

## SHADOW - Main Result

Calculation: varjutus\_lõuna\_real case\_29042024

### Assumptions for shadow calculations

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

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

Sunshine probability S (Average daily sunshine hours) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
1,06 2,24 4,50 6,38 8,59 8,43 8,90 7,50 5,07 2,54 1,01 0,68

Operational time  
N NE E SE S SW W NW Sum  
710 631 631 946 1 498 1 498 1 104 867 7 885

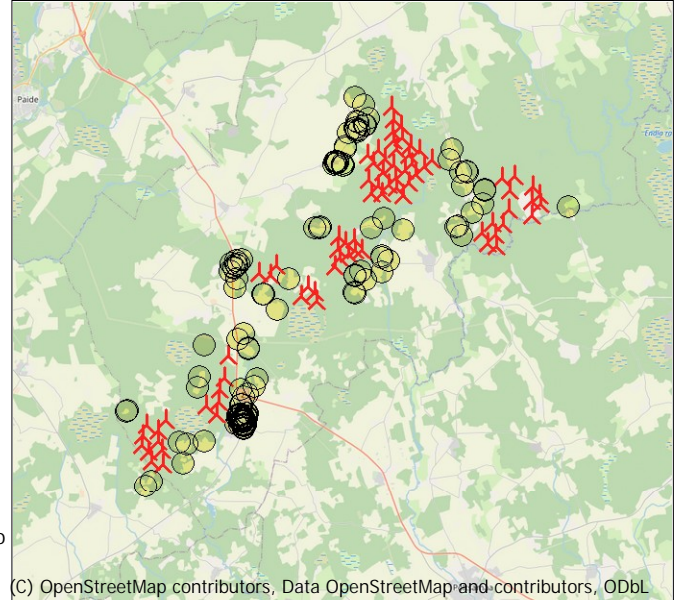
Monthly aggregation of real case reduction  
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:  
Height contours used: Height Contours: CONTOURLINE\_ONLINEDATA\_4.wpo  
Receptor grid resolution: 1,0 m

All coordinates are in  
Estonian Lambert L-EST97-EST97 (EE)

### WTGs

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	607 714	6 520 808	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
1	601 055	6 513 469	70,0	Ala3.2	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
1	603 609	6 519 612	70,0	Ala7	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
1	605 284	6 518 555	70,0	Ala8	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
1	616 150	6 523 446	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
1	609 890	6 528 002	80,0	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
1	601 493	6 515 271	70,0	Ala3.1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
1	597 074	6 510 906	66,8	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
2	605 647	6 519 084	70,0	Ala8	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
2	601 318	6 514 128	70,0	Ala3.1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
2	602 997	6 519 663	70,0	Ala7	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
2	607 034	6 520 121	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
2	609 434	6 524 101	71,0	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
2	616 418	6 525 179	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
2	600 374	6 512 572	70,0	Ala3.2	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
2	597 531	6 509 554	63,3	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
3	607 191	6 521 767	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
3	603 879	6 520 111	70,0	Ala7	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
3	605 954	6 518 743	70,0	Ala8	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
3	616 184	6 524 452	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
3	609 822	6 528 681	80,0	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
3	600 965	6 512 150	70,0	Ala3.2	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
3	598 135	6 509 441	62,2	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
4	601 042	6 512 799	70,0	Ala3.2	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
4	608 434	6 521 064	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
4	597 233	6 511 483	67,7	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
4	606 070	6 518 268	70,0	Ala8	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
4	609 880	6 527 372	80,0	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
4	615 724	6 525 083	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
5	608 039	6 521 053	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
5	617 399	6 524 656	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
5	610 298	6 527 658	80,0	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
5	598 280	6 511 768	67,2	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
6	607 111	6 521 071	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
6	617 748	6 524 243	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
6	598 088	6 510 181	63,8	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-

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## SHADOW - Main Result

Calculation: varjutus\_lõuna\_real case\_29042024

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	East	North	Z	Row data/Description	WTG type		Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data	
					Valid	Manufact.					Calculation distance	RPM
			[m]				[kW]	[m]	[m]	[m]	[RPM]	
6	609 720	6 524 574	72,2	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
7	607 247	6 520 606	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
7	597 851	6 511 221	66,3	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
7	608 830	6 524 079	71,1	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
7	617 824	6 523 771	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
8	607 564	6 521 439	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
8	597 851	6 510 649	65,1	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
8	608 684	6 524 754	72,9	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
8	615 481	6 522 065	72,8	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
9	597 352	6 510 046	64,6	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
9	607 995	6 521 639	70,0	Ala6	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
9	609 156	6 524 509	72,2	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
9	615 537	6 521 482	70,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
10	596 988	6 510 387	65,8	Ala3.3	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
10	617 391	6 523 183	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
10	609 416	6 525 185	73,7	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
11	615 076	6 521 574	70,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
11	608 886	6 525 688	75,3	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
12	617 341	6 523 930	80,0	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
12	608 556	6 526 102	76,4	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
13	615 272	6 522 696	75,9	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
13	610 162	6 524 409	71,7	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
14	614 761	6 522 139	71,5	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
14	609 142	6 526 379	76,9	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
15	615 861	6 522 626	77,7	Ala1	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
15	609 953	6 526 898	78,7	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
16	610 420	6 527 083	79,5	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
17	610 843	6 526 696	78,5	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
18	611 318	6 526 435	78,0	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
19	611 600	6 525 576	75,6	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
20	610 938	6 525 708	75,7	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
21	609 503	6 525 957	75,8	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
22	610 117	6 526 419	77,4	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
23	609 978	6 525 639	75,1	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
24	610 793	6 526 155	77,0	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
25	610 589	6 525 343	74,5	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
26	610 092	6 524 921	73,1	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
27	610 772	6 524 673	72,7	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
28	610 527	6 524 033	70,7	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
29	611 128	6 525 175	74,3	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-
30	611 971	6 525 936	76,8	TU5	Yes	VESTAS	V172-7.2-7 200	7 200	180,0	180,0	1 783	-

## Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Mikutooma	607 293	6 525 531	75,3	3,0	2,0	0,0	90,0	"Green house mode"	2,0
B	Otsa	607 979	6 527 342	79,3	3,0	2,0	0,0	90,0	"Green house mode"	2,0
C	Kadastiku tee 1	601 989	6 511 659	69,3	3,0	2,0	0,0	90,0	"Green house mode"	2,0
D	Tiigi	601 751	6 520 115	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
E	Rätsepa	609 465	6 520 669	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
F	Kadaka	613 083	6 526 529	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
G	Simmuni	609 544	6 519 936	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
H	Harjaku	607 048	6 525 661	75,7	3,0	2,0	0,0	90,0	"Green house mode"	2,0
I	Mõmmimäe tee 2	602 531	6 512 074	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
J	Mihkle	607 400	6 526 434	77,6	3,0	2,0	0,0	90,0	"Green house mode"	2,0
K	Valgepea	602 560	6 515 640	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
L	Kikevere	601 987	6 516 146	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
M	Antsu tee 4	602 506	6 511 986	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
N	Uustalu-Metsa	607 940	6 527 394	79,5	3,0	2,0	0,0	90,0	"Green house mode"	2,0
O	Jõeäärse	619 319	6 523 652	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
P	Pargi	613 883	6 525 336	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0

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## SHADOW - Main Result

Calculation: varjutus\_lõuna\_real case\_29042024

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No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
Q	H. Rebase tee 2	602 211	6 511 835	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
R	Sepa	608 442	6 527 647	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
S	Rukkilille	602 287	6 511 899	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
T	Roodde	607 858	6 529 129	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
U	Hermani	601 898	6 520 211	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
V	Uuesauna	599 405	6 510 513	64,3	3,0	2,0	0,0	90,0	"Green house mode"	2,0
W	Tuljaku tee 1	602 422	6 511 497	68,8	3,0	2,0	0,0	90,0	"Green house mode"	2,0
X	Tuljaku tee 5	602 384	6 511 458	68,6	3,0	2,0	0,0	90,0	"Green house mode"	2,0
Y	Salu	599 233	6 509 475	61,6	3,0	2,0	0,0	90,0	"Green house mode"	2,0
Z	Tuljaku tee 7	602 406	6 511 400	68,4	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AA	H. Rebase tee 6	602 104	6 511 890	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AB	Pika-Reinu	600 343	6 510 707	65,6	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AC	Viljandi mnt 11	602 364	6 511 897	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AD	Kiigevere tee 5/1	602 453	6 511 563	69,1	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AE	Antsu tee 15	602 471	6 511 858	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AF	Sandre	609 508	6 520 804	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AG	Nurme tee 2	602 204	6 512 118	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AH	Kamseni tee 1	602 321	6 511 982	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AI	Kingu	608 691	6 519 504	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AJ	Peetre	608 082	6 527 427	79,4	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AK	Neeme	610 566	6 522 230	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AL	Miku	605 915	6 522 165	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AM	Tänavotsa	607 269	6 525 601	75,5	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AN	Laane-Madise	609 539	6 522 773	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AO	Rehemetsa	602 073	6 520 373	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AP	Mäeotsa/1	614 849	6 524 401	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AQ	Pärna	607 949	6 527 524	79,7	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AR	Toominga	606 963	6 525 611	75,6	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AS	Viljandi mnt 3	602 361	6 511 687	69,6	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AT	Mäeotsa	614 838	6 524 436	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AU	Lillemäe	613 545	6 525 291	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AV	Mõisamaa	608 044	6 527 810	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AW	Reinu	601 475	6 519 738	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AX	Rendi	603 243	6 518 577	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AY	Hundiaugu	602 896	6 513 684	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
AZ	Vana-Kubja	607 489	6 527 214	79,7	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BA	Uue-Kaasiku	613 690	6 524 608	79,3	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BB	Kangru	614 776	6 523 679	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BC	Teeääre	606 187	6 522 203	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BD	Kamseni tee 5	602 113	6 512 160	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BE	Viljandi mnt 9b	602 415	6 511 897	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BF	Kaare tee 7	602 611	6 512 222	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BG	Kodutare tee 1	602 467	6 512 061	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BH	Kodunurme tee 6	602 153	6 511 967	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BI	Loigu	601 617	6 519 931	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BJ	Väike-Nurga	606 845	6 525 658	75,8	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BK	Kaeramaa/1	608 093	6 519 684	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BL	Rendi/1	603 222	6 518 567	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BM	Soosalu	609 874	6 520 527	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BN	Hansu	597 561	6 508 502	61,3	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BO	Lepametsa/1	596 194	6 512 216	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BP	Antsu tee 17	602 473	6 511 802	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BQ	Epa-Hansu	600 202	6 515 779	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BR	Sepa	601 754	6 520 305	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BS	Lombi	607 323	6 525 495	75,2	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BT	Viljandi mnt 9	602 352	6 511 828	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BU	Ellavere	608 567	6 528 014	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BV	H. Rebase tee 1	602 301	6 511 784	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BW	Tungla	608 306	6 528 771	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BX	Undiaugu	608 389	6 519 940	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BY	Haaviku	599 884	6 513 511	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
BZ	Palsu-Nurga	613 668	6 522 004	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CA	Kaare tee 2	602 518	6 512 236	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CB	Raja	604 568	6 519 443	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0

