017)	07:54 18:16 (A0020)	08:04 16:32	08:04 15:28
26	04:41 21:30	05:45 20:16	06:51 19:32 (A0017)	06:57 18:22 (A0020)	08:06 16:30	08:06 15:27
27	04:42 21:28	05:47 20:14	06:53 19:31 (A0017)	06:59 16:27	08:08 15:25	08:08 15:25
28	04:44 21:26	05:50 20:11	06:55 19:30 (A0017)	07:01 16:25	08:10 15:17 (A0019)	08:10 15:24
29	04:46 21:24	05:52 20:08	06:57 19:30 (A0017)	07:04 16:22	08:12 15:20 (A0019)	08:12 15:23
30	04:48 21:22	05:54 20:06	06:59 19:31 (A0017)	07:06 16:20	08:14 15:08 (A0019)	08:14 15:22
31	04:50 21:20	05:56 20:03	07:12 (A0017) 19:26 (A0017)	07:08 16:17	08:16 15:08 (A0019)	08:16 15:23 (A0019)
Potential sun hours	538	474	386	321	241	207
Total, worst case		399	200	255	132	302
Sun reduction		0,35	0,31	0,26	0,17	0,13
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,61	0,65	0,68	0,69	0,68
Total reduction		0,22	0,20	0,18	0,12	0,09
Total, real		87	41	45	16	27

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:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:7>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (818)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

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

609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January			February			March			April			May			June		
1	08:43		13:36 (A0021)	08:04			06:56			16:29 (A0018)	06:31		05:11			19:48 (A0015)	04:10	
	15:23	15	13:51 (A0021)	16:23			17:29	17	16:46 (A0018)	19:38			20:44	16		20:04 (A0015)	21:45	
2	08:43		13:36 (A0021)	08:02			06:54			16:29 (A0018)	06:28		19:10 (A0016)			19:48 (A0015)	04:09	
	15:24	15	13:51 (A0021)	16:26			17:31	16	16:45 (A0018)	19:40	1	19:11 (A0016)	20:46	16		20:04 (A0015)	21:47	
3	08:42		13:37 (A0021)	08:00			06:51			16:29 (A0018)	06:25		19:06 (A0016)			19:48 (A0015)	04:08	
	15:26	13	13:50 (A0021)	16:28			17:34	17	17:04 (A0013)	19:42	7	19:13 (A0016)	20:49	15		20:03 (A0015)	21:48	
4	08:42		13:38 (A0021)	07:57			06:48			16:30 (A0018)	06:22		19:05 (A0016)			19:48 (A0015)	04:07	
	15:27	13	13:51 (A0021)	16:30	6	15:53 (A0019)	17:36	19	17:06 (A0013)	19:45	11	19:16 (A0016)	20:51	14		20:02 (A0015)	21:50	
5	08:41		13:39 (A0021)	07:55			06:46			16:33 (A0018)	06:20		19:04 (A0016)			19:49 (A0015)	04:06	
	15:28	12	13:51 (A0021)	16:33	11	15:56 (A0019)	17:38	18	17:09 (A0013)	19:47	13	19:17 (A0016)	20:53	13		20:02 (A0015)	21:51	
6	08:41		13:40 (A0021)	07:53			06:43			16:59 (A0013)	06:17		19:03 (A0016)			19:50 (A0015)	04:05	
	15:30	10	13:50 (A0021)	16:35	14	15:57 (A0019)	17:40	12	17:11 (A0013)	19:49	13	19:16 (A0016)	20:55	11		20:01 (A0015)	21:52	
7	08:40		13:42 (A0021)	07:51			06:40			16:58 (A0013)	06:14		19:03 (A0016)			19:52 (A0015)	04:04	
	15:32	8	13:50 (A0021)	16:37	15	15:58 (A0019)	17:43	13	17:11 (A0013)	19:51	13	19:16 (A0016)	20:57	7		19:59 (A0015)	21:53	
8	08:39		13:44 (A0021)	07:49			06:37			16:58 (A0013)	06:11		19:04 (A0016)				04:03	
	15:33	5	13:49 (A0021)	16:40	16	15:58 (A0019)	17:45	12	17:10 (A0013)	19:53	12	19:16 (A0016)	20:59				21:55	
9	08:39			07:46			06:35			16:59 (A0013)	06:09		19:04 (A0016)			04:52	04:02	
	15:35			16:42	17	15:59 (A0019)	17:47	10	17:09 (A0013)	19:56	10	19:14 (A0016)	21:02				21:56	
10	08:38			07:44			06:32			17:00 (A0013)	06:06		19:05 (A0016)			04:50	04:01	
	15:37			16:45	17	15:59 (A0019)	17:49	7	17:07 (A0013)	19:58	7	19:12 (A0016)	21:04				21:57	
11	08:37			07:42			06:29				06:03		04:48				04:01	
	15:38			16:47	17	15:59 (A0019)	17:52				20:00		21:06				21:58	
12	08:36			07:39			06:26				06:00		04:45				04:00	
	15:40			16:49	17	15:59 (A0019)	17:54				20:02		21:08				21:59	
13	08:35			07:37			06:24				05:58		19:24 (A0017)			04:43	04:00	
	15:42			16:52	15	15:59 (A0019)	17:56				20:04	1	19:25 (A0017)			21:10	22:00	
14	08:33			07:35			06:21				05:55		19:20 (A0017)			04:41	03:59	
	15:44			16:54	13	15:57 (A0019)	17:58				20:07	10	19:30 (A0017)			21:12	22:00	
15	08:32			07:32			06:18				05:52		19:17 (A0017)			04:39	03:59	
	15:46			16:56	11	15:56 (A0019)	18:01				20:09	15	19:32 (A0017)			21:14	22:01	
16	08:31			07:30			06:15				05:50		19:15 (A0017)			04:37	03:59	
	15:48			16:59	4	15:53 (A0019)	18:03				20:11	17	19:32 (A0017)			21:16	22:02	
17	08:30			07:27			06:13				05:47		19:15 (A0017)			04:35	03:59	
	15:50			17:01			18:05				20:13	19	19:34 (A0017)			21:18	22:02	
18	08:28			07:25			06:10				05:44		19:13 (A0017)			04:33	03:58	
	15:52			17:03			18:07				20:16	21	19:34 (A0017)			21:20	22:03	
19	08:27			07:22			06:07				05:42		19:13 (A0017)			04:31	03:58	
	15:54			17:06			18:10				20:18	21	19:34 (A0017)			21:22	22:03	
20	08:25			07:20			06:04			17:38 (A0020)	05:39		19:13 (A0017)			04:29	03:58	
	15:56			17:08			18:12	4	17:42 (A0020)	20:20	21	19:34 (A0017)	21:24				22:04	
21	08:24			07:17			06:01			17:35 (A0020)	05:36		19:13 (A0017)			04:27	03:58	
	15:58			17:11			18:14	9	17:44 (A0020)	20:22	21	19:34 (A0017)	21:26				22:04	
22	08:22			07:15			05:59			17:34 (A0020)	05:34		19:12 (A0017)			04:26	03:59	
	16:01			17:13			18:16	13	17:47 (A0020)	20:24	21	19:33 (A0017)	21:28				22:04	
23	08:21			07:12			16:36 (A0018)			17:33 (A0020)	05:31		19:13 (A0017)			04:24	03:59	
	16:03			17:15	3	16:39 (A0018)	18:18	14	17:47 (A0020)	20:27	20	19:33 (A0017)	21:30				22:04	
24	08:19			07:09			16:32 (A0018)			17:32 (A0020)	05:28		19:13 (A0017)			04:22	03:59	
	16:05			17:17	10	16:42 (A0018)	18:21	15	17:47 (A0020)	20:29	19	19:32 (A0017)	21:32				22:04	
25	08:17			07:07			16:31 (A0018)			17:32 (A0020)	05:26		19:14 (A0017)			04:20	04:00	
	16:07			17:20	13	16:44 (A0018)	18:23	15	17:47 (A0020)	20:31	17	19:31 (A0017)	21:34				22:04	
26	08:15			07:04			16:30 (A0018)			17:32 (A0020)	05:23		19:16 (A0017)			04:19	04:00	
	16:09			17:22	15	16:45 (A0018)	18:25	14	17:46 (A0020)	20:33	20	20:00 (A0015)	21:35				22:04	
27	08:13			07:02			16:29 (A0018)			17:33 (A0020)	05:21		19:17 (A0017)			04:17	04:01	
	16:12			17:24	16	16:45 (A0018)	18:27	12	17:45 (A0020)	20:35	20	20:01 (A0015)	21:37				22:04	
28	08:12			06:59			05:42			17:34 (A0020)	05:18		19:21 (A0017)			04:16	04:01	
	16:14			17:27	16	16:45 (A0018)	18:29	9	17:43 (A0020)	20:38	16	20:03 (A0015)	21:39				22:04	
29	08:10						06:39			18:38 (A0020)	05:16		19:49 (A0015)			04:14	04:02	
	16:16						19:32	1	18:39 (A0020)	20:40	14	20:03 (A0015)	21:41				22:03	
30	08:08						06:36				05:13		19:48 (A0015)			04:13	04:03	
	16:19						19:34				20:42	15	20:03 (A0015)			21:42	22:03	
31	08:06						06:34						04:12					
	16:21						19:36						21:44					
Potential sun hours	228			262			366			429			515				539	
Total, worst case		91			246			247			395			92				
Sun reduction		0,19			0,16			0,22			0,42			0,53				
Oper. time red.		0,99			0,99			0,99			0,99			0,99				
Wind dir. red.		0,69			0,69			0,66			0,61			0,60				
Total reduction		0,13			0,11			0,15			0,26			0,32				
Total, real		12			28			37			104			29				

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: VÄSTRA EKÄS 1:7>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (818)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:03 22:03	04:52 21:18	05:58 20:00	07:01 18:36	07:10 16:15	15:11 (A0019) 15:21 (A0019)
2	04:04 22:02	04:55 21:16	06:00 19:57	07:04 18:34	07:13 16:13	15:22 (A0019) 15:20 (A0019)
3	04:05 22:01	04:57 21:14	06:02 19:55	07:06 18:31	07:15 16:10	15:23 (A0019) 15:19 (A0019)
4	04:06 22:01	04:59 21:11	06:04 19:52	07:08 18:28	07:17 16:08	15:24 (A0019) 15:18 (A0019)
5	04:07 22:00	05:01 21:09	06:07 19:49	07:10 18:25	07:20 16:06	15:25 (A0019) 15:17 (A0019)
6	04:08 21:59	05:03 21:07	06:09 19:46	07:12 18:23	07:22 16:04	15:26 (A0019) 15:16 (A0019)
7	04:10 21:58	05:05 21:04	06:11 19:44	07:14 18:20	07:24 16:01	15:27 (A0019) 15:15 (A0019)
8	04:11 21:57	05:07 21:02	06:13 19:41	07:17 18:17	07:27 15:59	15:28 (A0019) 15:13 (A0019)
9	04:12 21:56	05:09 21:00	06:15 19:38	07:19 18:14	07:29 15:57	15:29 (A0019) 15:14 (A0019)
10	04:13 21:55	05:11 20:57	06:17 19:35	07:21 18:12	07:31 15:55	15:30 (A0019) 15:14 (A0019)
11	04:15 21:54	05:13 20:55	06:19 19:32	07:23 18:09	07:33 15:53	15:31 (A0019) 15:13 (A0019)
12	04:16 21:53	05:15 20:52	06:21 19:30	07:25 18:06	07:36 15:51	15:32 (A0019) 15:13 (A0019)
13	04:18 21:52	05:18 20:50	06:23 19:27	07:28 18:03	07:38 15:49	15:33 (A0019) 15:13 (A0019)
14	04:19 21:50	05:20 20:48	06:25 19:24	07:30 18:01	07:40 15:47	15:34 (A0019) 15:12 (A0019)
15	04:21 21:49	05:22 20:45	06:28 19:21	07:32 18:00	07:42 15:45	15:35 (A0019) 15:12 (A0019)
16	04:23 21:47	05:24 20:43	06:30 19:18	07:34 17:55	07:45 15:43	15:36 (A0019) 15:12 (A0019)
17	04:24 21:46	05:26 20:40	06:32 19:16	07:36 17:53	07:47 15:41	15:37 (A0019) 15:12 (A0019)
18	04:26 21:44	05:28 20:37	06:34 19:13	07:39 17:50	07:49 15:39	15:38 (A0019) 15:13 (A0019)
19	04:28 21:43	05:30 20:35	06:36 19:10	07:41 17:48	07:51 15:38	15:39 (A0019) 15:13 (A0019)
20	04:29 21:41	05:33 20:32	06:38 19:07	07:43 17:45	07:53 15:36	15:40 (A0019) 15:13 (A0019)
21	04:31 21:39	05:35 20:30	06:40 19:04	07:45 17:42	07:56 15:34	15:41 (A0019) 15:13 (A0019)
22	04:33 21:38	05:37 20:27	06:42 19:02	07:48 17:40	07:58 15:33	15:42 (A0019) 15:14 (A0019)
23	04:35 21:36	05:39 20:24	06:44 18:59	07:50 17:37	08:00 15:31	15:43 (A0019) 15:14 (A0019)
24	04:37 21:34	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30	15:44 (A0019) 15:15 (A0019)
25	04:39 21:32	05:43 20:19	06:49 18:53	07:54 16:32	08:04 15:28	15:45 (A0019) 15:16 (A0019)
26	04:41 21:30	05:45 20:16	06:51 18:50	07:56 16:30	08:06 15:27	15:46 (A0019) 15:16 (A0019)
27	04:42 21:28	05:47 20:14	06:53 18:48	07:59 16:27	08:08 15:25	15:47 (A0019) 15:17 (A0019)
28	04:44 21:26	05:50 20:11	06:55 18:45	08:01 16:25	08:10 15:24	15:48 (A0019) 15:18 (A0019)
29	04:46 21:24	05:52 20:08	06:57 18:42	08:04 16:22	08:12 15:23	15:49 (A0019) 15:19 (A0019)
30	04:48 21:22	05:54 20:06	06:59 18:39	08:06 16:20	08:14 15:22	15:50 (A0019) 15:20 (A0019)
31	04:50 21:20	05:56 20:03		08:08 16:17	08:16 15:20	15:51 (A0019) 15:21 (A0019)
Potential sun hours	538	474	386	321	241	207
Total, worst case		404	195	295	93	428
Sun reduction		0,35	0,31	0,26	0,17	0,13
Oper. time red.		0,99	0,99	0,99	0,99	0,99
Wind dir. red.		0,61	0,64	0,68	0,69	0,69
Total reduction		0,22	0,20	0,18	0,12	0,09
Total, real		88	40	53	11	39

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

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

Project:

bruzaholm

Licensed user:

VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com

Calculated:

2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:11>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (880)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

## Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:29	06:31 19:38	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:26	08:00 16:28	06:51 17:34	06:26 19:43	05:06 20:49	04:08 21:49	04:06 22:02	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	08:42 15:27	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:09	08:21 15:18
5	08:42 15:29	07:56 16:33	06:46 17:39	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:50	07:10 18:26	07:20 16:06	08:23 15:17
6	08:41 15:30	07:53 16:36	06:43 17:41	06:17 19:49	04:59 20:55	04:05 21:53	04:09 21:59	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04	08:25 15:17
7	08:40 15:32	07:51 16:38	06:41 17:43	06:15 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:16
8	08:40 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:03 21:55	04:11 21:58	05:08 21:02	06:13 19:41	07:17 18:17	07:27 16:00	08:28 15:15
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 19:56	04:53 21:02	04:03 21:56	04:13 21:57	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:56	05:12 20:58	06:18 19:36	07:21 18:12	07:31 15:56	08:30 15:14
11	08:37 15:39	07:42 16:47	06:30 17:52	06:04 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:20 19:33	07:24 18:09	07:34 15:53	08:32 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:03	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:07	07:36 15:51	08:33 15:13
13	08:35 15:43	07:37 16:52	06:24 17:57	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:44	07:35 16:55	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:01	04:20 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:35 15:13
15	08:33 15:46	07:33 16:57	06:19 18:01	05:53 20:09	04:40 21:15	04:00 22:01	04:21 21:49	05:22 20:45	06:28 19:22	07:32 17:59	07:43 15:45	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:38 21:17	03:59 22:02	04:23 21:48	05:24 20:43	06:30 19:19	07:35 17:56	07:45 15:44	08:37 15:13
17	08:30 15:50	07:28 17:02	06:13 18:06	05:47 20:14	04:35 21:19	03:59 22:03	04:25 21:46	05:27 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:29 15:53	07:25 17:04	06:10 18:08	05:45 20:16	04:34 21:21	03:59 22:03	04:26 21:45	05:29 20:38	8 06:21 (A0004) 06:12 (A0004)	06:34 07:39	17:51 15:40	15:42 08:39
19	08:27 15:55	07:23 17:06	06:07 18:10	05:42 20:18	06:09 (A0004) 06:17 (A0004)	04:32 21:23	03:59 22:04	05:31 21:43	10 06:22 (A0004) 06:11 (A0004)	06:36 07:41	15:40 07:52	15:13 08:40
20	08:26 15:57	07:20 17:09	06:05 18:12	05:39 20:20	8 06:23 (A0004) 06:07 (A0004)	04:30 21:25	03:59 22:04	05:33 21:41	12 06:23 (A0004) 06:10 (A0004)	19:10 17:48	15:38 07:54	15:13 08:41
21	08:24 15:59	07:18 17:11	06:02 18:14	05:37 20:23	11 06:18 (A0004) 06:05 (A0004)	04:28 21:26	03:59 22:04	05:35 21:40	13 06:23 (A0004) 06:10 (A0004)	19:08 17:45	15:36 07:56	15:14 08:41
22	08:23 16:01	07:15 17:13	05:59 18:17	05:34 20:25	13 06:18 (A0004) 06:05 (A0004)	04:26 21:28	03:59 22:04	05:37 21:38	13 06:23 (A0004) 06:10 (A0004)	19:05 17:40	15:35 15:33	15:14 15:14
23	08:21 16:03	07:12 17:16	05:56 18:19	05:32 20:27	13 06:18 (A0004) 06:05 (A0004)	04:24 21:30	03:59 22:05	05:39 21:36	12 06:22 (A0004) 06:11 (A0004)	19:02 17:38	15:33 15:32	15:14 15:15
24	08:19 16:05	07:10 17:18	05:54 18:21	05:29 20:29	12 06:17 (A0004) 06:05 (A0004)	04:23 21:32	04:00 22:05	05:42 21:34	11 06:22 (A0004) 06:13 (A0004)	18:59 17:35	15:32 15:30	15:15 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	12 06:17 (A0004) 06:06 (A0004)	04:21 21:34	04:00 22:05	05:44 21:33	8 06:21 (A0004) 06:15 (A0004)	18:56 17:35	15:30 15:29	15:16 15:16
26	08:16 16:10	07:05 17:23	05:48 18:25	05:24 20:34	9 06:15 (A0004) 06:07 (A0004)	04:19 21:36	04:01 22:04	05:46 21:31	4 06:19 (A0004)	18:54 16:33	15:29 08:06	15:17 08:43
27	08:14 16:12	07:02 17:25	05:45 18:28	05:21 20:36	7 06:14 (A0004)	04:18 21:37	04:01 22:04	05:48 21:29		18:51 16:28	15:27 15:26	15:17 15:18
28	08:12 16:14	06:59 17:27	05:42 18:30	05:19 20:38		04:16 21:39	04:02 22:04	05:50 21:27		18:48 16:25	15:26 15:25	15:18 15:19
29	08:10 16:17		06:40 19:32	05:16 20:40		04:15 21:41	04:02 22:04	05:52 21:25		18:45 16:23	15:25 15:23	15:19 15:20
30	08:08 16:19		06:37 19:34	05:14 20:42		04:13 21:42	04:03 22:03	05:54 21:23		18:40 16:20	15:22 15:22	15:20 15:21
31	08:06 16:21		06:34 19:36			04:12 21:44		05:56 20:03		16:18		08:44 15:22
Potential sun hours	228	263	366	429	515	539	538	474	386	321	241	207
Total, worst case				89				91				
Sun reduction				0,42				0,35				
Oper. time red.				0,99				0,99				
Wind dir. red.				0,66				0,66				
Total reduction				0,28				0,23				
Total, real				25				21				