To be continued on next page...

## SHADOW - Main Result

Calculation: varjutus\_lõuna\_real case\_29042024

...continued from previous page

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
CC	Põllu	601 506	6 520 124	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CD	Viljandi mnt 7/1	602 347	6 511 797	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CE	Hansu	606 931	6 525 606	75,6	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CF	Sigapusma	606 803	6 525 556	75,5	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CG	Jaanimardi	606 918	6 525 665	75,8	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CH	Markuse-Uuetoa	614 199	6 523 196	75,6	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CI	Kodunurme tee 2	602 214	6 512 012	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CJ	Kadastiku tee 2	602 170	6 511 596	69,1	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CK	Sillaotsa	601 818	6 520 081	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CL	Palsu	613 481	6 522 446	71,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CM	Peetri	606 152	6 522 180	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CN	Vändra	608 366	6 527 634	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CO	Aru	612 937	6 525 966	79,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CP	Papli	602 240	6 512 716	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CQ	Magasi-Aida	602 253	6 512 726	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CR	Viljandi mnt 15	602 366	6 512 040	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CS	Ellavere-Peetri	607 426	6 526 525	77,9	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CT	Sinsu/1	608 127	6 518 790	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CU	Sinsu	608 076	6 518 815	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CV	Umalasaare	602 284	6 516 467	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CW	Lehise	603 022	6 514 068	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CX	Kamseni tee 2	602 308	6 511 949	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CY	Lepametsa	596 155	6 512 201	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
CZ	Timmu	599 996	6 514 134	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DA	Viljapuuai	607 950	6 527 828	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DB	Viljandi mnt 7	602 341	6 511 753	69,9	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DC	Kodunurme tee 8	602 110	6 511 967	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DD	Luha	607 296	6 525 491	75,2	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DE	H. Rebase tee 4	602 180	6 511 848	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DF	Jaama	613 868	6 525 413	80,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DG	Nurme	608 918	6 522 249	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DH	Kiigevere tee 5/2	602 413	6 511 585	69,2	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DI	Kiigevere tee 4	602 384	6 511 645	69,4	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DJ	Kiigevere tee 6	602 440	6 511 638	69,5	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DK	Kaeramaa	608 057	6 519 711	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DL	Paaristi	602 328	6 513 124	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DM	Kõrtsi	602 194	6 513 485	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DN	Palsu	613 386	6 522 420	70,7	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DO	Kamseni tee 6	602 075	6 512 122	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DP	Uuesauna	601 833	6 519 368	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DQ	Kiigevere tee 5	602 415	6 511 541	69,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DR	Kase	602 532	6 513 220	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DS	Kamseni tee 4	602 109	6 512 092	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DT	Kase	602 529	6 515 706	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DU	Nurme tee 4	602 241	6 512 143	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DV	Lõugu	607 023	6 525 638	75,7	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DW	Välja	604 000	6 517 802	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DX	Ristisaare	598 984	6 510 593	64,2	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DY	Kaasiku	601 739	6 518 864	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
DZ	Korni	607 861	6 527 509	79,8	3,0	2,0	0,0	90,0	"Green house mode"	2,0
EA	Kiigevere tee 8	602 482	6 511 632	69,5	3,0	2,0	0,0	90,0	"Green house mode"	2,0
EB	Viljandi mnt 13	602 355	6 511 972	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
EC	Kõrtsi	601 681	6 519 929	70,0	3,0	2,0	0,0	90,0	"Green house mode"	2,0
ED	Kesa	597 264	6 508 194	61,2	3,0	2,0	0,0	90,0	"Green house mode"	2,0

## Calculation Results

Shadow receptor

No.	Name	Shadow, expected values	
		Shadow hours per year [h/year]	
A	Mikutooma	11:17	
B	Otsa	4:47	

To be continued on next page...

Project:

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Calculated:  
29.04.2024 10:57/4.0.540

## SHADOW - Main Result

Calculation: varjutus\_lõuna\_real case\_29042024

...continued from previous page

No.	Name	Shadow, expected values
		Shadow hours per year [h/year]
	C Kadastiku tee 1	13:56
	D Tiigi	2:54
	E Rätsepa	27:26
	F Kadaka	6:06
	G Simmuni	0:00
	H Harjaku	3:44
	I Mõmmimäe tee 2	8:51
	J Mihkle	7:39
	K Valgepea	4:24
	L Kikevere	4:09
	M Antsu tee 4	11:21
	N Uustalu-Metsa	4:26
	O Jõeäärse	7:34
	P Pargi	0:00
	Q H. Rebase tee 2	8:31
	R Sepa	19:30
	S Rukkilille	11:11
	T Roode	0:00
	U Hermani	3:09
	V Uuesauna	12:58
	W Tuljaku tee 1	5:37
	X Tuljaku tee 5	6:41
	Y Salu	17:29
	Z Tuljaku tee 7	7:15
	AA H. Rebase tee 6	8:02
	AB Pika-Reinu	0:00
	AC Viljandi mnt 11	11:42
	AD Kiigevere tee 5/1	4:44
	AE Antsu tee 15	11:18
	AF Sandre	18:06
	AG Nurme tee 2	15:28
	AH Kamseni tee 1	13:05
	AI Kingu	3:28
	AJ Peetre	4:26
	AK Neeme	0:00
	AL Miku	4:42
	AM Tänavotsa	10:16
	AN Laane-Madise	0:00
	AO Rehemetsa	4:56
	AP Mäeotsa/1	17:00
	AQ Pärna	3:42
	AR Toominga	3:19
	AS Viljandi mnt 3	7:18
	AT Mäeotsa	17:38
	AU Lillemäe	4:10
	AV Mõisamaa	1:03
	AW Reinu	2:51
	AX Rendi	0:00
	AY Hundiaugu	3:37
	AZ Vana-Kubja	1:46
	BA Uue-Kaasiku	0:00
	BB Kangru	16:38
	BC Teeääre	7:43
	BD Kamseni tee 5	16:15
	BE Viljandi mnt 9b	11:50
	BF Kaare tee 7	6:27
	BG Kodutare tee 1	10:46
	BH Kodunurme tee 6	11:12
	BI Loigu	3:04
	BJ Väike-Nurga	2:47
	BK Kaeramaa/1	13:45
	BL Rendi/1	0:00
	BM Soosalu	4:57

To be continued on next page...

## SHADOW - Main Result

Calculation: varjutus\_lõuna\_real case\_29042024

...continued from previous page

No.	Name	Shadow, expected values Shadow hours per year [h/year]
BN	Hansualle	0:00
BO	Lepametsa/1	4:49
BP	Antsu tee 17	10:31
BQ	Epa-Hansu	2:34
BR	Sepa	2:23
BS	Lombi	12:45
BT	Viljandi mnt 9	10:15
BU	Ellavere	18:54
BV	H. Rebase tee 1	8:37
BW	Tungla	4:18
BX	Undiaugu	15:51
BY	Haaviku	17:40
BZ	Palsu-Nurga	12:58
CA	Kaare tee 2	7:33
CB	Raja	21:36
CC	Põllu	2:09
CD	Viljandi mnt 7/1	9:34
CE	Hansu	3:11
CF	Sigapusma	0:00
CG	Jaanimardi	3:05
CH	Markuse-Uuetoa	10:01
CI	Kodunurme tee 2	13:08
CJ	Kadastiku tee 2	10:56
CK	Sillaotsa	3:19
CL	Palsu	3:22
CM	Peetri	7:40
CN	Vändra	11:26
CO	Aru	14:41
CP	Papli	17:05
CQ	Magasi-Aida	17:15
CR	Viljandi mnt 15	13:34
CS	Ellavere-Peetri	7:15
CT	Sinsu/1	0:00
CU	Sinsu	0:00
CV	Umalasaare	2:04
CW	Lehise	2:31
CX	Kamseni tee 2	12:28
CY	Lepametsa	4:36
CZ	Timmu	9:55
DA	Viljapuuaia	0:00
DB	Viljandi mnt 7	8:26
DC	Kodunurme tee 8	10:30
DD	Luha	11:55
DE	H. Rebase tee 4	8:20
DF	Jaama	0:00
DG	Nurme	9:26
DH	Kiigevere tee 5/2	5:03
DI	Kiigevere tee 4	6:35
DJ	Kiigevere tee 6	4:29
DK	Kaeramaa	14:35
DL	Paaristi	11:01
DM	Kõrtsi	12:23
DN	Palsu	3:03
DO	Kamseni tee 6	17:49
DP	Uuesauna	6:40
DQ	Kiigevere tee 5	5:20
DR	Kase	11:33
DS	Kamseni tee 4	14:15
DT	Kase	4:11
DU	Nurme tee 4	15:33
DV	Lõugu	3:37
DW	Välja	9:14
DX	Ristisaare	26:36

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Project:  
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Calculated:  
29.04.2024 10:57/4.0.540