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:14>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (907)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:30	06:31 19:39	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:26	08:00 16:28	06:51 17:34	06:26 19:43	05:07 20:49	04:08 21:49	04:06 22:02	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	08:42 15:27	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:12	06:05 19:52	07:08 18:29	07:18 16:09	08:21 15:18
5	08:42 15:29	07:56 16:33	06:46 17:39	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:50	07:11 18:26	07:20 16:06	08:23 15:17
6	08:41 15:30	07:54 16:36	06:43 17:41	06:17 19:50	04:59 20:56	04:05 21:53	04:09 22:00	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04	08:25 15:17
7	08:40 15:32	07:51 16:38	06:41 17:43	06:15 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:16
8	08:40 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:04 21:55	04:11 21:58	05:08 21:03	06:13 19:41	07:17 18:17	07:27 16:00	08:28 15:15
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 19:56	04:53 21:02	04:03 21:56	04:13 21:57	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:56	05:12 20:58	06:18 19:36	07:21 18:12	07:32 15:56	08:31 15:14
11	08:37 15:39	07:42 16:47	06:30 17:52	06:04 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:20 19:33	07:24 18:09	07:34 15:53	08:32 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:03	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:07	07:36 15:51	08:33 15:13
13	08:35 15:43	07:37 16:52	06:24 17:57	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:45	07:35 16:55	06:21 17:59	05:55 20:07	04:42 21:13	04:00 22:01	04:20 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:35 15:13
15	08:33 15:46	07:33 16:57	06:19 18:01	05:53 20:09	04:40 21:15	04:00 22:01	04:21 21:49	05:22 20:45	06:28 19:22	07:32 17:59	07:43 15:46	08:37 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:12	04:38 21:17	03:59 22:02	04:23 21:48	05:24 20:43	06:30 19:19	07:35 17:56	07:45 15:44	08:38 15:13
17	08:30 15:50	07:28 17:02	06:13 18:06	05:47 20:14	04:36 21:19	03:59 22:03	04:25 21:46	05:27 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:29 15:53	07:25 17:04	06:10 18:08	05:45 20:16	04:34 21:21	03:59 22:03	04:26 21:45	05:29 20:38	06:34 19:13	07:39 17:51	07:49 15:40	08:39 15:13
19	08:27 15:55	07:23 17:06	06:07 18:10	05:42 20:18	04:32 21:23	03:59 22:04	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	08:26 15:57	07:20 17:09	06:05 18:12	05:39 20:20	04:30 21:25	03:59 22:04	04:30 21:41	05:33 20:33	06:39 19:08	07:44 17:45	07:54 15:37	08:41 15:14
21	08:24 15:59	07:18 17:11	06:02 18:14	05:37 20:23	04:28 21:27	03:59 22:04	04:32 21:40	05:35 20:30	06:41 19:05	07:46 17:43	07:56 15:35	08:41 15:14
22	08:23 16:01	07:15 17:13	05:59 18:17	05:34 20:25	04:26 21:28	03:59 22:04	04:34 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:16	05:56 18:19	05:32 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:43 15:15
24	08:19 16:05	07:10 17:18	05:54 18:21	05:29 20:29	04:23 21:32	04:00 22:05	04:37 21:34	05:42 20:22	06:47 18:56	07:53 17:35	08:02 15:30	08:43 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:05	04:39 21:33	05:44 20:20	06:49 18:54	06:55 16:33	08:04 15:29	08:43 15:16
26	08:16 16:10	07:05 17:23	05:48 18:25	05:24 20:34	04:19 21:36	04:01 22:05	04:41 21:31	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:44 15:17
27	08:14 16:12	07:02 17:25	05:45 18:28	05:21 20:36	04:18 21:38	04:01 22:04	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:44 15:18
28	08:12 16:15	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:27	05:50 20:11	06:56 18:45	07:02 16:25	08:10 15:25	08:44 15:19
29	08:10 16:17		06:40 19:32	05:16 20:40	04:15 21:41	04:02 22:04	04:47 21:25	05:52 20:09	06:58 18:42	07:04 16:23	08:12 15:23	08:44 15:20
30	08:08 16:19		06:37 19:34	05:14 20:42	04:13 21:43	04:03 22:03	04:49 21:23	05:54 20:06	07:00 18:40	07:06 16:20	08:14 15:22	08:44 15:21
31	08:06 16:21		06:34 19:36		04:12 21:44		04:51 21:20	05:56 20:03		07:09 16:18		08:44 15:22
Potential sun hours	228	263	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:15>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (883)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669

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

	January	February	March	April	May	June
1	08:43 15:23	08:04 16:24	06:57 17:29	06:31 19:38	05:11 20:44	06:04 (A0008) 21:46 14 05:14 (A0007)
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	06:06 (A0008) 21:47 14 05:14 (A0007)
3	08:43 15:26	08:00 16:28	06:51 17:34	06:26 19:43	05:06 20:49	06:09 (A0008) 21:48 15 05:15 (A0004)
4	08:42 15:27	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	06:20 (A0023) 21:50 17 05:17 (A0004)
5	08:42 15:29	07:56 16:33	06:46 17:39	06:20 19:47	05:02 20:53	06:21 (A0023) 21:51 18 05:18 (A0004)
6	08:41 15:30	07:53 16:35	06:43 17:41	06:17 19:49	04:59 20:55	06:23 (A0023) 21:53 19 05:20 (A0004)
7	08:40 15:32	07:51 16:38	06:41 17:43	06:14 19:52	04:57 20:58	06:29 (A0023) 21:54 19 05:20 (A0004)
8	08:40 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:03 21:55 20 05:20 (A0004)
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 19:56	04:52 21:02	04:03 21:56 20 05:21 (A0004)
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57 20 05:21 (A0004)
11	08:37 15:39	07:42 16:47	06:30 17:52	06:04 20:00	04:48 21:06	04:01 21:58 20 05:22 (A0004)
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:03	04:46 21:08	04:01 21:59 21 05:22 (A0004)
13	08:35 15:43	07:37 16:52	06:24 17:57	05:58 20:05	04:44 21:10	04:00 22:00 21 05:23 (A0004)
14	08:34 15:44	07:35 16:54	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:01 21 05:24 (A0004)
15	08:32 15:46	07:32 16:57	06:19 18:01	05:53 20:09	04:39 21:14	03:59 22:01 21 05:24 (A0004)
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:37 21:17	03:59 22:02 21 05:25 (A0004)
17	08:30 15:50	07:28 17:02	06:13 18:05	05:47 20:14	04:35 21:19	03:59 22:03 21 05:24 (A0004)
18	08:28 15:52	07:25 17:04	06:10 18:08	05:45 20:16	04:33 21:21	03:59 22:03 21 05:24 (A0004)
19	08:27 15:55	07:23 17:06	06:07 18:10	05:42 20:18	04:32 21:23	03:59 22:03 22 05:26 (A0004)
20	08:26 15:57	07:20 17:09	06:05 18:12	05:39 20:20	06:27 (A0023) 6 06:33 (A0023)	03:59 22:04 21 05:26 (A0004)
21	08:24 15:59	07:18 17:11	06:02 18:14	05:37 20:22	06:24 (A0023) 11 06:35 (A0023)	03:59 22:04 21 05:26 (A0004)
22	08:22 16:01	07:15 17:13	05:59 18:16	05:34 20:25	06:12 (A0008) 16 06:37 (A0023)	03:59 22:04 21 05:26 (A0004)
23	08:21 16:03	07:12 17:16	05:56 18:19	05:31 20:27	06:07 (A0008) 27 06:38 (A0023)	03:59 22:04 21 05:26 (A0004)
24	08:19 16:05	07:10 17:18	05:53 18:21	05:29 20:29	06:06 (A0008) 31 06:39 (A0023)	04:00 22:05 21 05:26 (A0004)
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	06:04 (A0008) 34 06:39 (A0023)	04:00 22:04 21 05:26 (A0004)
26	08:16 16:10	07:05 17:23	05:48 18:25	05:24 20:33	06:04 (A0008) 35 06:39 (A0023)	05:03 (A0007) 7 05:10 (A0007)
27	08:14 16:12	07:02 17:25	05:45 18:27	05:21 20:36	06:04 (A0008) 35 06:39 (A0023)	05:02 (A0007) 9 05:11 (A0007)
28	08:12 16:14	06:59 17:27	05:42 18:30	05:19 20:38	06:03 (A0008) 36 06:39 (A0023)	05:02 (A0007) 10 05:12 (A0007)
29	08:10 16:17	06:59 19:32	05:39 20:40	05:16 20:40	06:04 (A0008) 35 06:39 (A0023)	05:00 (A0007) 12 05:12 (A0007)
30	08:08 16:19	06:37 19:34	05:14 20:42	05:14 20:42	06:04 (A0008) 33 06:38 (A0023)	04:03 22:03 21 05:27 (A0004)
31	08:06 16:21	06:34 19:36			04:12 21:44	05:00 (A0007) 13 05:13 (A0007)
Potential sun hours	228	263	366	429	515	539
Total, worst case				299	175	596
Sun reduction				0,42	0,53	0,43
Oper. time red.				0,99	0,99	0,99
Wind dir. red.				0,66	0,67	0,69
Total reduction				0,28	0,35	0,29
Total, real				83	62	174

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:  
bruzaholm

Licensed user:  
VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:15>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (883)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	04:04 22:03	05:06 (A0007) 05:27 (A0004)	04:53 21:18	05:58 20:00	07:02 18:37	07:11 16:16
2	04:05 22:02	05:06 (A0007) 05:27 (A0004)	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13
3	04:06 22:02	05:07 (A0007) 05:27 (A0004)	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11
4	04:07 22:01	05:07 (A0007) 05:27 (A0004)	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:09
5	04:08 22:00	05:06 (A0007) 05:26 (A0004)	05:01 21:09	06:07 19:49	07:10 18:26	07:20 16:06
6	04:09 21:59	05:07 (A0007) 05:26 (A0004)	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04
7	04:10 21:59	05:07 (A0007) 05:26 (A0004)	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02
8	04:11 21:58	05:07 (A0007) 05:25 (A0004)	05:07 21:02	06:30 (A0023) 06:43 (A0023)	06:13 19:41	07:27 18:17
9	04:13 21:57	05:07 (A0007) 05:24 (A0004)	05:10 21:00	06:28 (A0023) 06:43 (A0023)	06:15 19:38	07:29 18:15
10	04:14 21:55	05:07 (A0007) 05:22 (A0007)	05:12 20:58	06:16 (A0008) 06:44 (A0023)	06:17 19:36	07:31 18:12
11	04:15 21:54	05:07 (A0007) 05:21 (A0007)	05:14 20:55	06:14 (A0008) 06:45 (A0023)	06:20 19:33	07:34 18:09
12	04:17 21:53	05:08 (A0007) 05:22 (A0007)	05:16 20:53	06:12 (A0008) 06:46 (A0023)	06:22 19:30	07:36 18:07
13	04:18 21:52	05:09 (A0007) 05:22 (A0007)	05:18 20:50	06:11 (A0008) 06:46 (A0023)	06:24 19:27	07:38 18:04
14	04:20 21:50	05:09 (A0007) 05:21 (A0007)	05:20 20:48	06:11 (A0008) 06:46 (A0023)	06:26 19:24	07:40 18:01
15	04:21 21:49	05:10 (A0007) 05:21 (A0007)	05:22 20:45	06:11 (A0008) 06:46 (A0023)	06:28 19:22	07:43 17:58
16	04:23 21:48	05:10 (A0007) 05:20 (A0007)	05:24 20:43	06:10 (A0008) 06:46 (A0023)	06:30 19:19	07:45 17:56
17	04:25 21:46	05:12 (A0007) 05:20 (A0007)	05:27 20:40	06:11 (A0008) 06:46 (A0023)	06:32 19:16	07:47 17:53
18	04:26 21:45	05:13 (A0007) 05:18 (A0007)	05:29 20:38	06:11 (A0008) 06:45 (A0023)	06:34 19:13	07:49 17:51
19	04:28 21:43	05:31 20:35	05:31 20:30	06:12 (A0008) 06:44 (A0023)	06:36 19:10	07:52 17:48
20	04:30 21:41	05:33 20:33	05:33 20:33	06:13 (A0008) 06:43 (A0023)	06:38 19:08	07:54 17:45
21	04:32 21:40	05:35 20:30	05:35 20:30	06:27 (A0023) 06:42 (A0023)	06:41 19:05	07:56 17:43
22	04:33 21:38	05:37 20:27	05:37 20:27	06:29 (A0023) 06:40 (A0023)	06:43 19:02	07:58 17:40
23	04:35 21:36	05:39 20:25	05:39 20:25	06:32 (A0023) 06:36 (A0023)	06:45 18:59	08:00 17:38
24	04:37 21:34	05:41 20:22	05:41 20:22	06:47 18:56	07:52 17:35	08:02 15:30
25	04:39 21:32	05:44 20:19	05:44 20:19	06:49 18:53	06:55 16:33	08:04 15:29
26	04:41 21:31	05:46 20:17	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27
27	04:43 21:29	05:48 20:14	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26
28	04:45 21:27	05:50 20:11	05:50 20:11	06:55 18:45	07:02 16:25	08:10 15:25
29	04:47 21:25	05:52 20:09	05:52 20:09	06:58 18:42	07:04 16:23	08:12 15:23
30	04:49 21:22	05:54 20:06	05:54 20:06	07:00 18:40	07:06 16:20	08:14 15:22
31	04:51 21:20	05:56 20:03	05:56 20:03	07:08 16:18	07:08 16:18	08:44 15:22
Potential sun hours	538	474	386	321	241	207
Total, worst case	277	413				
Sun reduction	0,38	0,35				
Oper. time red.	0,99	0,99				
Wind dir. red.	0,69	0,66				
Total reduction	0,26	0,23				
Total, real	73	95				

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)

## SHADOW - Calendar

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:16>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (877)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:30	06:31 19:39	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:26	08:00 16:29	06:51 17:34	06:26 19:43	05:07 20:49	04:08 21:49	04:06 22:02	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	08:42 15:27	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:12	06:05 19:52	07:08 18:29	07:18 16:09	08:21 15:18
5	08:42 15:29	07:56 16:33	06:46 17:39	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:50	07:11 18:26	07:20 16:06	08:23 15:17
6	08:41 15:30	07:54 16:36	06:43 17:41	06:17 19:50	04:59 20:56	04:05 21:53	04:09 22:00	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04	08:25 15:17
7	08:40 15:32	07:51 16:38	06:41 17:43	06:15 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:16
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Potential sun hours	228	263	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:17>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (896)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:24	08:04 16:24	06:57 17:30	06:31 19:39	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
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31	08:06 16:21		06:34 19:36		04:12 21:44		04:51 21:20	05:56 20:03		07:09 16:18		08:44 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:18>1 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (908)  
Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER G]

### Assumptions for shadow calculations

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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:24	08:04 16:24	06:57 17:30	06:31 19:39	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
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28	08:12 16:15	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:27	05:50 20:11	06:56 18:45	07:02 16:25	08:10 15:25	08:44 15:19
29	08:10 16:17		06:40 19:32	05:16 20:40	04:15 21:41	04:02 22:04	04:47 21:25	05:52 20:09	06:58 18:42	07:04 16:23	08:12 15:23	08:44 15:20
30	08:08 16:19		06:37 19:34	05:14 20:42	04:13 21:42	04:03 22:03	04:49 21:23	05:54 20:06	07:00 18:40	07:06 16:20	08:14 15:22	08:44 15:21
31	08:06 16:21		06:34 19:36		04:12 21:44		04:51 21:20	05:56 20:03		07:09 16:18		08:44 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:2>2 - Shadow Receptor: 5,0 x 5,0 Azimuth: 0,0° Slope: 0,0° (809)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:30	06:31 19:39	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
3	08:43 15:26	08:00 16:28	06:51 17:34	06:26 19:43	05:07 20:49	04:08 21:49	04:06 22:02	04:57 21:14	06:03 19:55	07:06 18:31	07:15 16:11	08:20 15:19
4	08:42 15:27	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:09	08:21 15:18
5	08:42 15:29	07:56 16:33	06:46 17:39	06:20 19:47	05:02 20:53	04:06 21:51	04:08 22:00	05:01 21:09	06:07 19:50	07:11 18:26	07:20 16:06	08:23 15:17
6	08:41 15:30	07:54 16:36	06:43 17:41	06:17 19:49	04:59 20:56	04:05 21:53	04:09 22:00	05:03 21:07	06:09 19:47	07:13 18:23	07:22 16:04	08:25 15:17
7	08:40 15:32	07:51 16:38	06:41 17:43	06:15 19:52	04:57 20:58	04:04 21:54	04:10 21:59	05:05 21:05	06:11 19:44	07:15 18:20	07:25 16:02	08:26 15:16
8	08:40 15:34	07:49 16:40	06:38 17:45	06:12 19:54	04:55 21:00	04:04 21:55	04:11 21:58	05:08 21:03	06:13 19:41	07:17 18:17	07:27 16:00	08:28 15:15
9	08:39 15:35	07:47 16:43	06:35 17:48	06:09 19:56	04:53 21:02	04:03 21:56	04:13 21:57	05:10 21:00	06:15 19:38	07:19 18:15	07:29 15:58	08:29 15:15
10	08:38 15:37	07:44 16:45	06:32 17:50	06:06 19:58	04:50 21:04	04:02 21:57	04:14 21:56	05:12 20:58	06:18 19:36	07:21 18:12	07:31 15:56	08:30 15:14
11	08:37 15:39	07:42 16:47	06:30 17:52	06:04 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:20 19:33	07:24 18:09	07:34 15:53	08:32 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:03	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:07	07:36 15:51	08:33 15:13
13	08:35 15:43	07:37 16:52	06:24 17:57	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
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15	08:33 15:46	07:33 16:57	06:19 18:01	05:53 20:09	04:40 21:15	04:00 22:01	04:21 21:49	05:22 20:45	06:28 19:22	07:32 17:59	07:43 15:46	08:37 15:13
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21	08:24 15:59	07:18 17:11	06:02 18:14	05:37 20:23	04:28 21:27	03:59 22:04	04:32 21:40	05:35 20:30	06:41 19:05	07:46 17:43	07:56 15:35	08:41 15:14
22	08:23 16:01	07:15 17:13	05:59 18:17	05:34 20:25	04:26 21:28	03:59 22:04	04:34 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
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Potential sun hours	228	263	366	429	515	539	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:2>2 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (849)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:43 15:23	08:04 16:24	06:57 17:30	06:31 19:39	05:11 20:45	04:11 21:46	04:04 22:03	04:53 21:18	05:59 20:01	07:02 18:37	07:11 16:16	08:16 15:21
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4	08:42 15:27	07:58 16:31	06:49 17:36	06:23 19:45	05:04 20:51	04:07 21:50	04:07 22:01	04:59 21:12	06:05 19:52	07:08 18:28	07:18 16:09	08:21 15:18
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Total, worst case												
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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: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5mShadow receptor: ÅGERSGÖL 1:6>1 - Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (861)  
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [VAXJO /KRONOBER 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 time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
609 445 528 478 509 548 616 1 096 1 460 1 177 580 623 8 669  
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
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2	08:43 15:25	08:02 16:26	06:54 17:32	06:28 19:41	05:09 20:47	04:10 21:47	04:05 22:02	04:55 21:16	06:01 19:58	07:04 18:34	07:13 16:13	08:18 15:20
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11	08:37 15:39	07:42 16:47	06:30 17:52	06:04 20:00	04:48 21:06	04:01 21:58	04:15 21:54	05:14 20:55	06:20 19:33	07:24 18:09	07:34 15:53	08:32 15:14
12	08:36 15:41	07:40 16:50	06:27 17:54	06:01 20:03	04:46 21:08	04:01 21:59	04:17 21:53	05:16 20:53	06:22 19:30	07:26 18:07	07:36 15:51	08:33 15:14
13	08:35 15:43	07:37 16:52	06:24 17:57	05:58 20:05	04:44 21:10	04:00 22:00	04:18 21:52	05:18 20:50	06:24 19:27	07:28 18:04	07:38 15:49	08:34 15:13
14	08:34 15:45	07:35 16:55	06:21 17:59	05:55 20:07	04:42 21:12	04:00 22:01	04:20 21:51	05:20 20:48	06:26 19:24	07:30 18:01	07:41 15:47	08:35 15:13
15	08:33 15:46	07:33 16:57	06:19 18:01	05:53 20:09	04:40 21:15	04:00 22:01	04:22 21:49	05:22 20:45	06:28 19:22	07:32 17:59	07:43 15:46	08:36 15:13
16	08:31 15:48	07:30 16:59	06:16 18:03	05:50 20:11	04:38 21:17	03:59 22:02	04:23 21:48	05:25 20:43	06:30 19:19	07:35 17:56	07:45 15:44	08:37 15:13
17	08:30 15:51	07:28 17:02	06:13 18:06	05:47 20:14	04:36 21:19	03:59 22:03	04:25 21:46	05:27 20:40	06:32 19:16	07:37 17:53	07:47 15:42	08:38 15:13
18	08:29 15:53	07:25 17:04	06:10 18:08	05:45 20:16	04:34 21:21	03:59 22:03	04:26 21:45	05:29 20:38	06:34 19:13	07:39 17:51	07:49 15:40	08:39 15:13
19	08:27 15:55	07:23 17:06	06:07 18:10	05:42 20:18	04:32 21:23	03:59 22:04	04:28 21:43	05:31 20:35	06:36 19:10	07:41 17:48	07:52 15:38	08:40 15:13
20	08:26 15:57	07:20 17:09	06:05 18:12	05:39 20:20	04:30 21:25	03:59 22:04	04:30 21:41	05:33 20:33	06:39 19:08	07:43 17:45	07:54 15:37	08:41 15:14
21	08:24 15:59	07:18 17:11	06:02 18:14	05:37 20:23	04:28 21:26	03:59 22:04	04:32 21:40	05:35 20:30	06:41 19:05	07:46 17:43	07:56 15:35	08:41 15:14
22	08:23 16:01	07:15 17:13	05:59 18:17	05:34 20:25	04:26 21:28	03:59 22:04	04:34 21:38	05:37 20:27	06:43 19:02	07:48 17:40	07:58 15:33	08:42 15:14
23	08:21 16:03	07:12 17:16	05:56 18:19	05:32 20:27	04:24 21:30	03:59 22:05	04:35 21:36	05:39 20:25	06:45 18:59	07:50 17:38	08:00 15:32	08:42 15:15
24	08:19 16:05	07:10 17:18	05:54 18:21	05:29 20:29	04:23 21:32	04:00 22:05	04:37 21:34	05:42 20:22	06:47 18:56	07:53 17:35	08:02 15:30	08:43 15:16
25	08:17 16:08	07:07 17:20	05:51 18:23	05:26 20:31	04:21 21:34	04:00 22:05	04:39 21:33	05:44 20:19	06:49 18:54	06:55 16:33	08:04 15:29	08:43 15:16
26	08:16 16:10	07:05 17:23	05:48 18:25	05:24 20:34	04:19 21:36	04:01 22:04	04:41 21:31	05:46 20:17	06:51 18:51	06:57 16:30	08:06 15:27	08:43 15:17
27	08:14 16:12	07:02 17:25	05:45 18:28	05:21 20:36	04:18 21:37	04:01 22:04	04:43 21:29	05:48 20:14	06:53 18:48	06:59 16:28	08:08 15:26	08:44 15:18
28	08:12 16:15	06:59 17:27	05:42 18:30	05:19 20:38	04:16 21:39	04:02 22:04	04:45 21:27	05:50 20:11	06:56 18:45	07:02 16:25	08:10 15:25	08:44 15:19
29	08:10 16:17	06:40 19:32	05:16 20:40	04:15 21:41	04:02 22:04	04:02 21:25	04:47 20:09	05:52 18:42	06:58 16:23	07:04 15:23	08:12 15:20	08:44 15:20
30	08:08 16:19	06:37 19:34	05:14 20:42	04:13 21:42	04:03 22:03	04:03 21:23	04:49 21:23	05:54 20:06	07:00 18:40	07:06 16:20	08:14 15:22	08:44 15:21
31	08:06 16:21	06:34 19:36	05:12 20:44	04:12 21:44	04:02 22:04	04:02 21:20	04:51 20:03	05:56 18:40	07:09 16:18	07:09 15:22	08:44 15:22	08:44 15:22
Potential sun hours	228	263	366	429	515	538	538	474	386	321	241	207
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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:  
bruzaholm