## SHADOW - Main Result

Calculation: varjutus\_lõuna\_real case\_29042024

...continued from previous page

No.	Name	Shadow, expected values Shadow hours per year [h/year]
	DY Kaasiku	9:31
	DZ Kornil	3:43
	EA Kiigevere tee 8	4:12
	EB Viljandi mnt 13	12:56
	EC Kõrtsi	3:20
	ED Kesa	0:00

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

No.	Name	Expected [h/year]
1	Ala6	2:28
1	Ala3.2	32:59
1	Ala7	12:27
1	Ala8	12:33
1	Ala1	5:11
1	TU5	9:30
1	Ala3.1	14:14
1	Ala3.3	2:29
2	Ala8	4:10
2	Ala3.1	21:09
2	Ala7	36:17
2	Ala6	21:04
2	TU5	0:00
2	Ala1	4:48
2	Ala3.2	8:24
2	Ala3.3	2:34
3	Ala6	6:57
3	Ala7	0:00
3	Ala8	1:55
3	Ala1	10:49
3	TU5	18:07
3	Ala3.2	47:39
3	Ala3.3	9:49
4	Ala3.2	44:06
4	Ala6	25:25
4	Ala3.3	3:28
4	Ala8	0:00
4	TU5	5:26
4	Ala1	9:08
5	Ala6	9:55
5	Ala1	0:00
5	TU5	1:53
5	Ala3.3	0:00
6	Ala6	4:57
6	Ala1	4:01
6	Ala3.3	18:02
6	TU5	0:00
7	Ala6	10:30
7	Ala3.3	14:35
7	TU5	0:00
7	Ala1	3:32
8	Ala6	4:03
8	Ala3.3	7:26
8	TU5	2:47
8	Ala1	3:00
9	Ala3.3	1:47
9	Ala6	16:49
9	TU5	0:00
9	Ala1	0:00
10	Ala3.3	0:00
10	Ala1	0:00
10	TU5	0:00

To be continued on next page...

## SHADOW - Main Result

Calculation: varjutus\_lõuna\_real case\_29042024

...continued from previous page

No.	Name	Expected [h/year]
11	Ala1	2:28
11	TU5	7:45
12	Ala1	0:00
12	TU5	31:14
13	Ala1	12:01
13	TU5	0:00
14	Ala1	15:54
14	TU5	12:23
15	Ala1	3:30
15	TU5	3:25
16	TU5	0:00
17	TU5	0:00
18	TU5	5:32
19	TU5	4:22
20	TU5	0:00
21	TU5	0:00
22	TU5	0:00
23	TU5	0:00
24	TU5	0:00
25	TU5	0:00
26	TU5	0:00
27	TU5	0:00
28	TU5	0:00
29	TU5	0:00
30	TU5	15:22