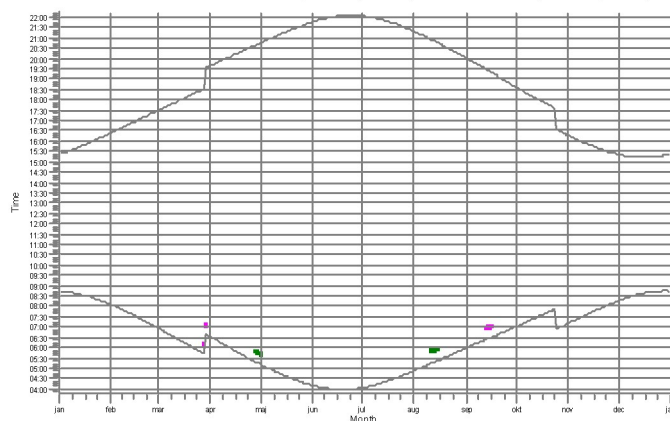
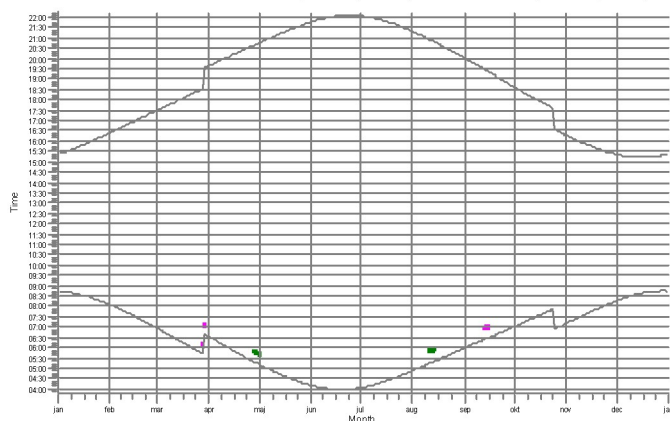
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Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

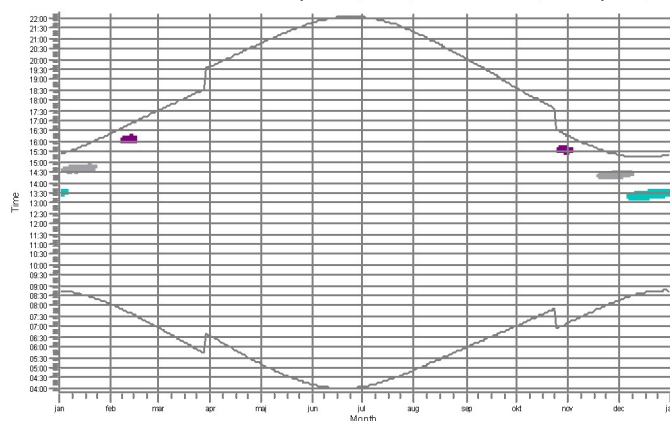
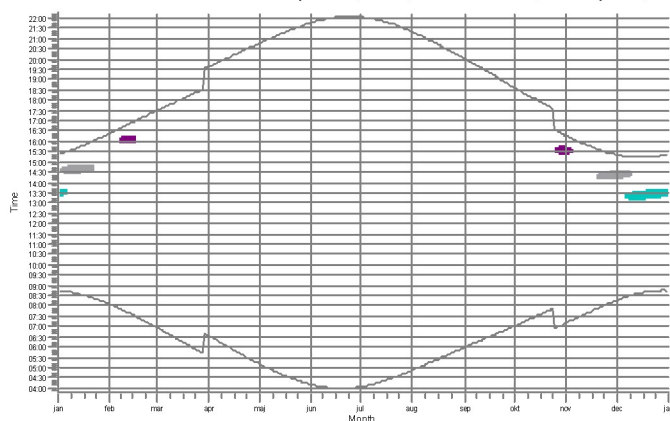
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

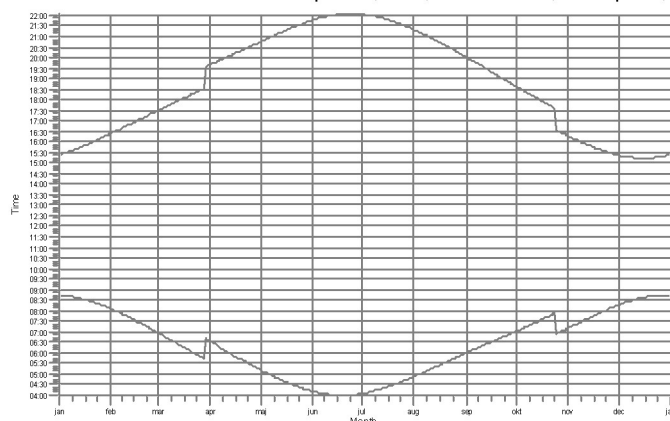
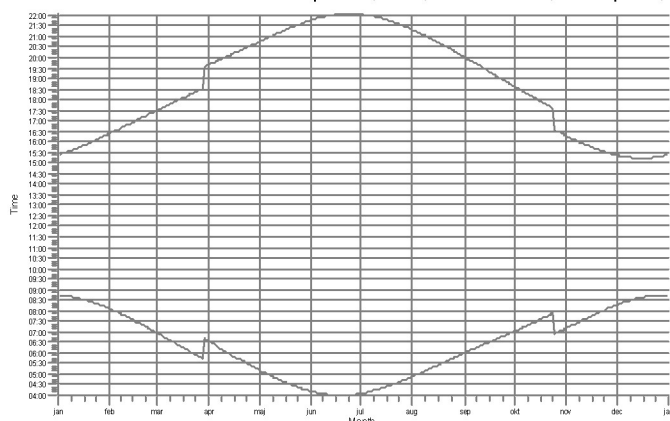
ARKARP 1:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (ξ ARKARP 1:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (ξ



ARKARP 1:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (ξ ARKARP 1:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (ξ



BOGÅRD 6:29>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° BOGÅRD 6:30>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



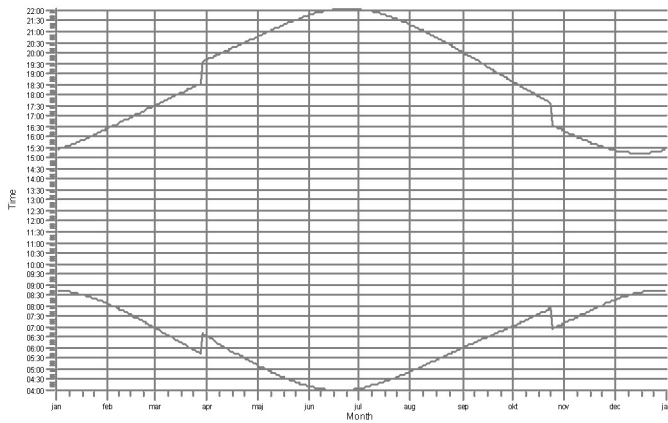
WTGs

1: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (283) A0005: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1272) A0015: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1282)  
5: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (287) A0010: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1277)

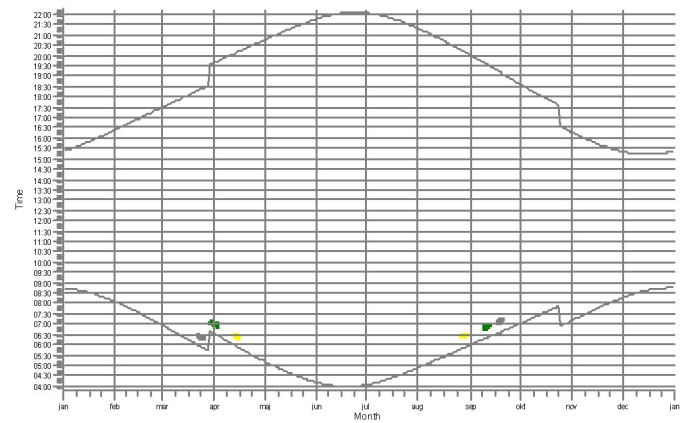
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

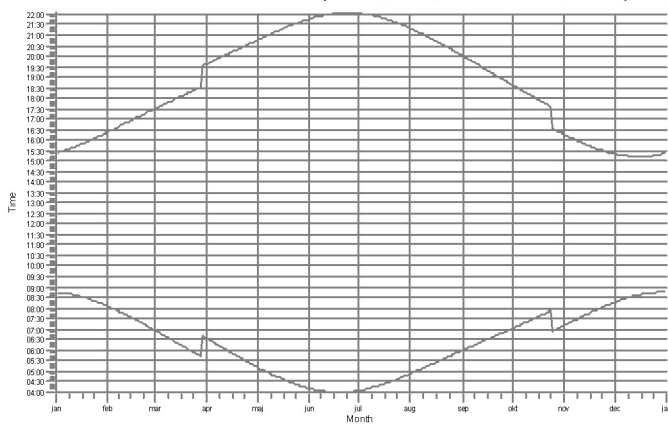
BOGARD 6:32>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



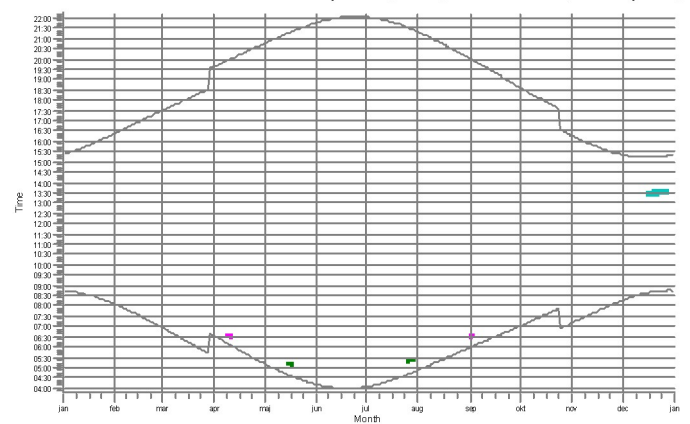
BROKABO 1:11>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



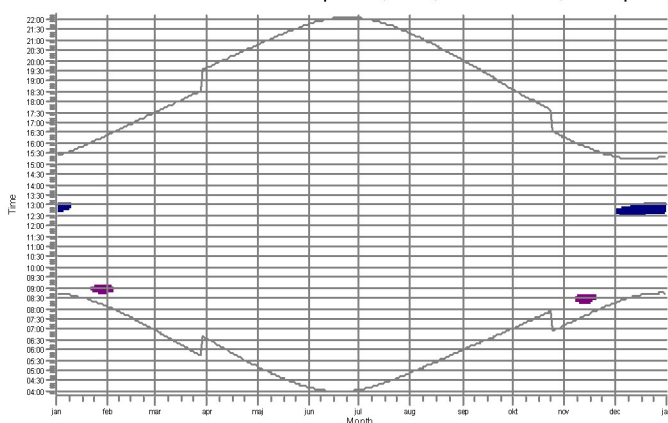
BROKABO 1:12>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



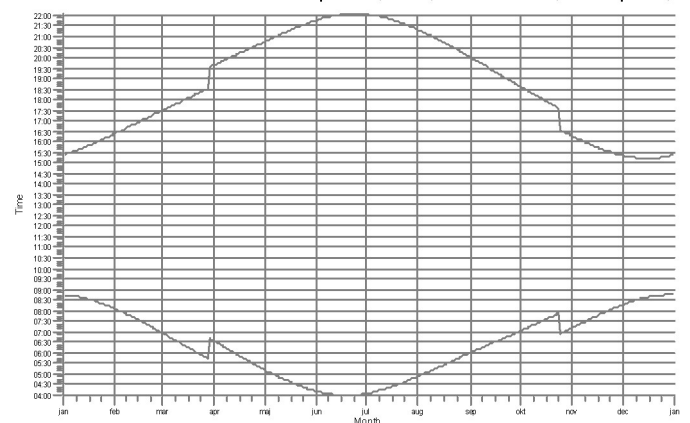
BROKABO 1:13>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



BROKABO 1:19>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



BROKABO 1:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



### WTGs

1: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (283)	5: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (287)	A0015: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1282)
2: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (284)	A0001: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1268)	
4: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (286)	A0005: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1272)	



Project:  
bruzaholm

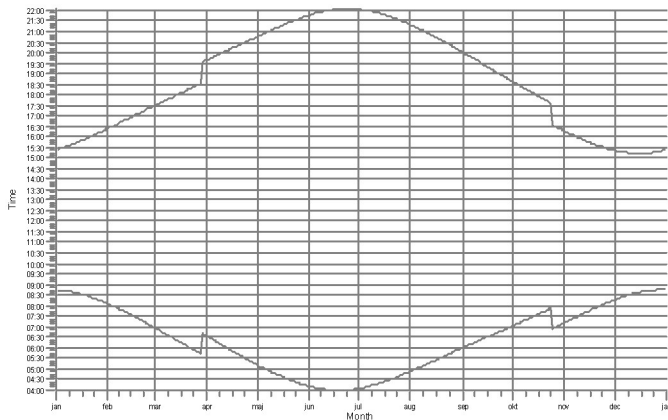
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Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

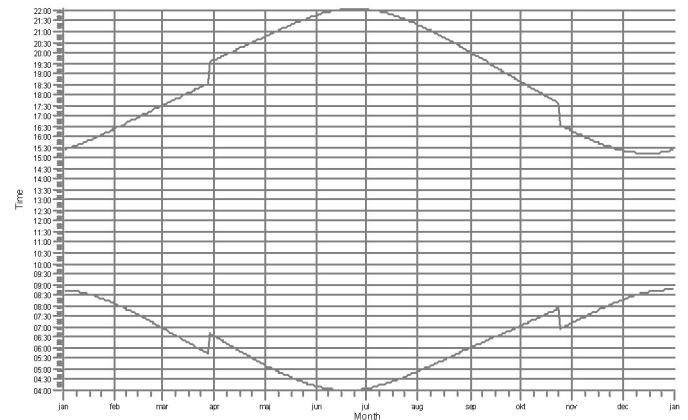
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

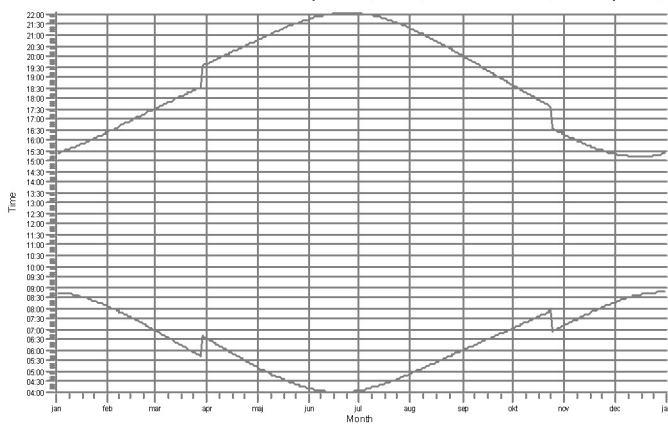
BROKABO 1:6>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



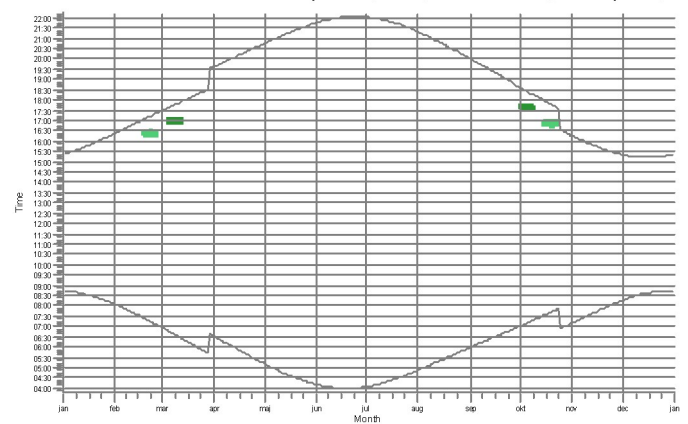
BROKABO 1:7>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



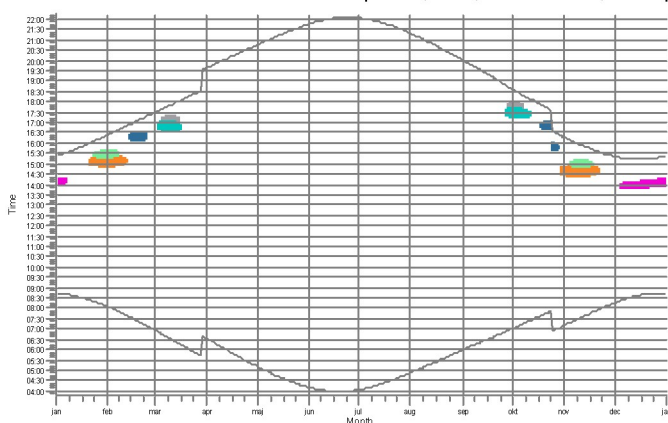
BROKABO 1:8>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



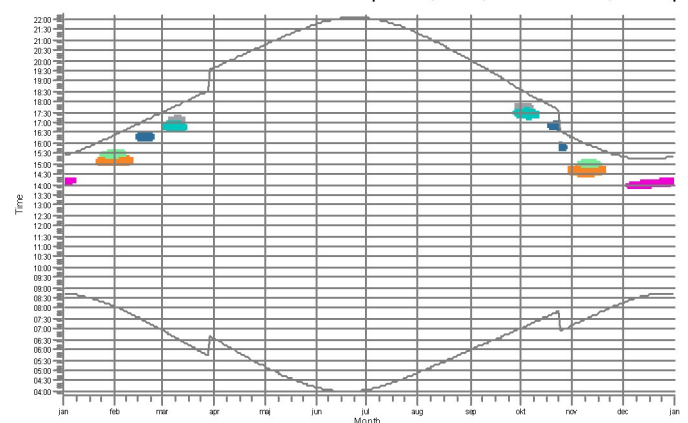
DÄNHULT 1:2>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (



DÖDRINGSHULT 1:4>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



DÖDRINGSHULT 1:4>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



WTGs

A0010: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1277)	A0017: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1284)	A0021: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1285)
A0015: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1282)	A0018: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1285)	A0022: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1289)
A0016: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1283)	A0020: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1287)	



Project:  
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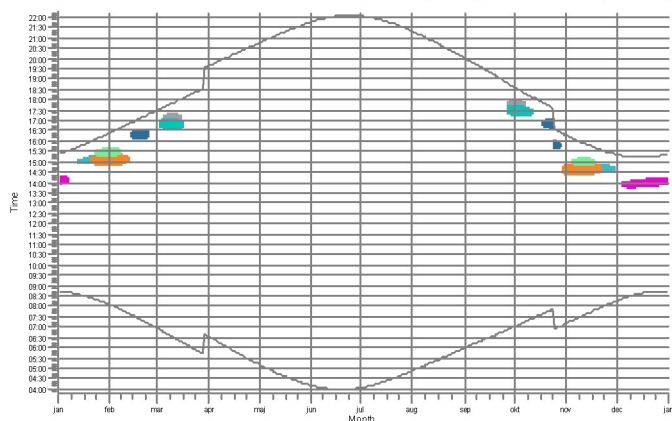
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Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

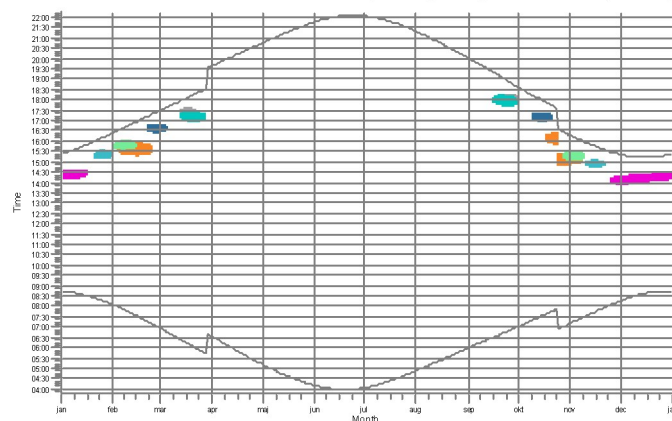
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

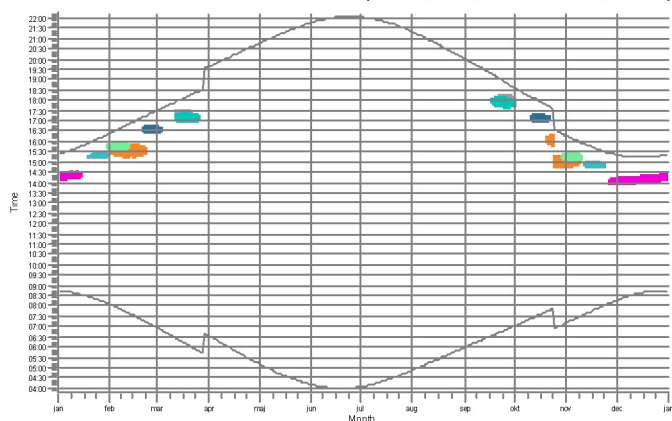
DÖDRINGSHULT 1:4>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



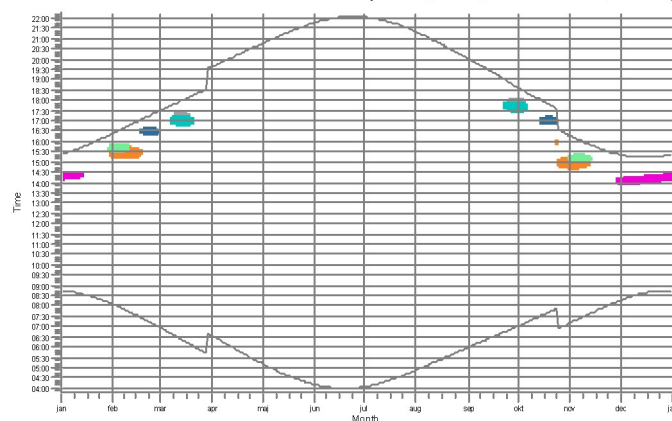
DÖDRINGSHULT 1:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



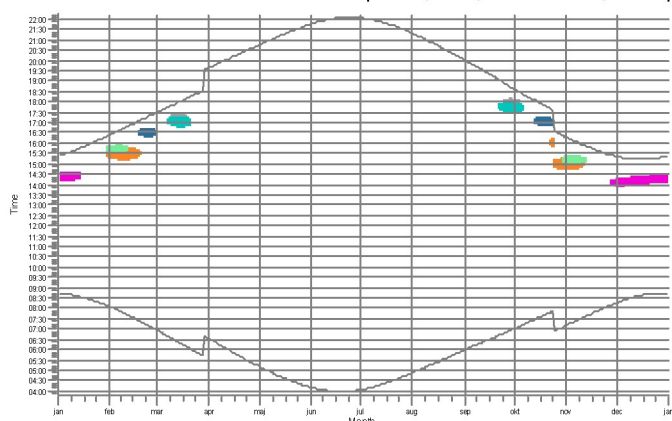
DÖDRINGSHULT 1:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



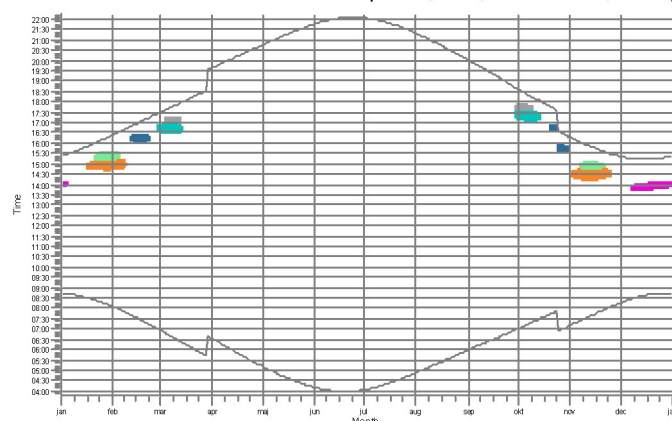
DÖDRINGSHULT 1:7>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



DÖDRINGSHULT 1:7>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



DÖDRINGSHULT 1:8>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



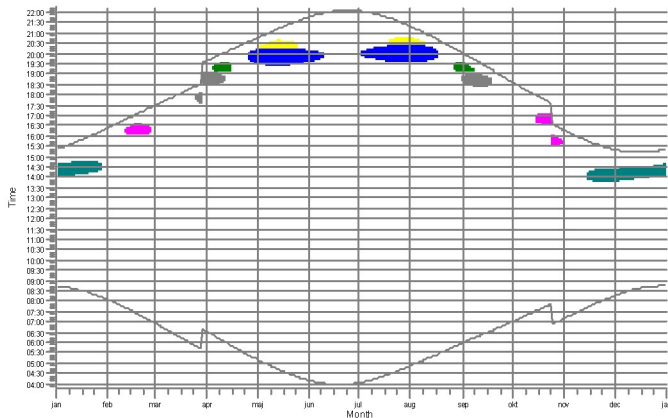
WTGs

A0010: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1277)	A0016: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1283)	A0020: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1287)
A0013: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1280)	A0017: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1284)	
A0015: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1282)	A0018: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1285)	

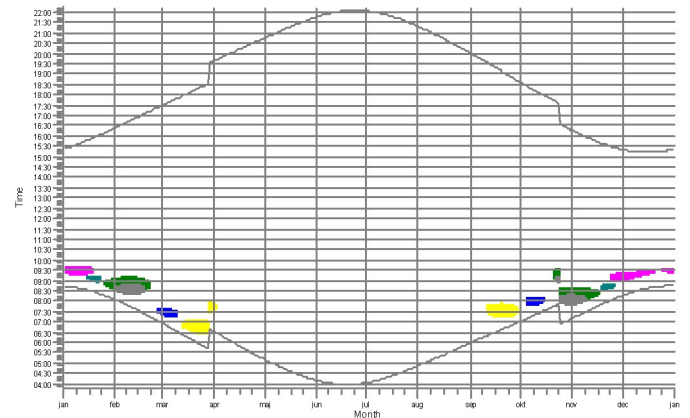
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

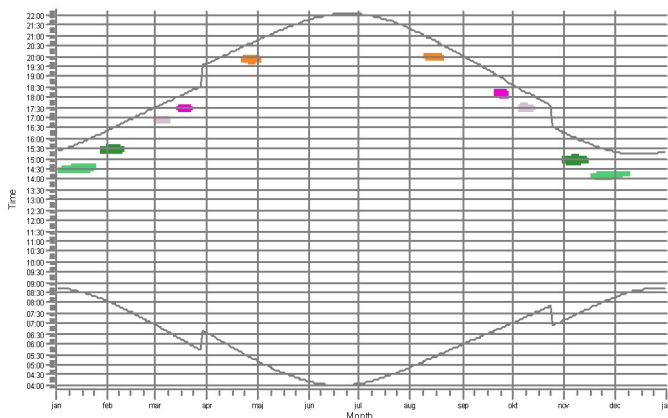
Grevekulla: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (806)



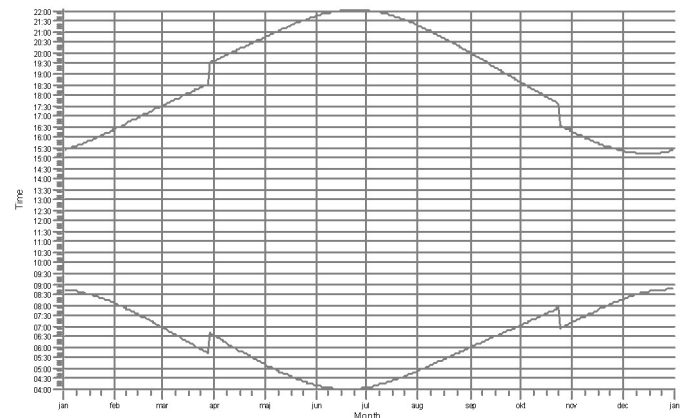
Grevekulla 1:11: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (806)



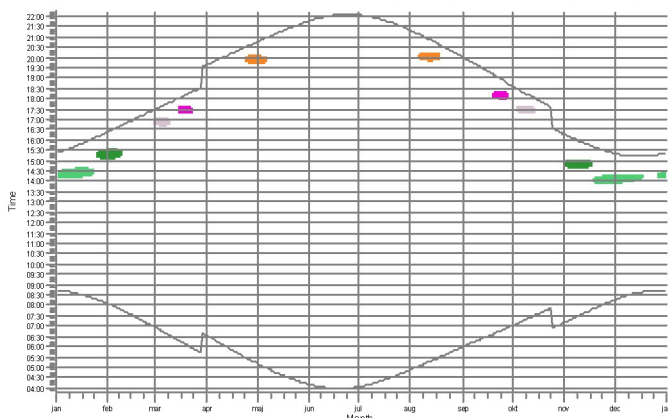
HUSTOMTA 1:10>2: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (806)



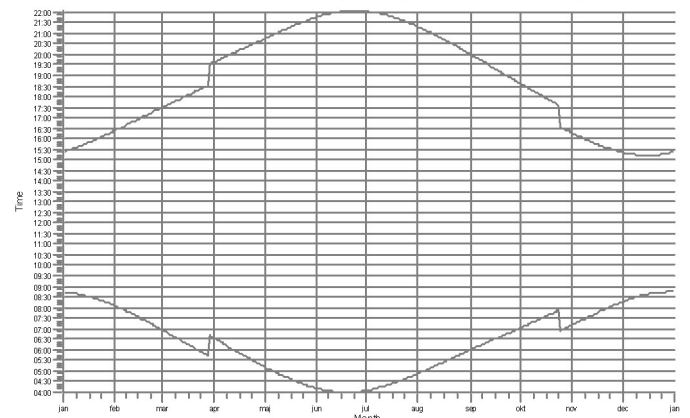
HUSTOMTA 1:13>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (806)



HUSTOMTA 1:15>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (806)



HUSTOMTA 1:16>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (806)



### WTGs

1: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (283)	5: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (287)	A0019: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1286)
2: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (284)	6: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (288)	A0021: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1288)
3: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (285)	A0017: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1284)	A0022: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1289)
4: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (286)	A0018: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1285)	

Project:  
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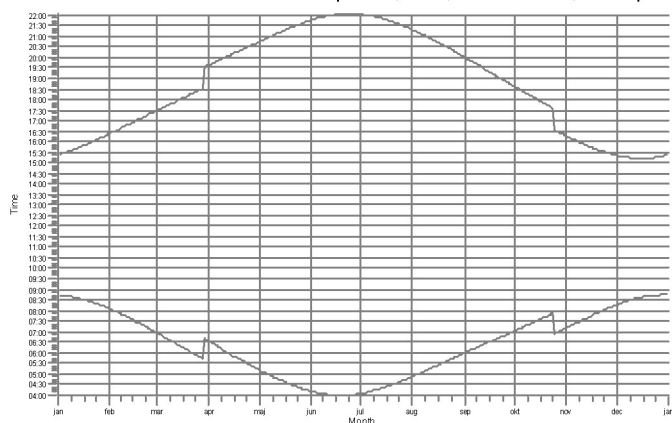
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Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

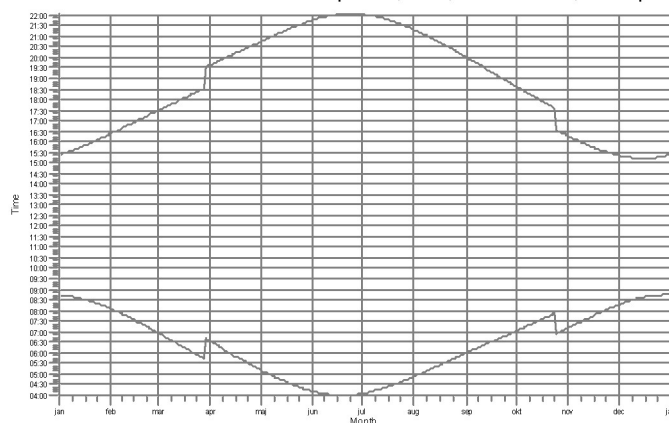
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

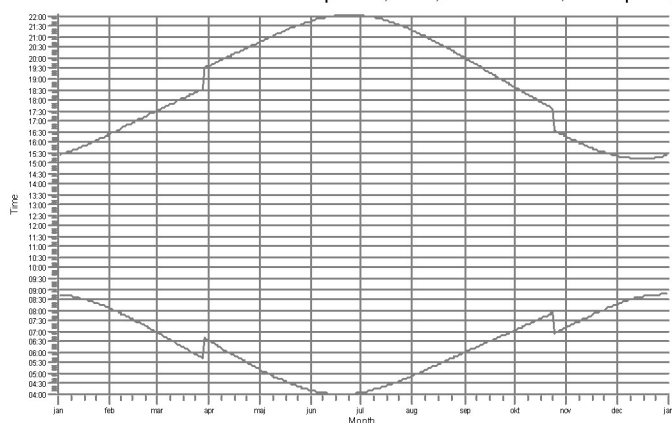
HUSTOMTA 1:17>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,



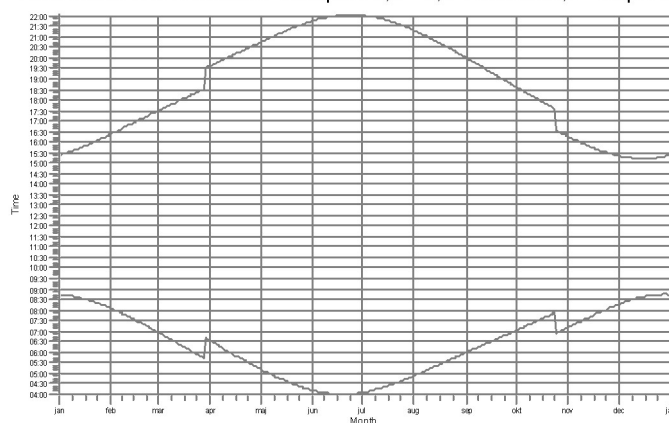
HUSTOMTA 1:17>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,



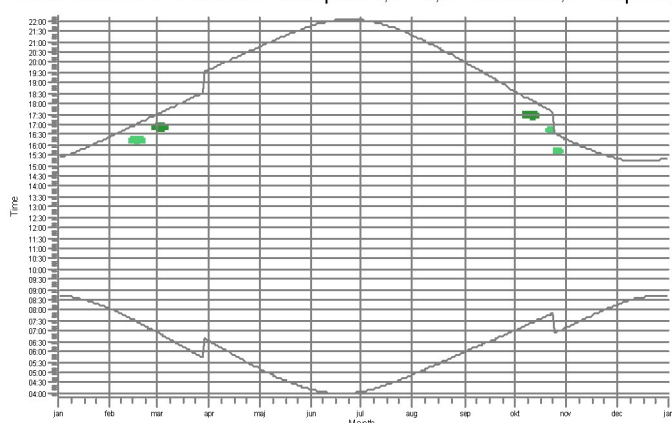
HUSTOMTA 1:6>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



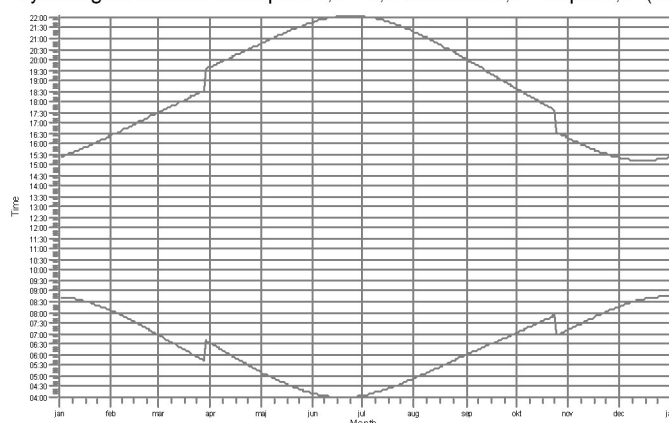
HUSTOMTA 3:1>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



HUSTOMTA 3:1>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



Hyltestugan: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (804,



WTGs

A0021: GAMESA G132 -108,2dB 5000 132,0 IO! hub: 174,0 m (TOT: 240,0 m) (1288)

A0022: GAMESA G132 -108,2dB 5000 132,0 IO! hub: 174,0 m (TOT: 240,0 m) (1289)

Project:  
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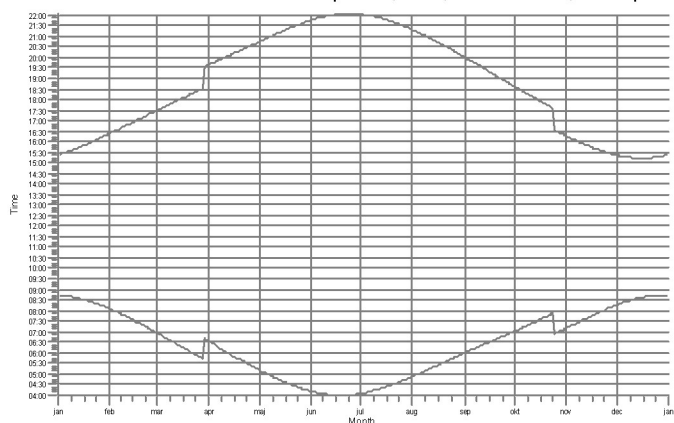
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Calculated:  
2017-09-08 18:12/3.1.617

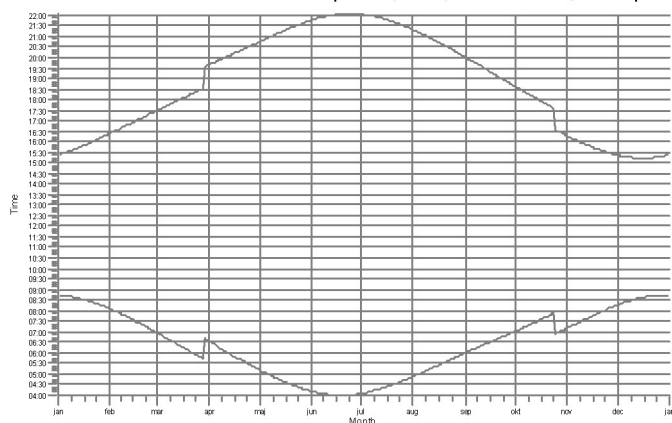
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

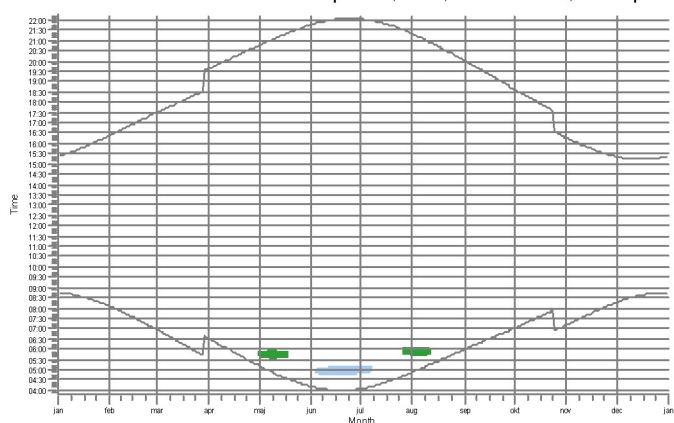
HÄRSTORP 1:13>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



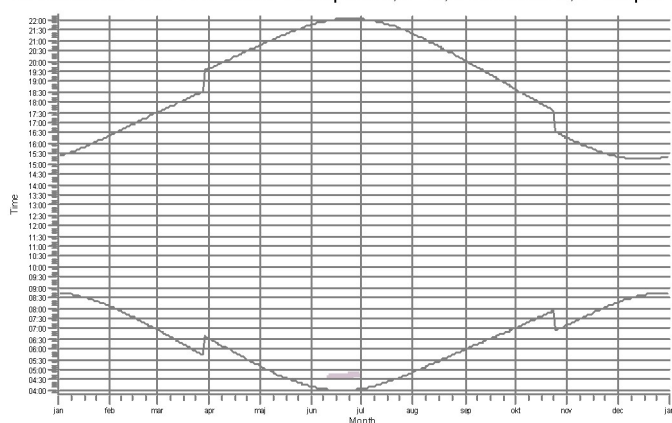
HÄSSLEÅS 1:11>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



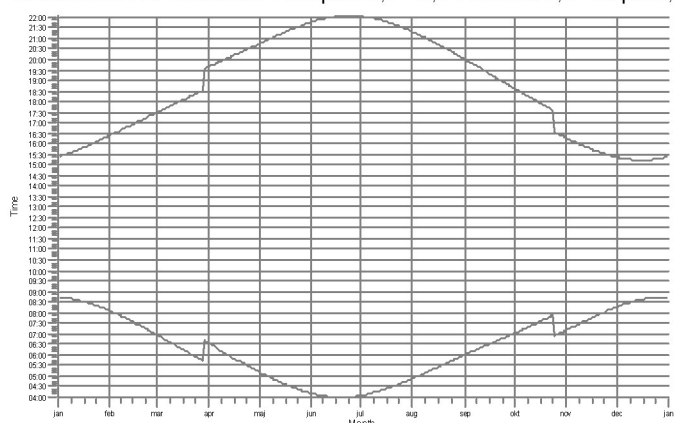
HÄSSLEÅS 1:12>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