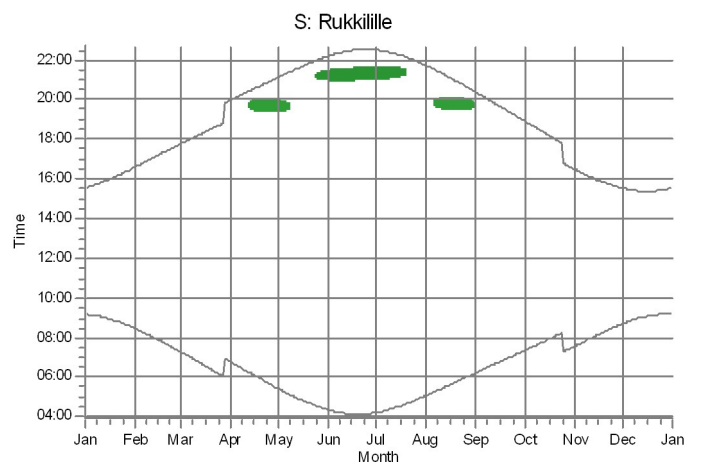
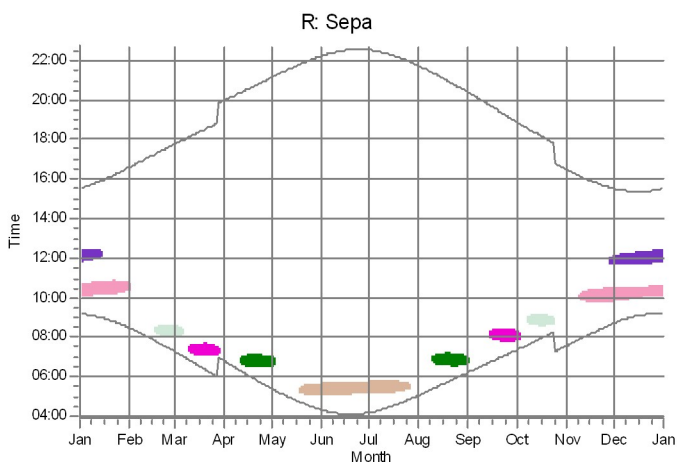
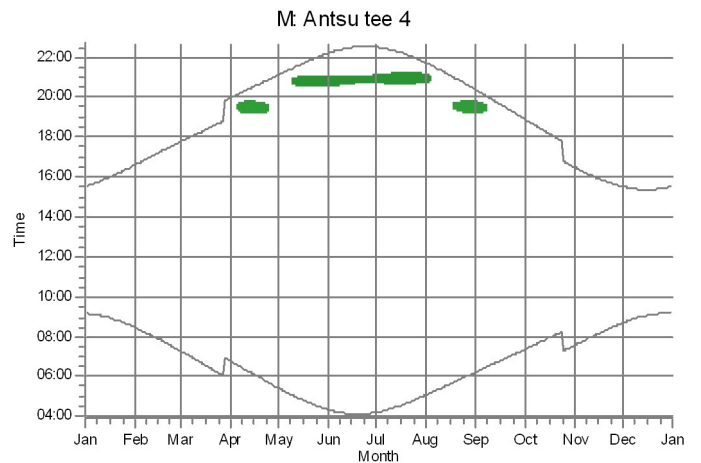
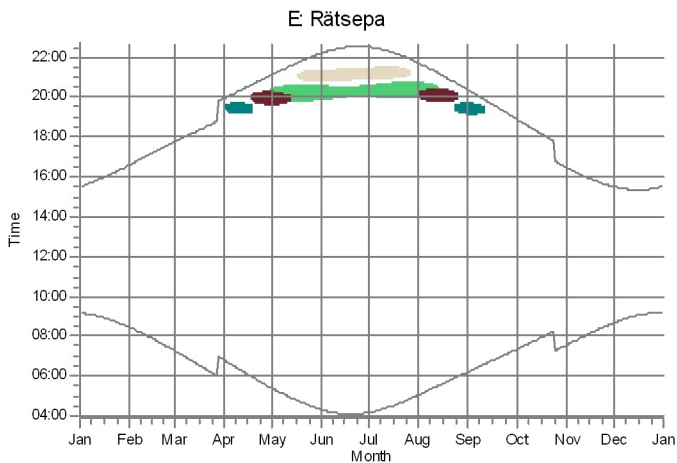
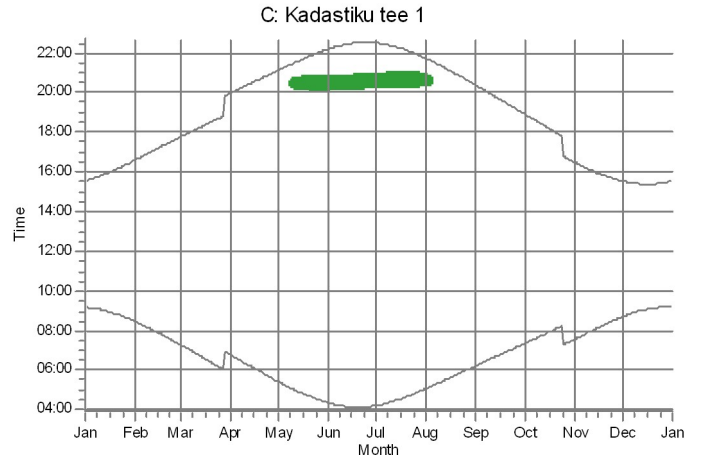
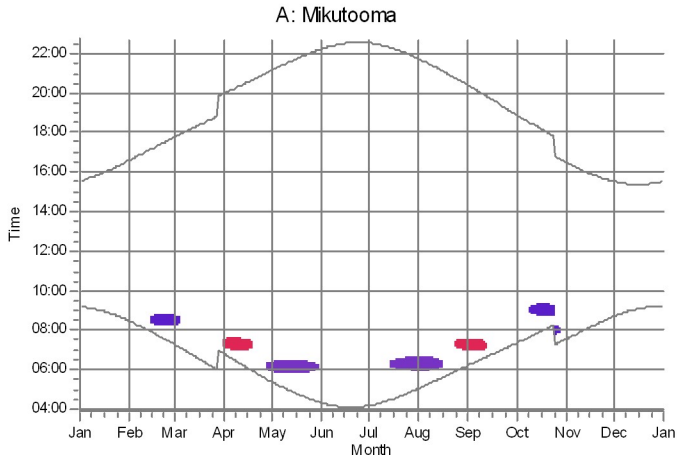
Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