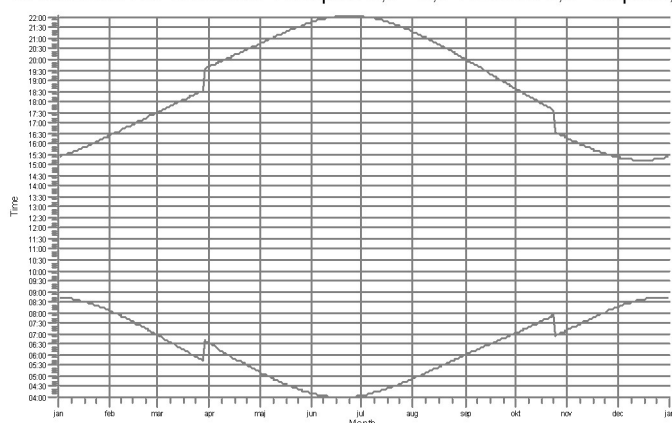
HÄSSLEÅS 1:13>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



HÄSSLEÅS 1:4>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



HÄSSLEÅS 1:6>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



WTGs

A0009: GAMESA G132 -108.2dB 5000 132.0 IOf hub: 174,0 m (TOT: 240,0 m) (1276) A0014: GAMESA G132 -108.2dB 5000 132.0 IOf hub: 174,0 m (TOT: 240,0 m) (1281) A0019: GAMESA G132 -108.2dB 5000 132.0 IOf hub: 174,0 m (TOT: 240,0 m) (1286)

Project:  
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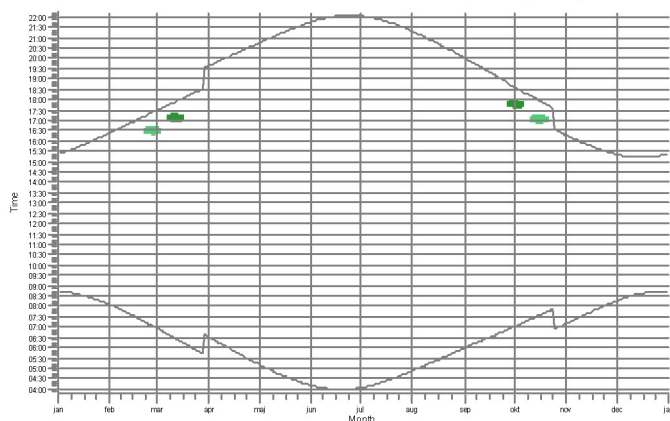
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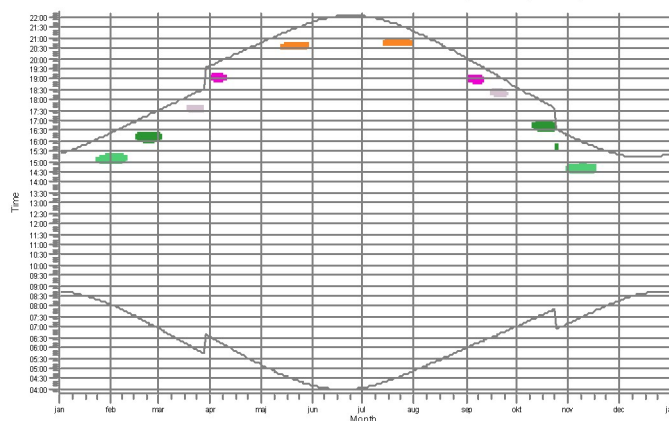
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

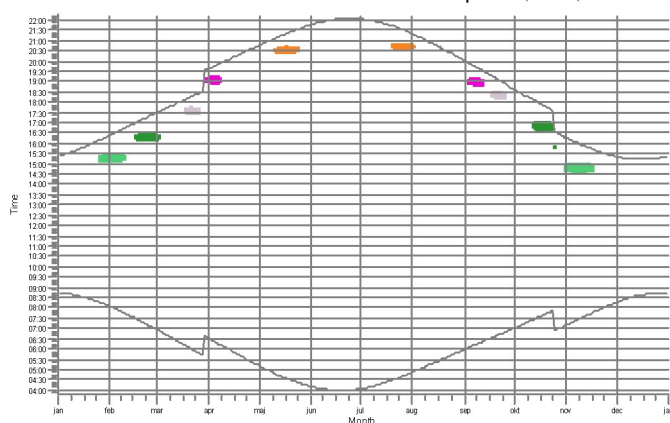
INGATORPS-BJÖRKEBERG 1:2>1: Shadow Receptor: 5,0 × 5,0 Azimuth:



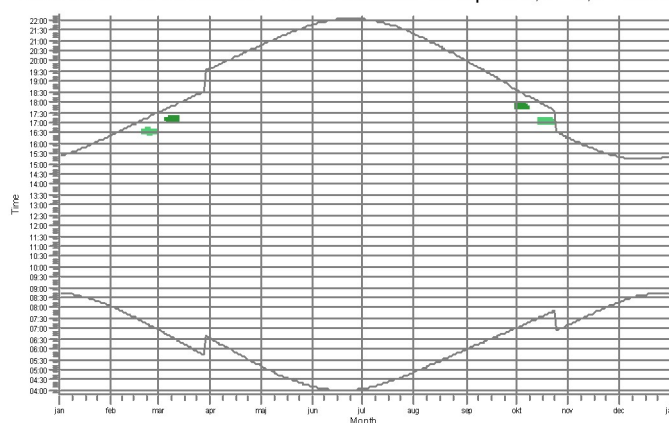
INGATORPS-BJÖRKEBERG 1:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth:



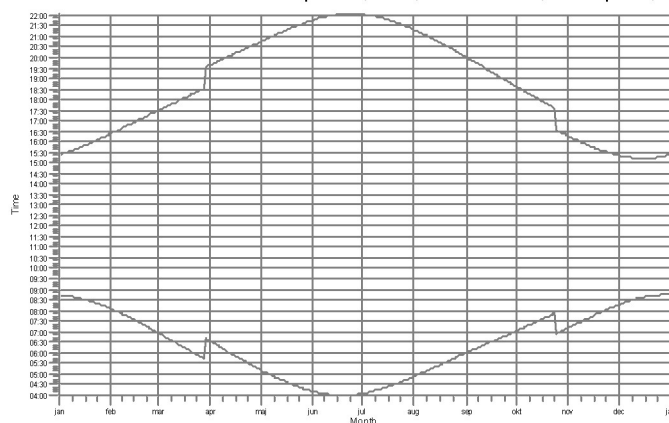
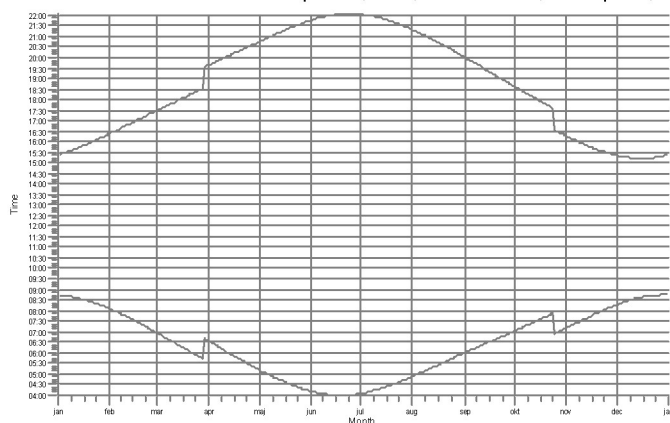
INGATORPS-BJÖRKEBERG 1:4>1: Shadow Receptor: 5,0 × 5,0 Azimuth:



INGATORPS-GRIMMESTORP 2:4>1: Shadow Receptor: 5,0 × 5,0 Azimuth:



JUSTORP 1:2>2: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° ( JUSTORP 1:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (



WTGs

A0017: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1284) A0019: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1286) A0022: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1289)  
A0018: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1285) A0021: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1288)



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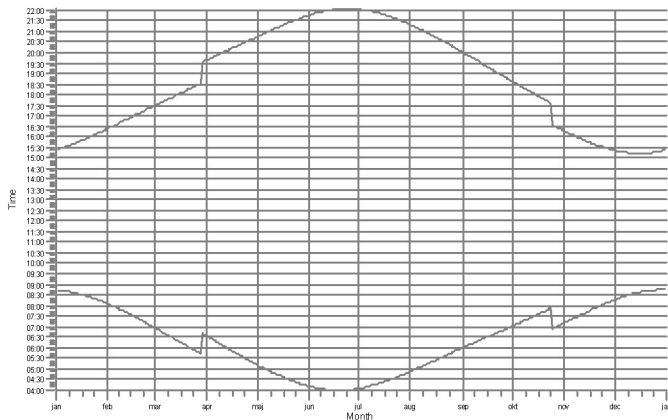
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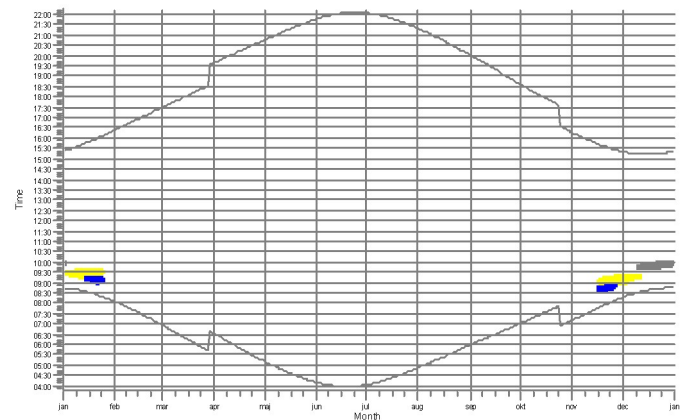
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

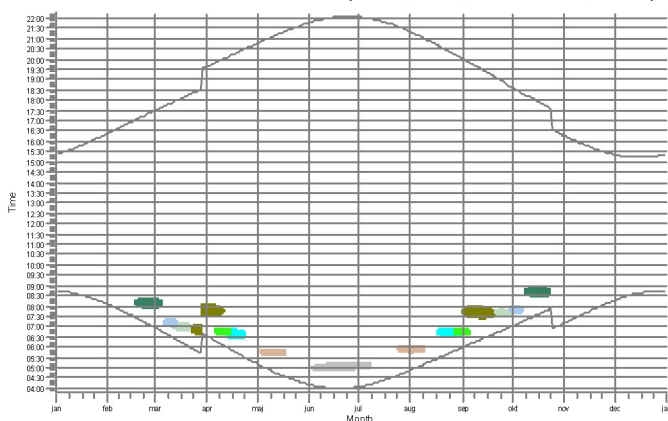
JUSTORP 1:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (



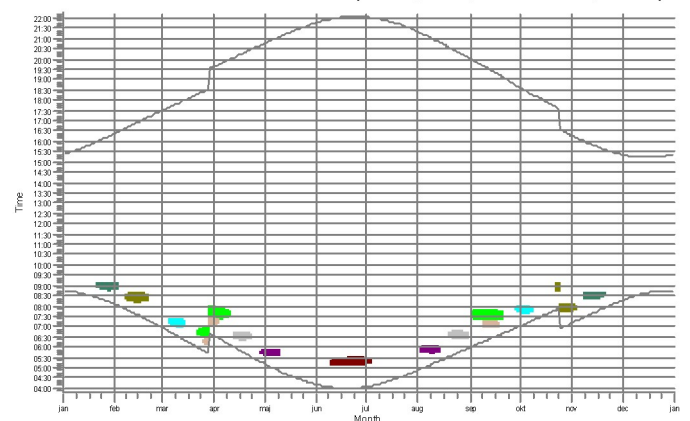
Jonsberg: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (803)



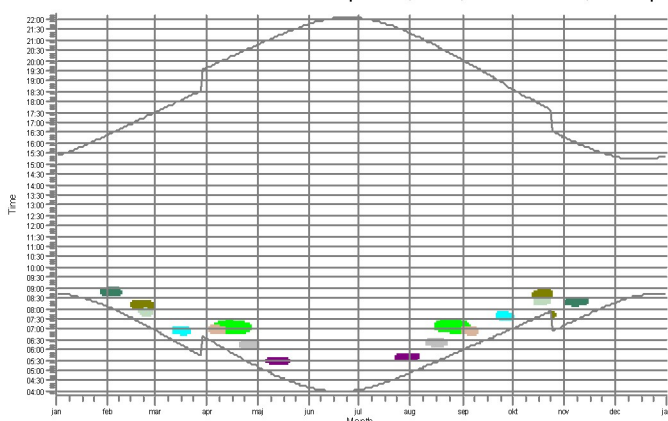
KONGSERYD 1:11>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (



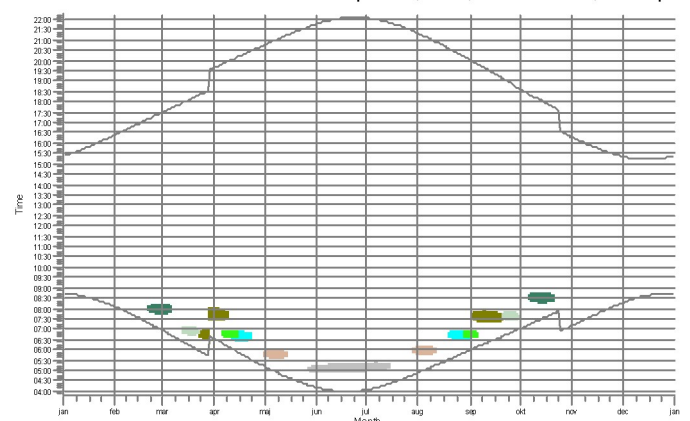
KONGSERYD 1:17>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (

















KONGSERYD 1:18>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (



KONGSERYD 1:19>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (



WTGs

	2: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (284)		A0004: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1271)		A0009: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1276)
	3: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (285)		A0005: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1272)		A0011: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1278)
	4: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (286)		A0006: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1273)		A0012: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1279)
	A0002: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1269)		A0007: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1274)		A0023: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1290)
	A0003: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1270)		A0008: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1275)		



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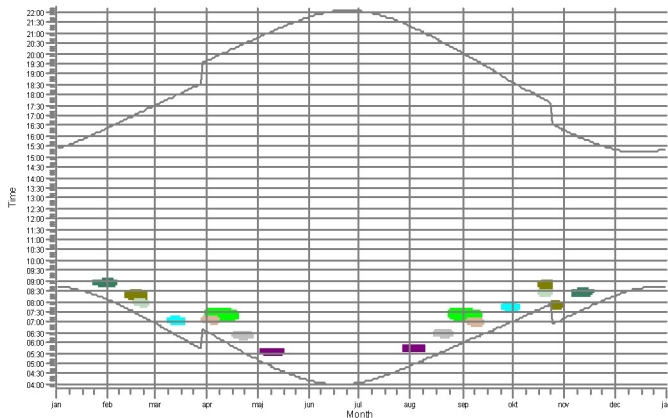
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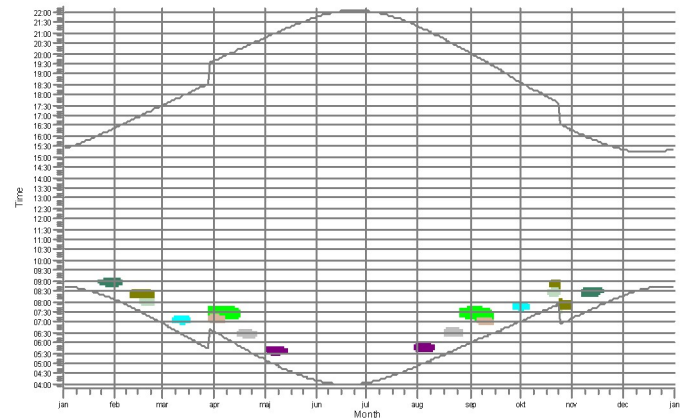
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

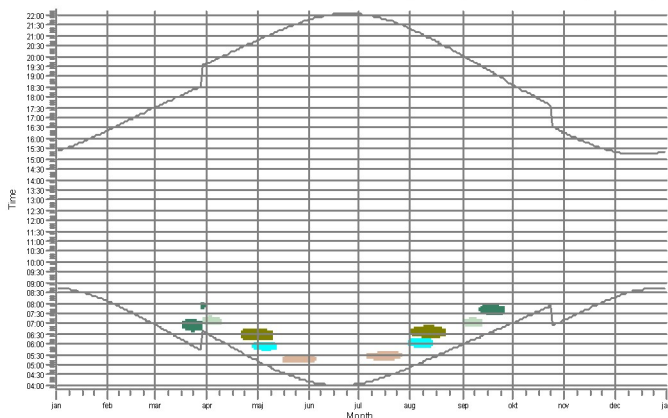
KONGSERYD 1:20>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 1



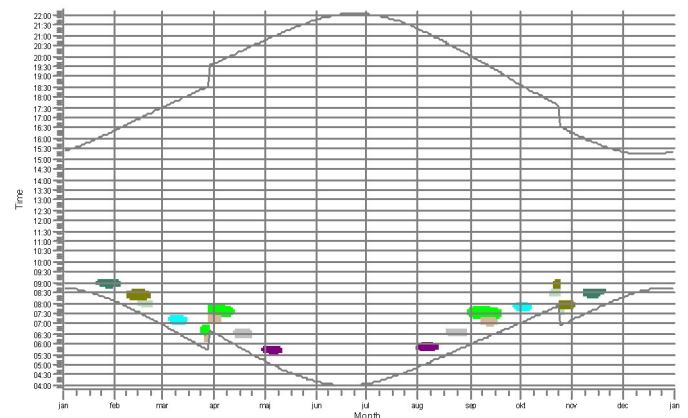
KONGSERYD 1:22>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 1



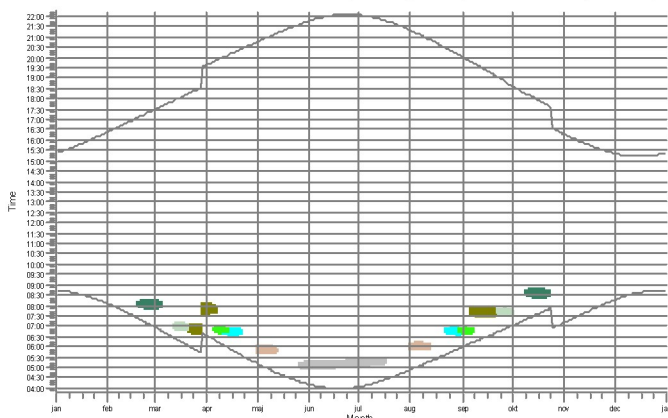
KONGSERYD 1:23>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 1



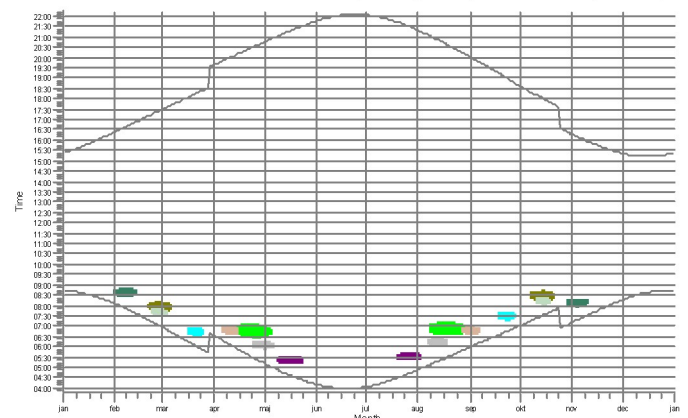
KONGSERYD 1:24>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 1



KONGSERYD 1:25>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 1



KONGSERYD 1:26>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 1



WTGs

A0003: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1270)	A0006: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1273)	A0011: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1278)
A0004: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1271)	A0007: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1274)	A0012: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1279)
A0005: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1272)	A0008: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1275)	A0023: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1290)

Project:  
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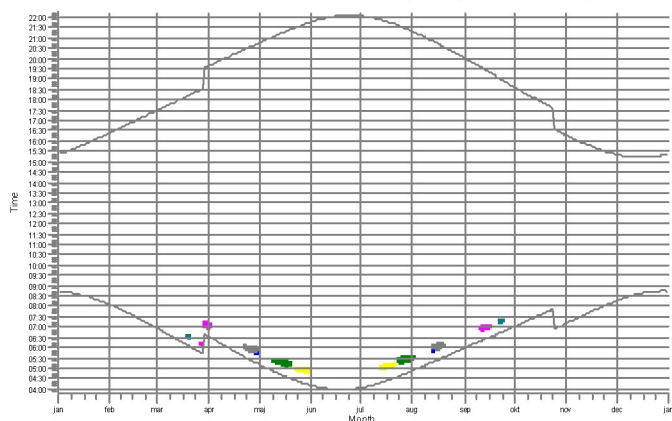
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2017-09-08 18:12/3.1.617