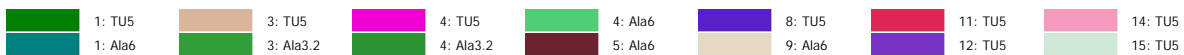


## SHADOW - Calendar, graphical

Calculation: varjutus\_lõuna\_real case\_29042024

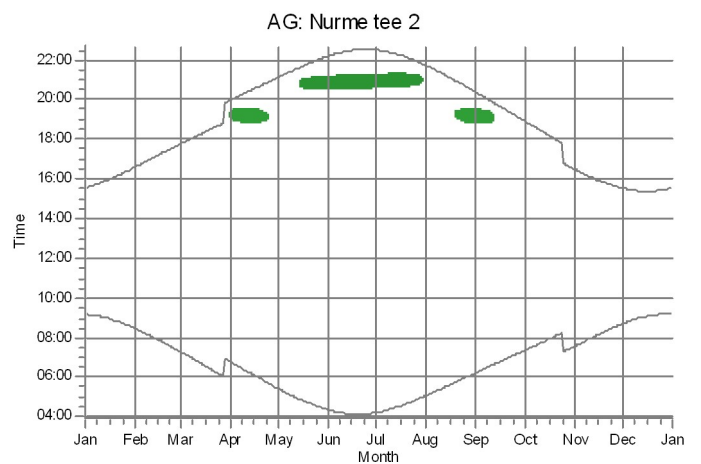
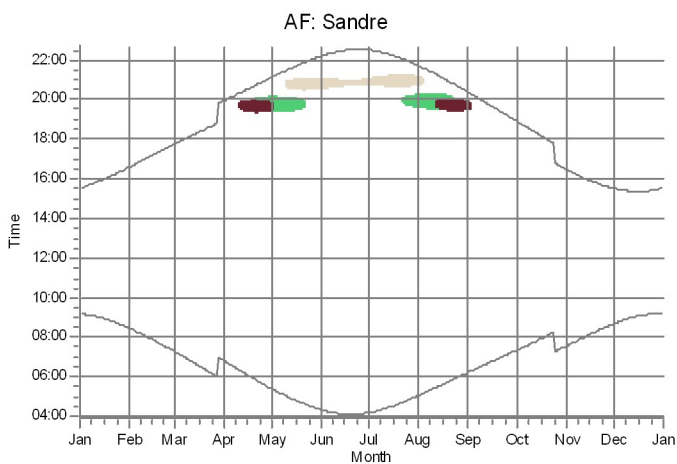
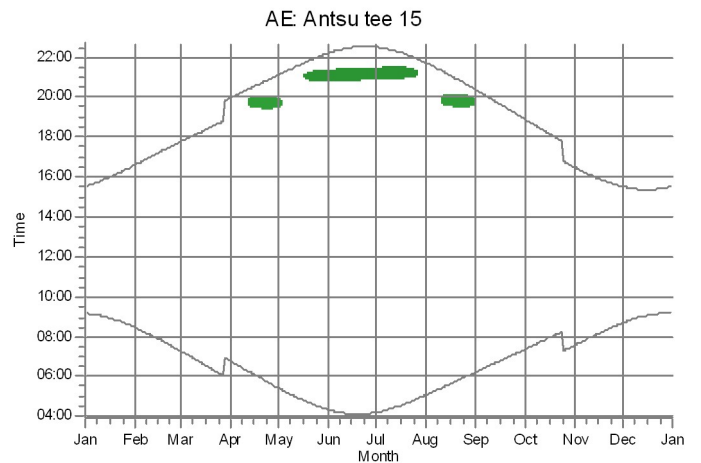
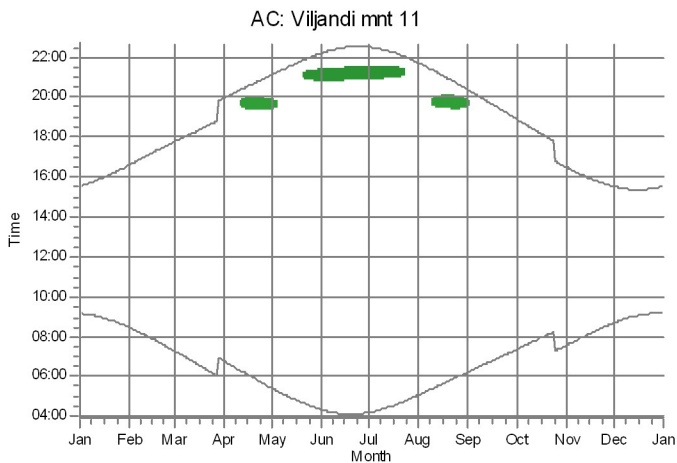
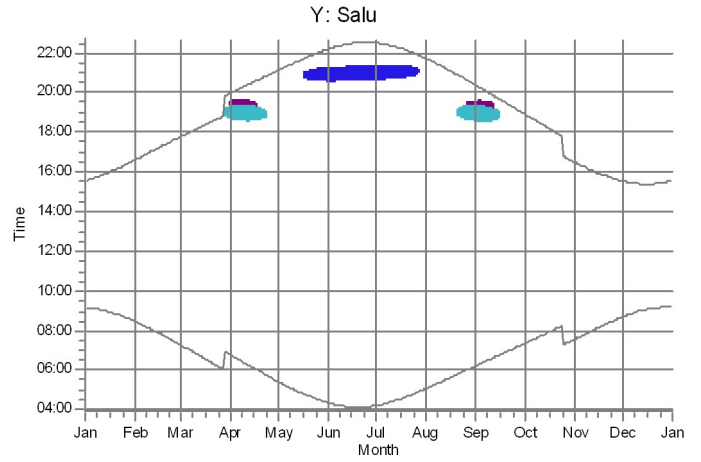
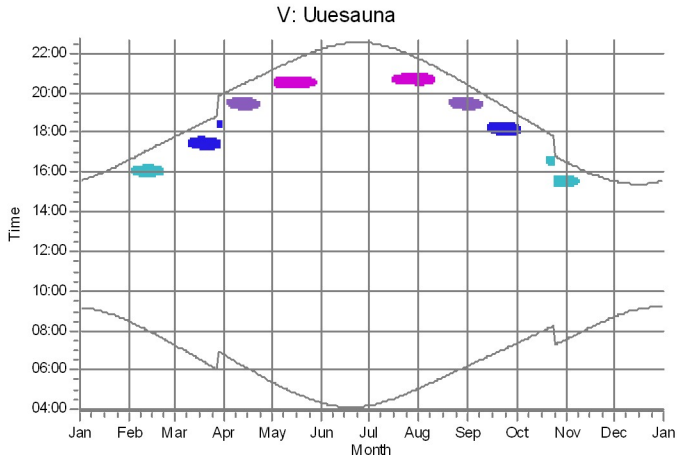