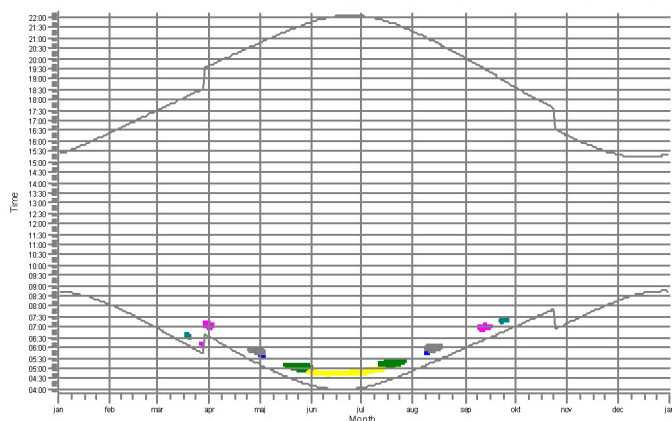
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

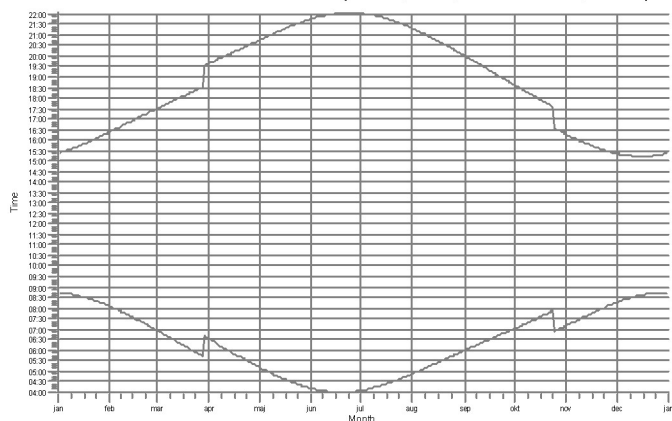
LILLA HESTER 2:1>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



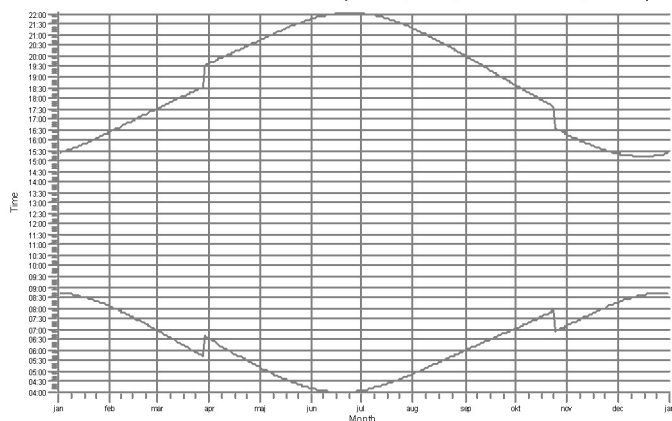
LILLA HESTER 2:2>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



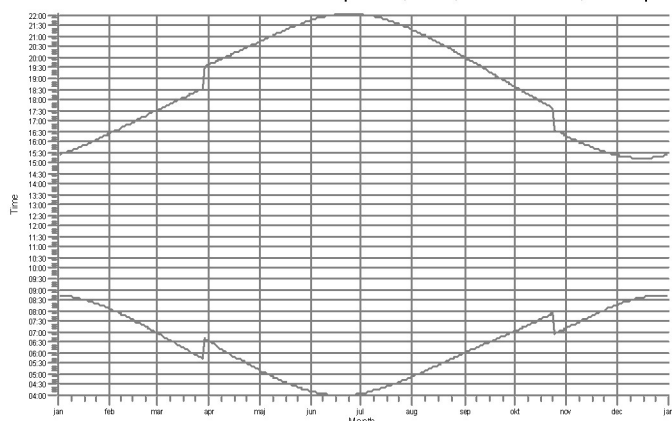
LÖVSEHULT 1:20>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



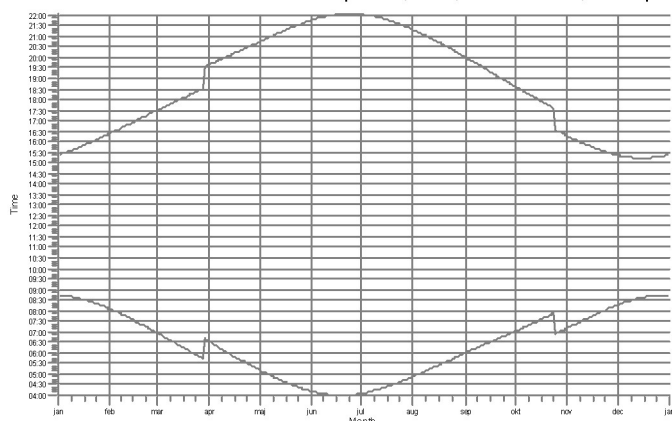
LÖVSEHULT 1:21>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



LÖVSEHULT 1:23>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



LÖVSEHULT 1:24>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



WTGs

1: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (283) 3: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (285) 5: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (287)  
2: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (284) 4: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (286) 6: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (288)

Project:  
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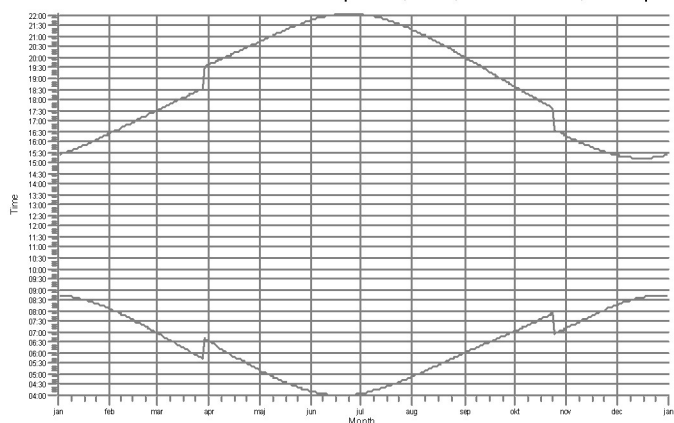
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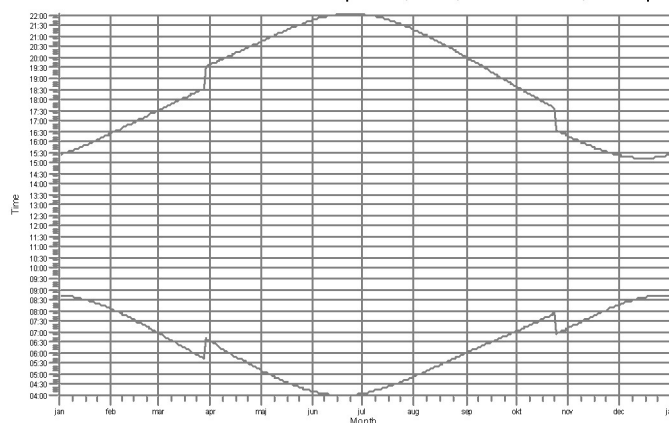
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

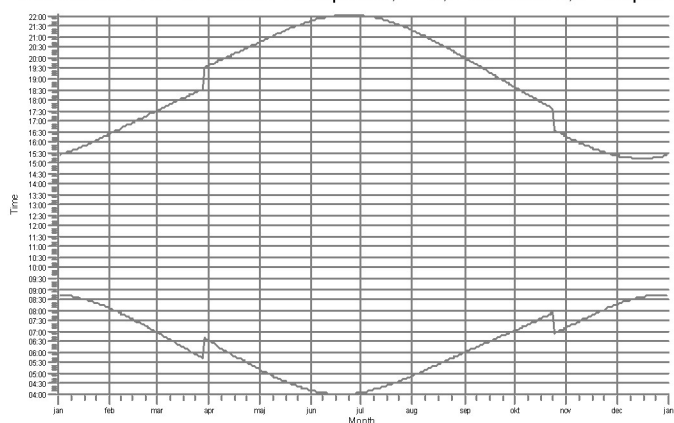
LÖVSEHULT 1:26>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



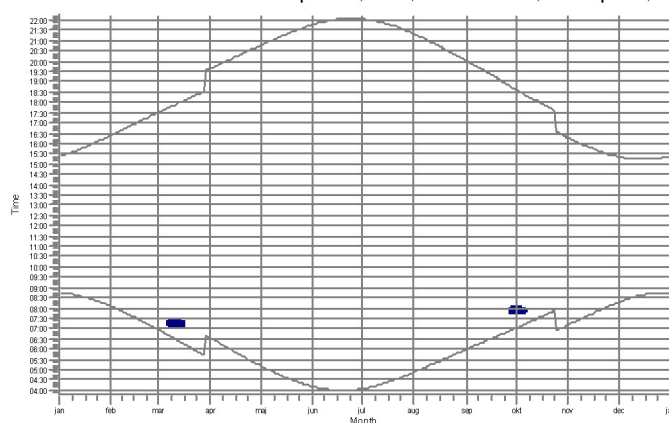
LÖVSEHULT 1:27>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



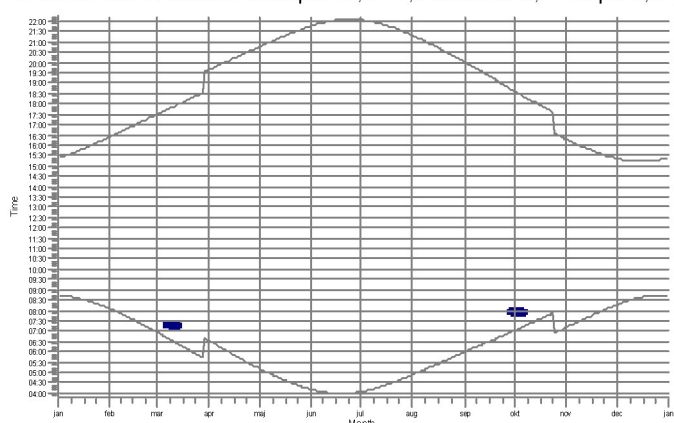
LÖVSEHULT 1:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



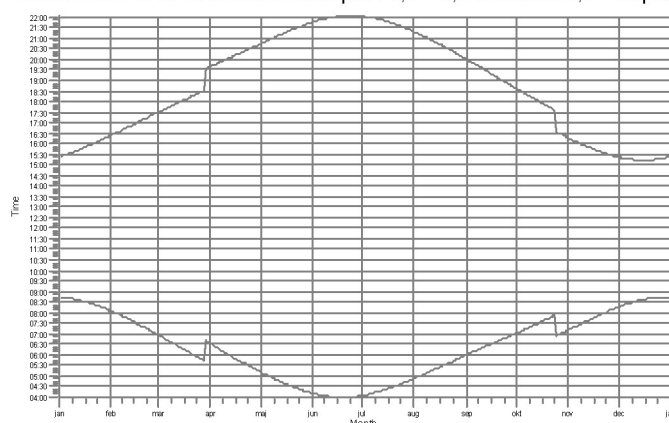
NAREBO 1:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (ξ



NAREBO 1:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (ξ



NÖDJEHULT 1:10>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



WTGs

A0001: GAMESA G132 -108,2dB 5000 132.0 l0! hub: 174,0 m (TOT: 240,0 m) (1268)

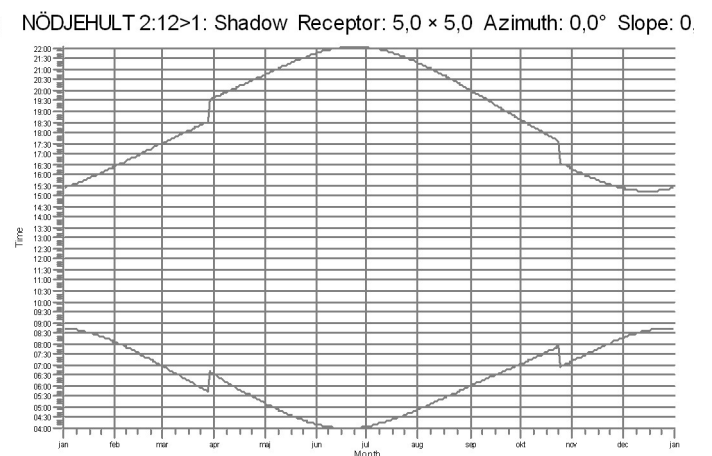
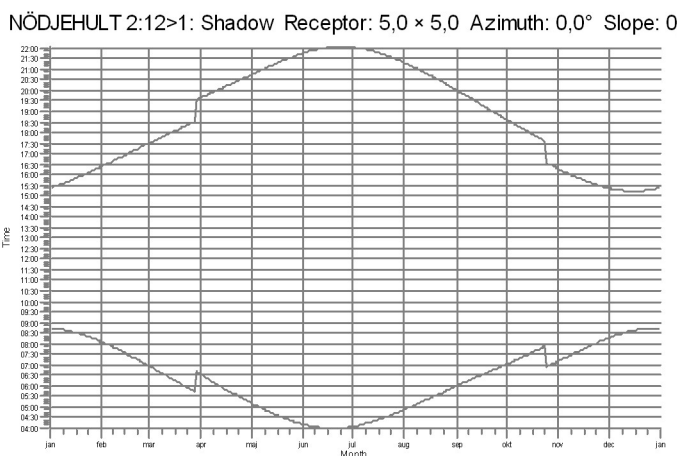
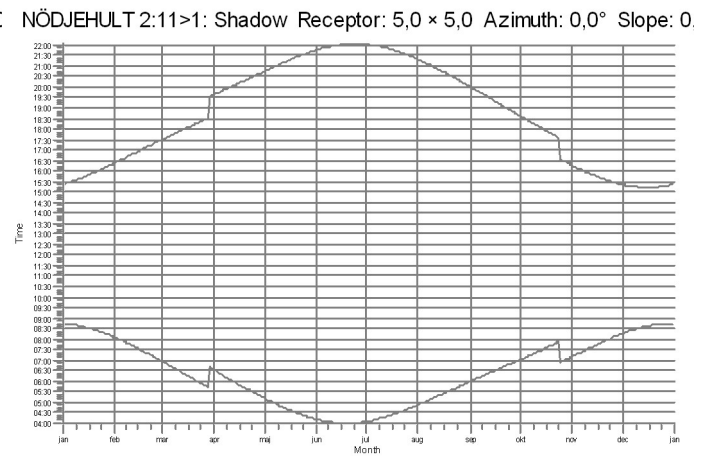
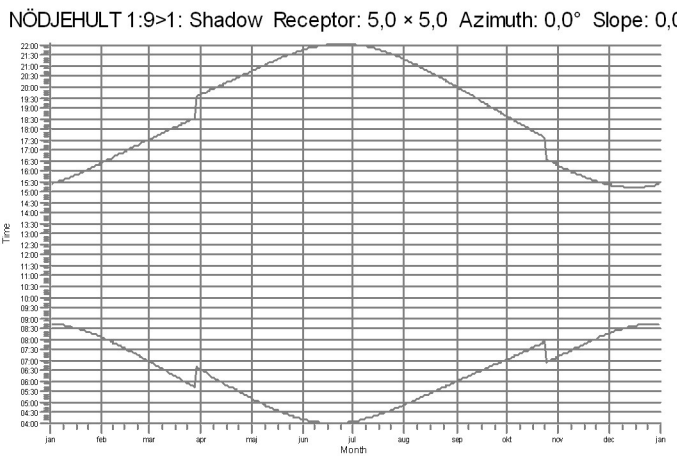
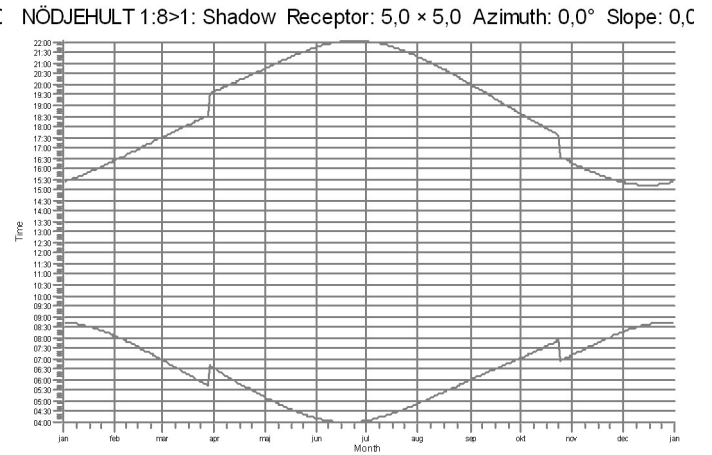
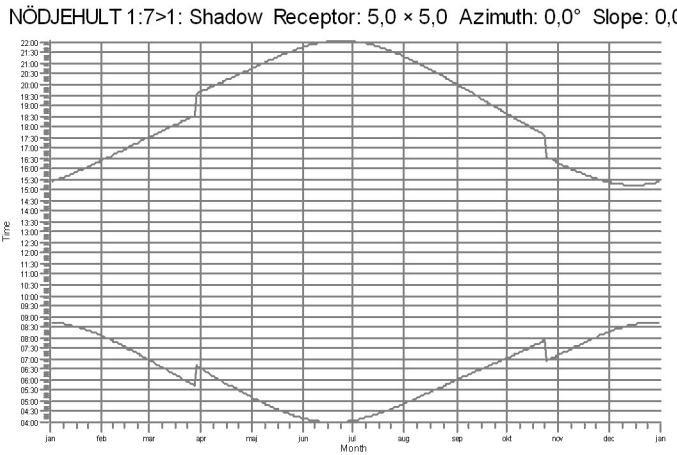
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## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m



WTGs

Project:  
bruzaholm

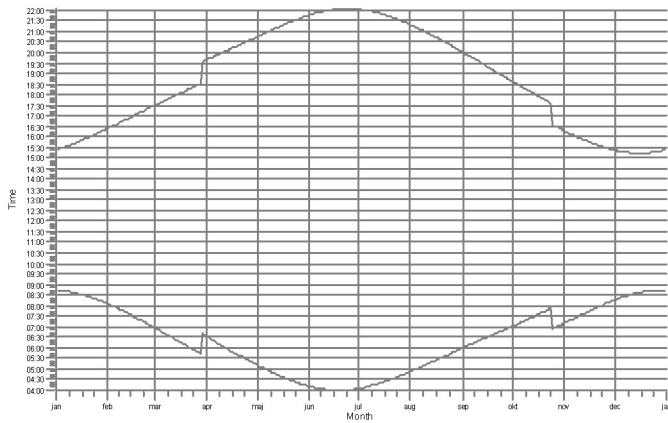
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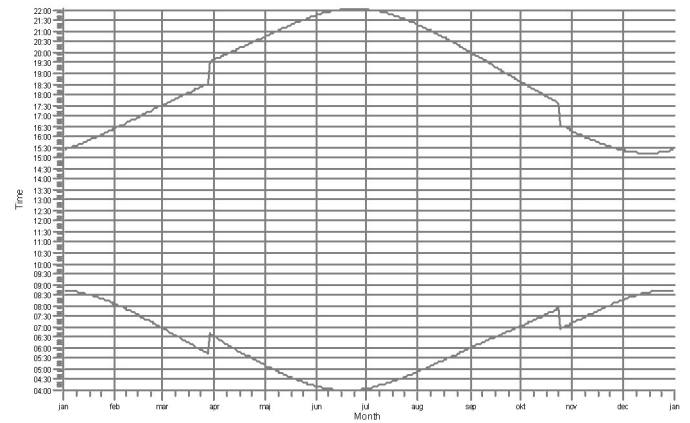
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

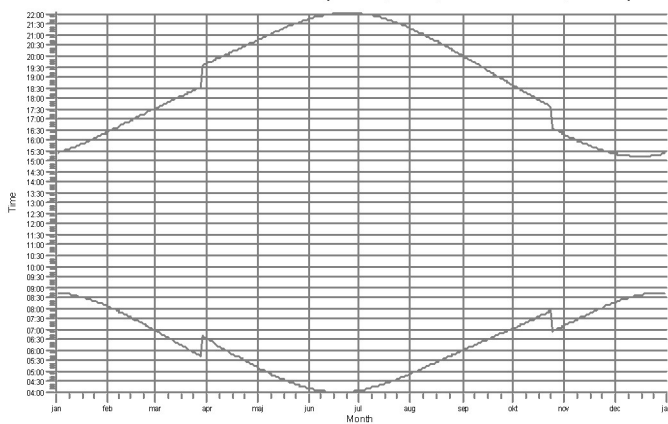
NÖDJEHULT 2:13>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



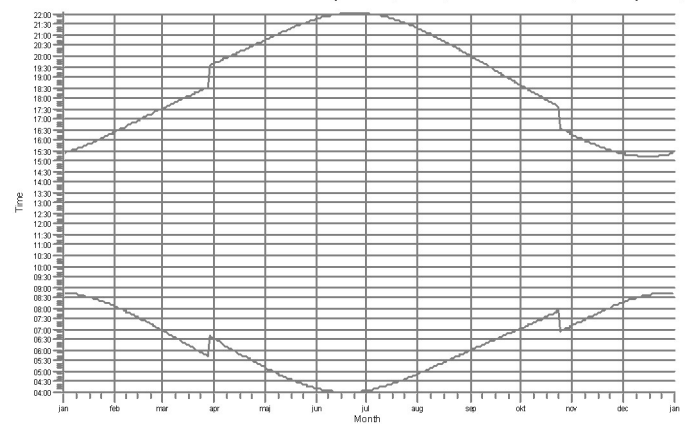
NÖDJEHULT 4:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



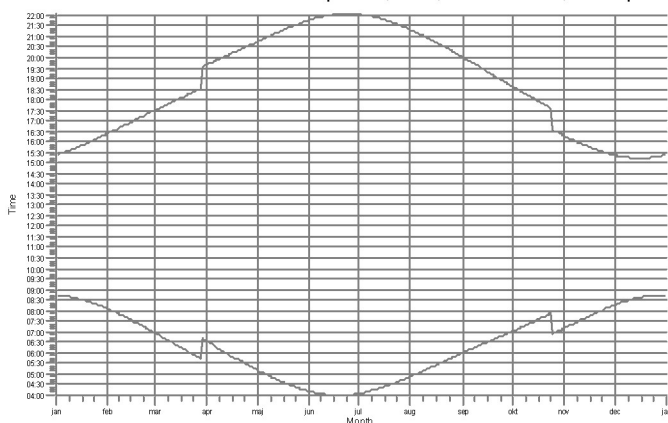
NÖDJEHULT 5:2>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



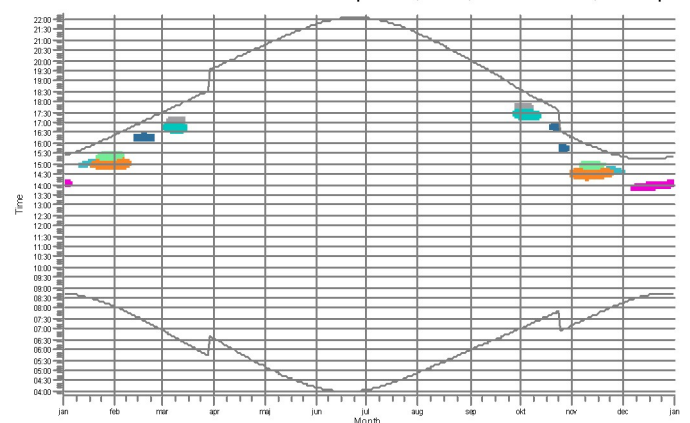
NÖDJEHULT 5:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



NÖDJEHULT 5:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



PASSAMÅLEN 1:3>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



WTGs

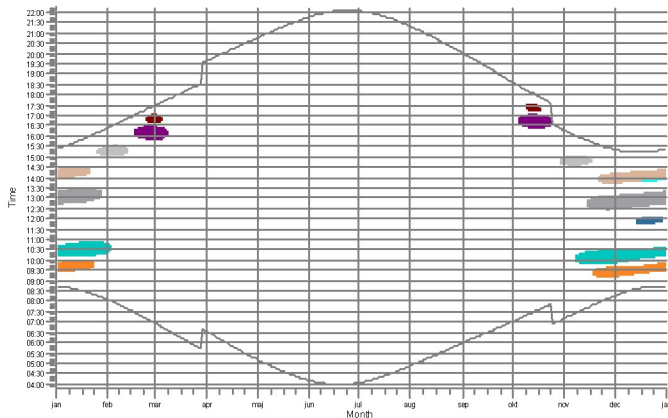
A0010: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1277)	A0016: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1283)	A0020: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1287)
A0013: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1280)	A0017: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1284)	
A0015: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1282)	A0018: GAMESA G132 -108.2dB 5000 132.0 IO! hub: 174,0 m (TOT: 240,0 m) (1285)	



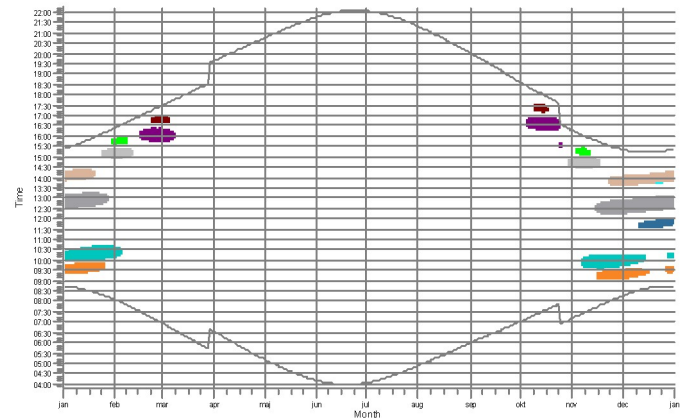
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

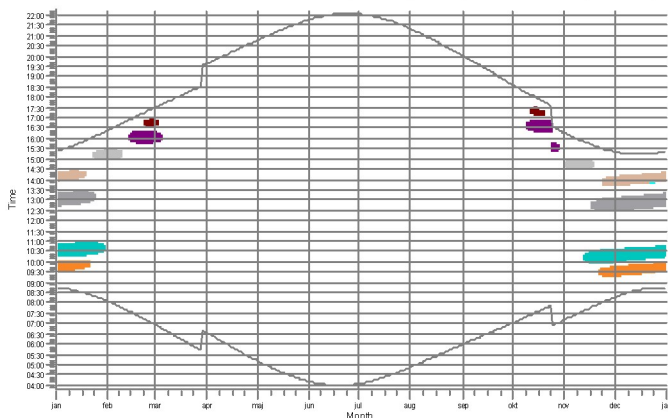
PASSAMÅLEN 1:6>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



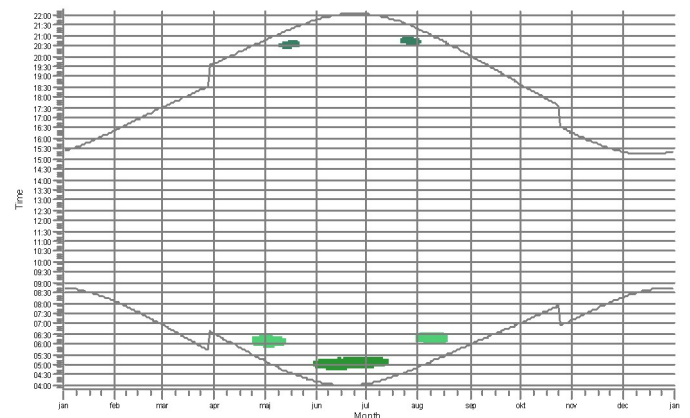
PASSAMÅLEN 1:7>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



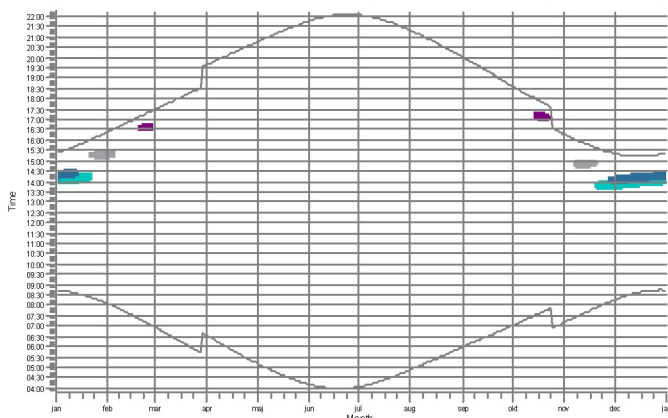
PASSAMÅLEN 1:8>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



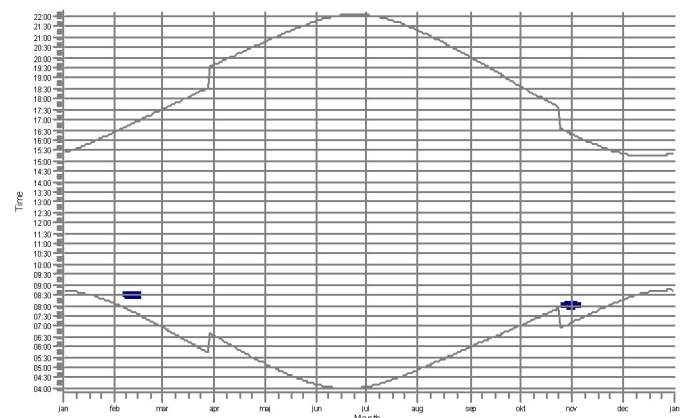
SKÄLJARYD 1:5>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



SPINKARP 1:1>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



STENSGÖL 1:11>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



WTGs

A0001: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1268)	A0007: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1274)	A0017: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1284)
A0002: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1269)	A0010: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1277)	A0021: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1288)
A0003: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1270)	A0011: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1278)	A0022: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1289)
A0005: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1272)	A0015: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1282)	A0023: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1290)
A0006: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1273)	A0016: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1283)	



Project:  
bruzaholm

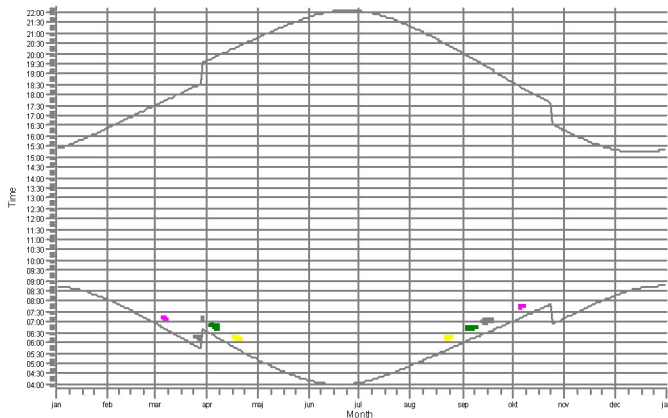
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Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

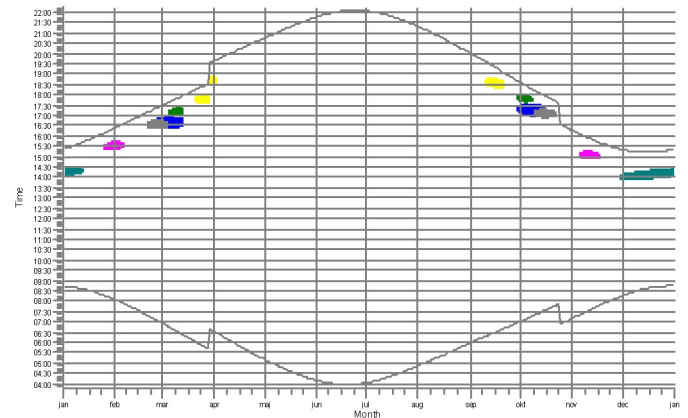
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

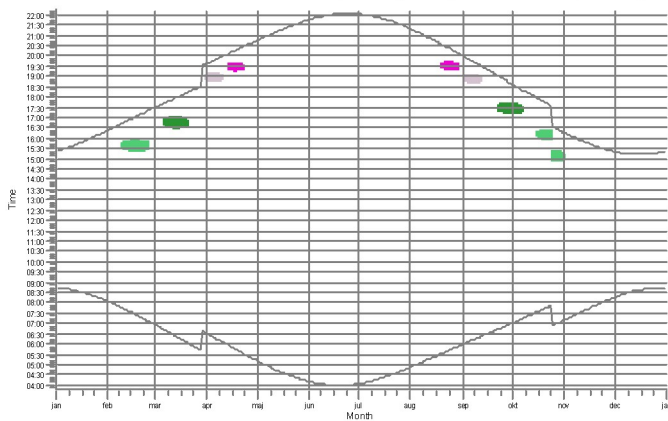
STORA HESTER 1:7>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



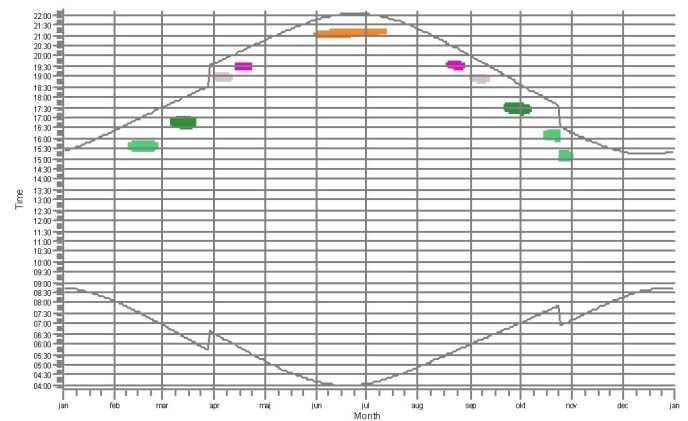
Stora Gluggebo: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0° (i



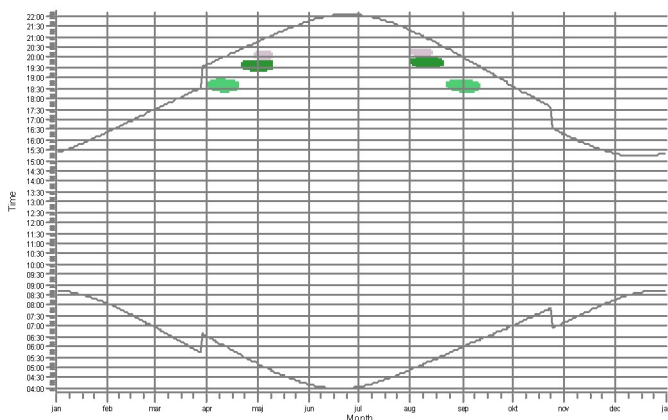
SÄLDEFALL 1:11>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



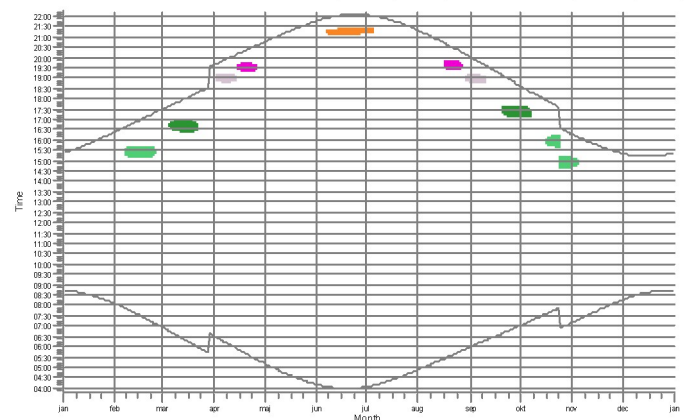
SÄLDEFALL 1:12>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0



SÄLDEFALL 1:6>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



SÄLDEFALL 1:7>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



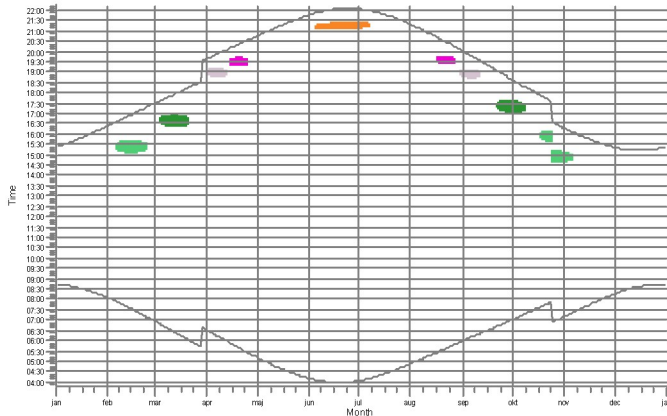
WTGs

1: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (283)	5: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (287)	A0019: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1286)
2: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (284)	6: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (288)	A0021: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1288)
3: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (285)	A0017: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1284)	A0022: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1289)
4: VESTAS V117-3.3 GridStream 3300 117.0 IOI hub: 91,5 m (TOT: 150,0 m) (286)	A0018: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1285)	

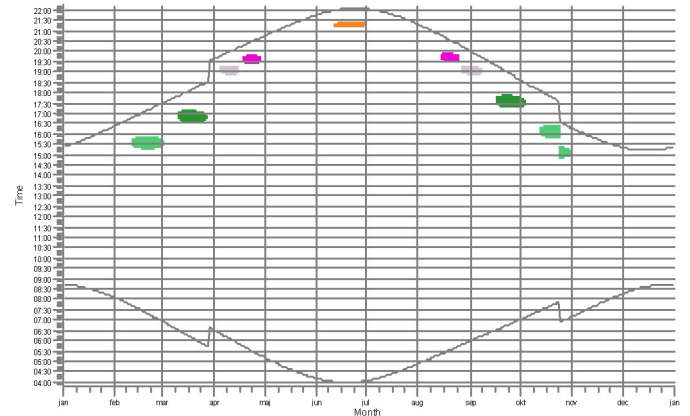
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

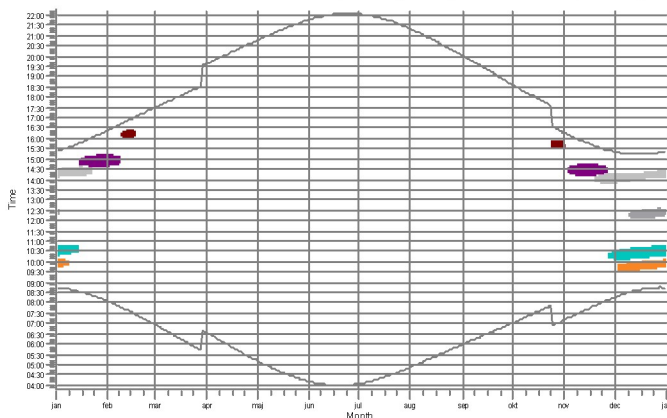
SÄLDEFALL 1:7>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



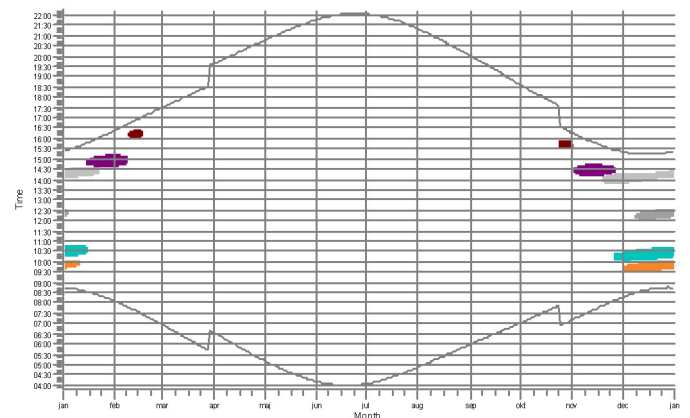
SÄLDEFALL 1:8>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



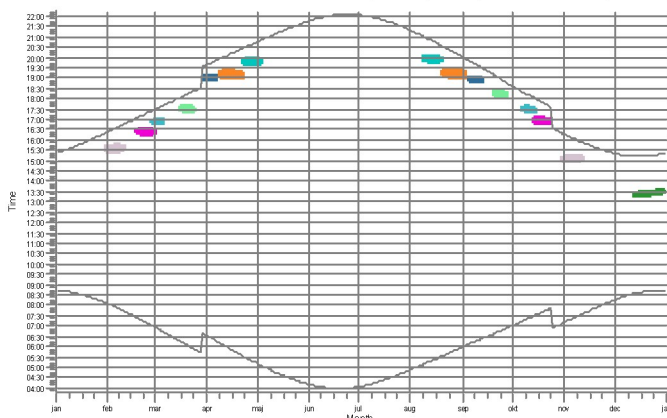
VASSEMÅLA 1:1>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



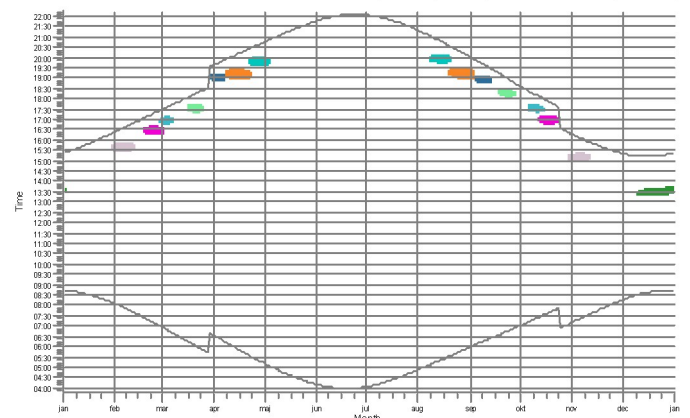
VASSEMÅLA 1:1>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



VÄSTRA EKÅS 1:10>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



VÄSTRA EKÅS 1:10>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0°



### WTGs

A0002: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1269)	A0015: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1282)	A0020: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1287)
A0005: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1272)	A0016: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1283)	A0021: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1288)
A0006: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1273)	A0017: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1284)	A0022: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1289)
A0010: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1277)	A0018: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1285)	
A0013: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1280)	A0019: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1286)	

Project:  
bruzaholm

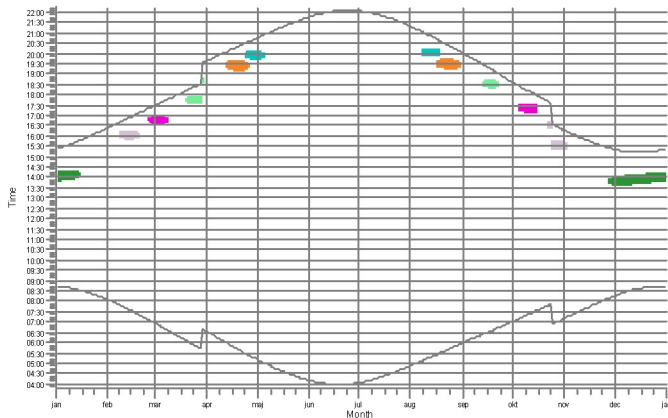
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VATTENFALL AB IT  
Företagsenhet 1002  
SE-962 80 Jokkmokk

Helena Wickman / helena.wickman@vattenfall.com  
Calculated:  
2017-09-08 18:12/3.1.617

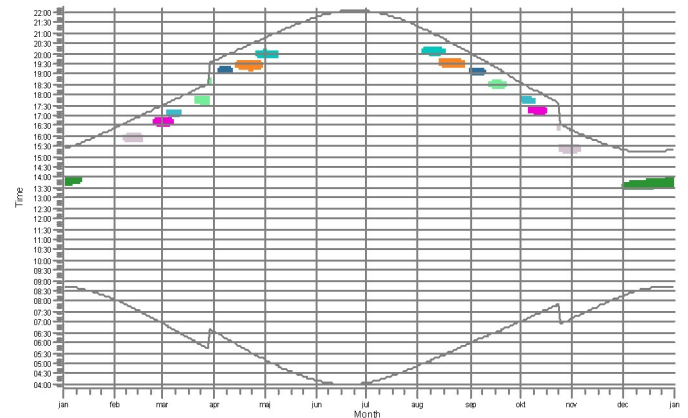
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

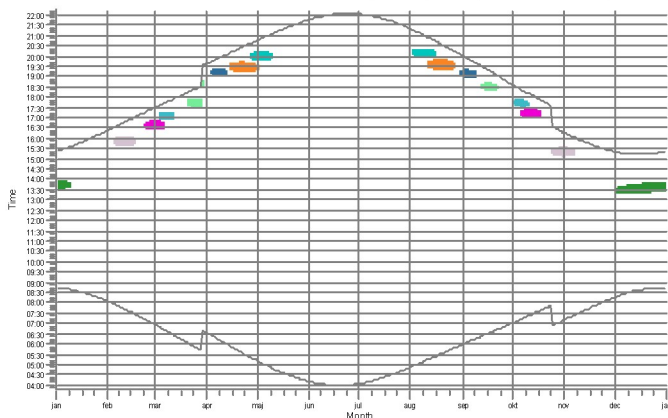
VÄSTRA EKÅS 1:13>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



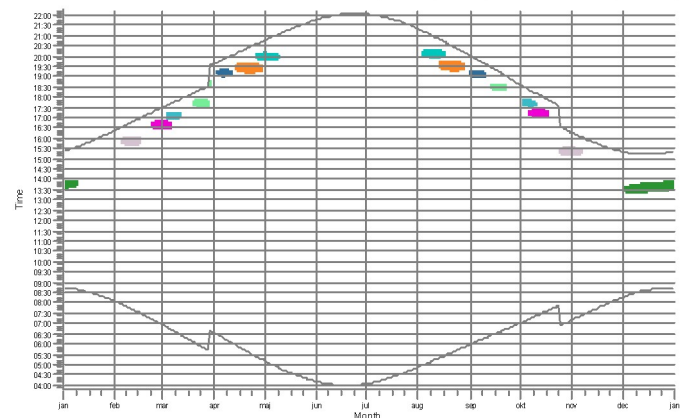
VÄSTRA EKÅS 1:14>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



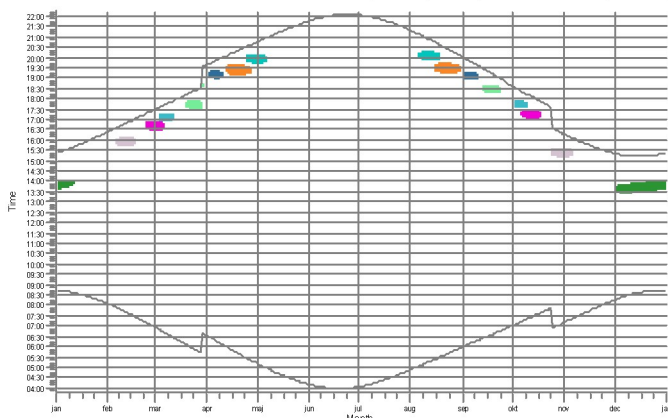
VÄSTRA EKÅS 1:15>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



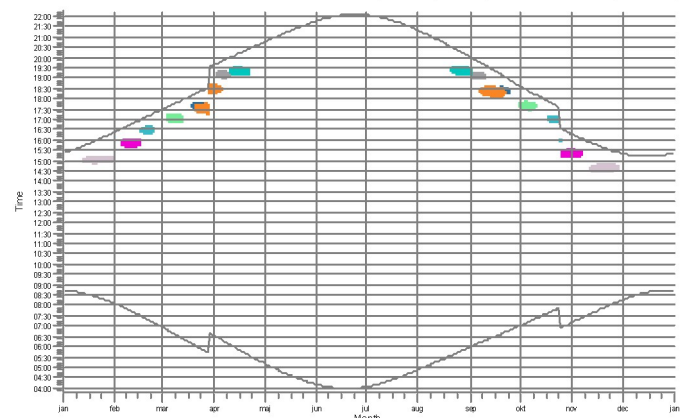
VÄSTRA EKÅS 1:15>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



VÄSTRA EKÅS 1:16>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



VÄSTRA EKÅS 1:17>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope



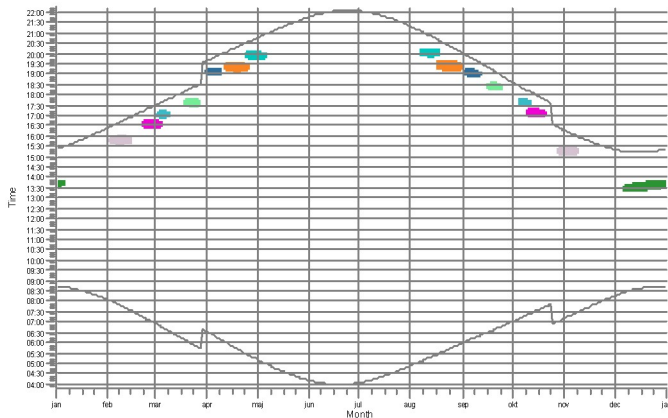
WTGs

A0010: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1277)	A0016: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1283)	A0019: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1286)
A0013: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1280)	A0017: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1284)	A0020: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1287)
A0015: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1282)	A0018: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1285)	A0021: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1288)

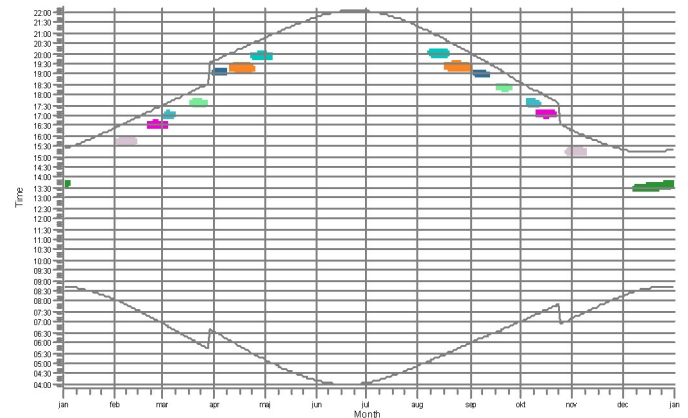
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

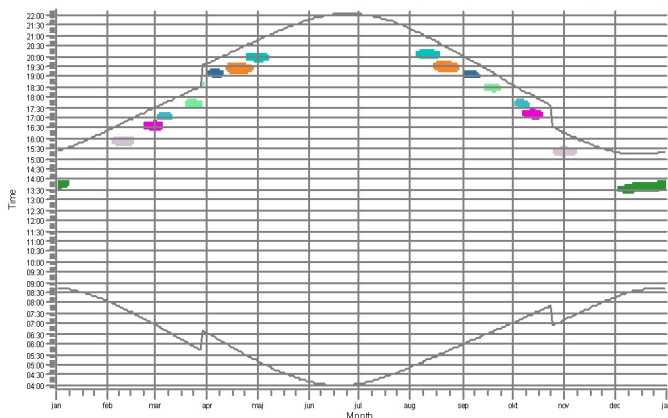
VÄSTRA EKÅS 1:18>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope:



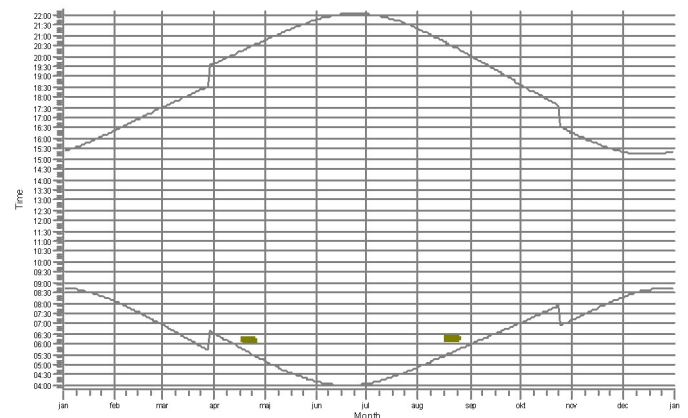
VÄSTRA EKÅS 1:19>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope:



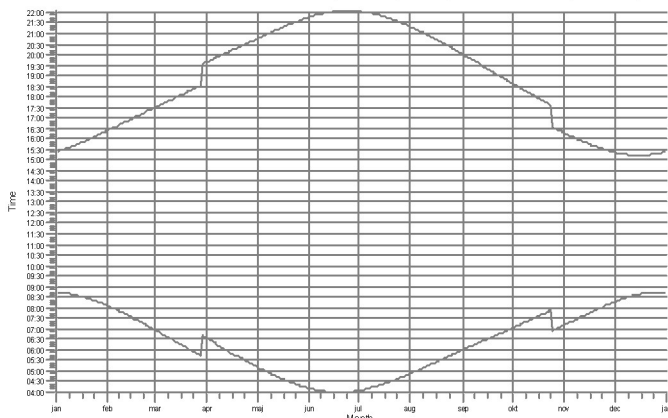
VÄSTRA EKÅS 1:7>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope:



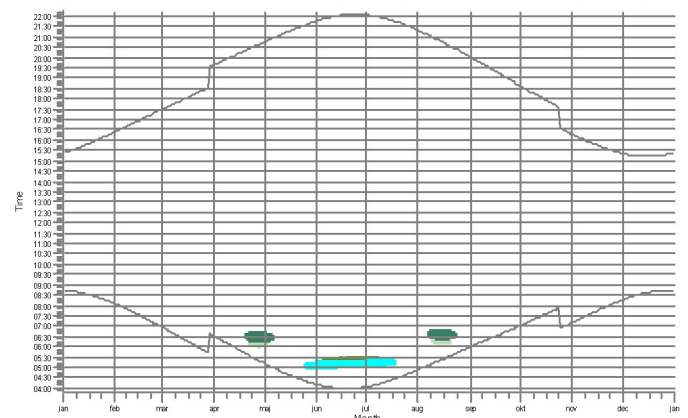
ÄGERSGÖL 1:11>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,



ÄGERSGÖL 1:14>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,



ÄGERSGÖL 1:15>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,



### WTGs

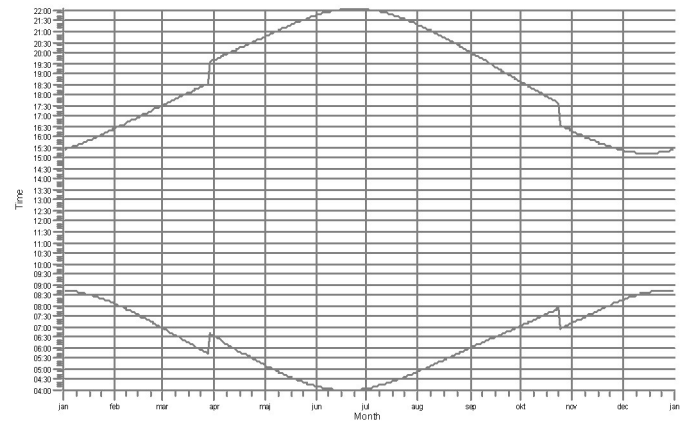
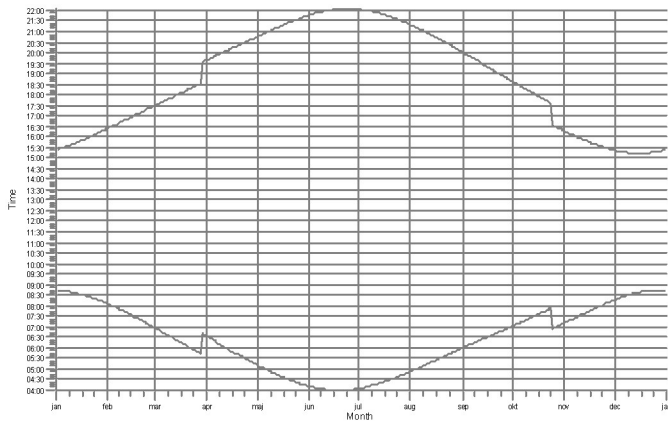
A0004: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1271)	A0015: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1282)	A0019: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1286)
A0007: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1274)	A0016: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1283)	A0020: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1287)
A0008: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1275)	A0017: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1284)	A0021: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1288)
A0013: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1280)	A0018: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1285)	A0023: GAMESA G132 -108.2dB 5000 132.0 IOI hub: 174,0 m (TOT: 240,0 m) (1290)



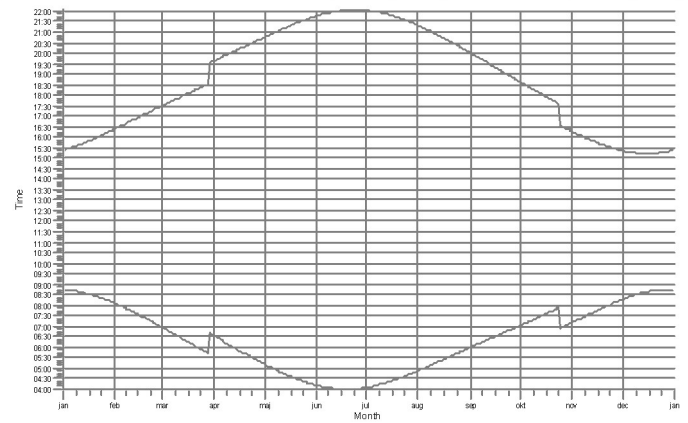
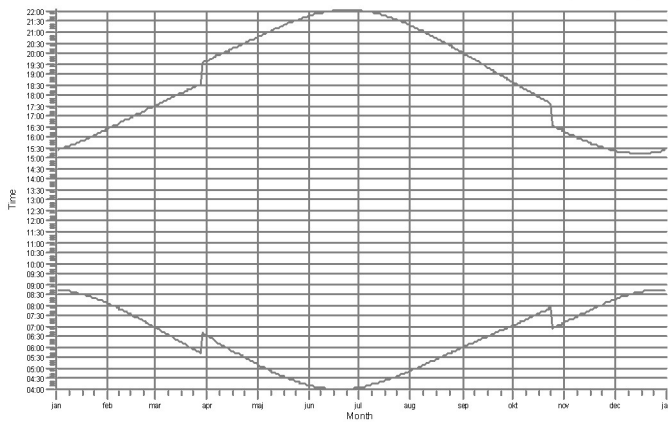
## SHADOW - Calendar, graphical

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m

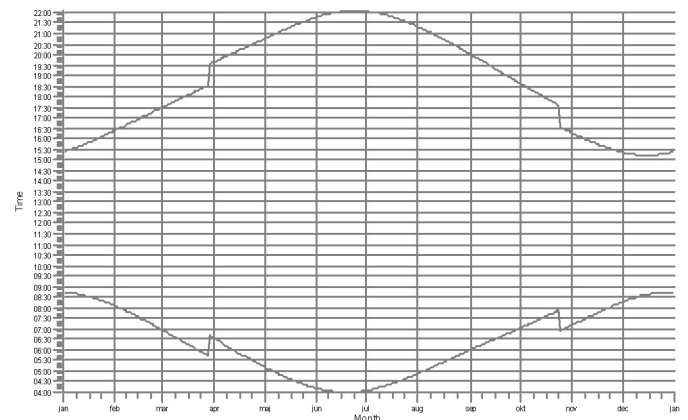
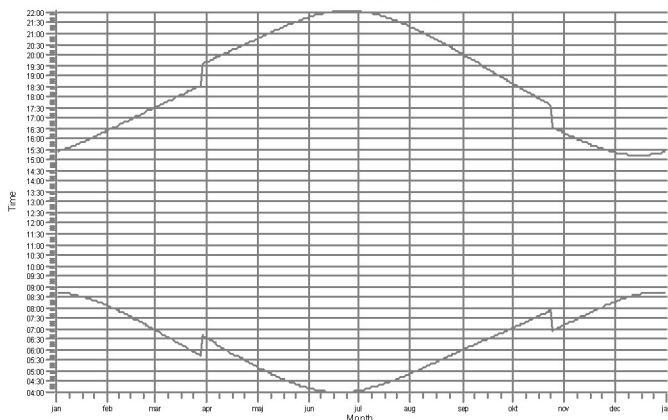
ÄGERSGÖL 1:16>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0, ÄGERSGÖL 1:17>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,



ÄGERSGÖL 1:18>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0, ÄGERSGÖL 1:2>2: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0



ÄGERSGÖL 1:2>2: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0 ÄGERSGÖL 1:6>1: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 0,0

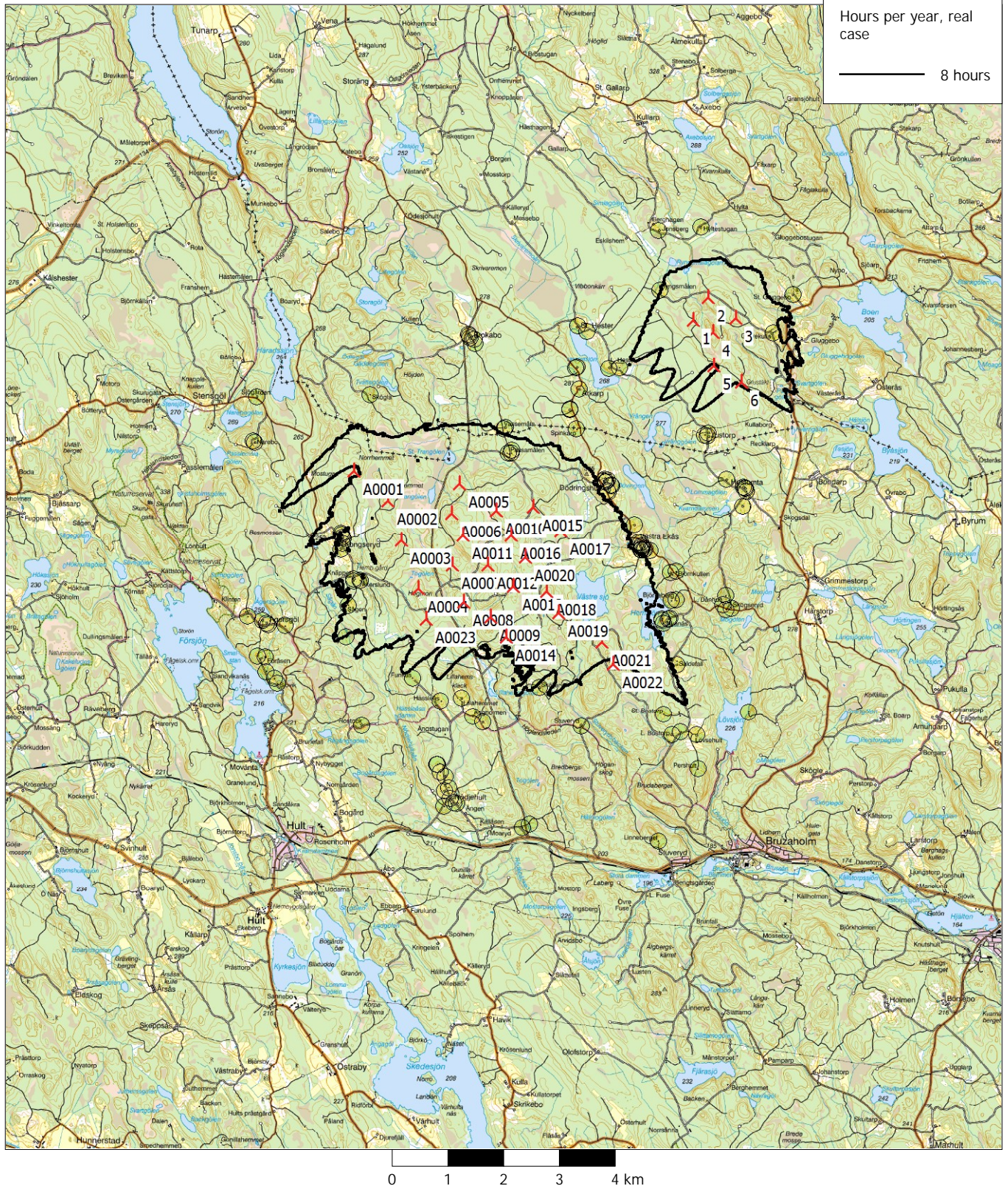


WTGs



## SHADOW - Map

Calculation: A\_LSBH007 - 23 x G132-5.0 hh174m + Grevekulla 6xV117 3.3 hh91,5m



▲ New WTG

● Shadow receptor

Flicker map level: Height Contours: Hk 2m + 5m uttunnad(1).wpo (2)