WTGs

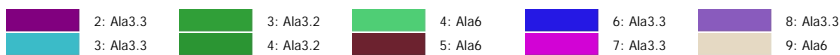


## SHADOW - Calendar, graphical

Calculation: varjutus\_lõuna\_real case\_29042024

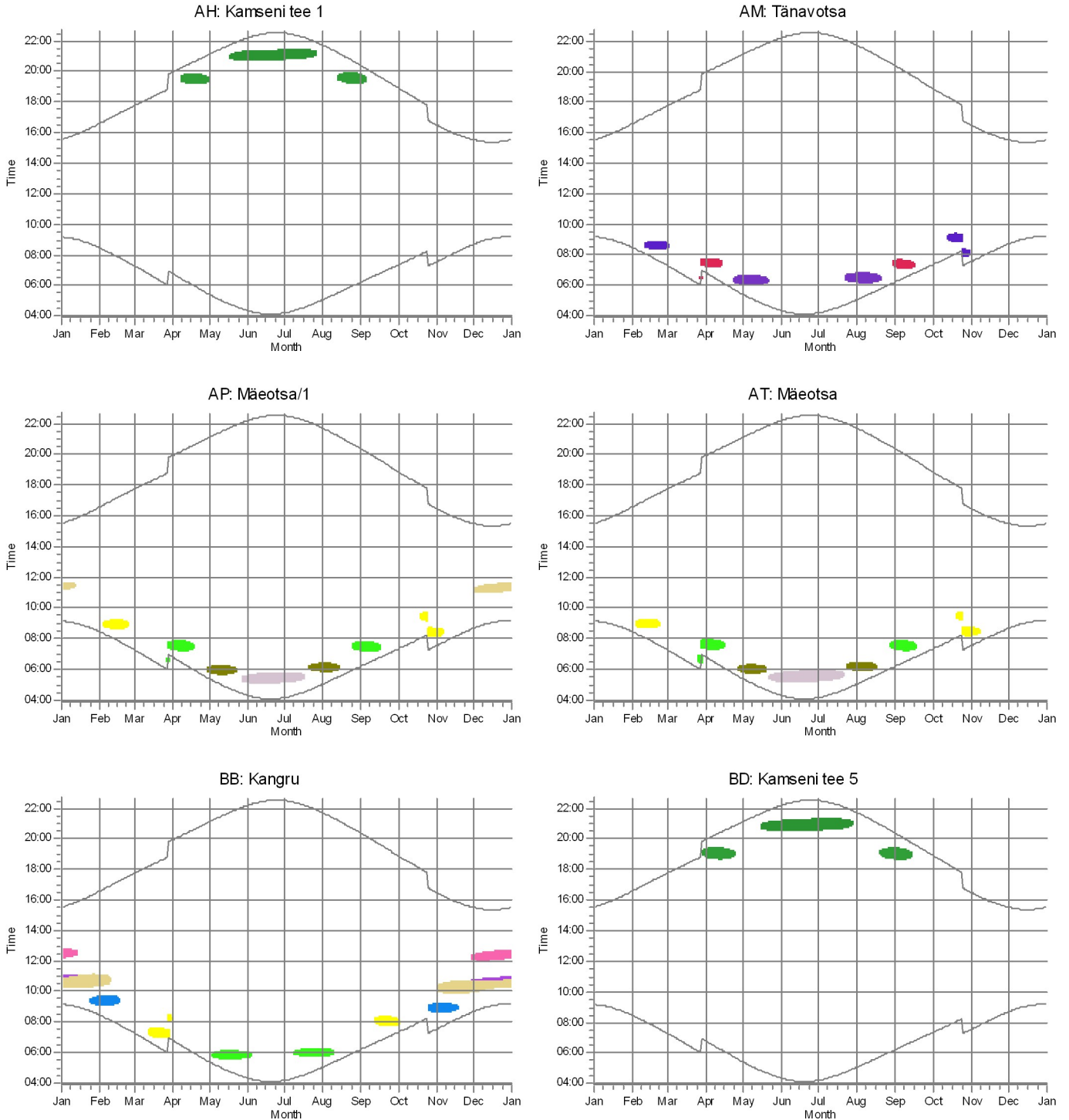


WTGs

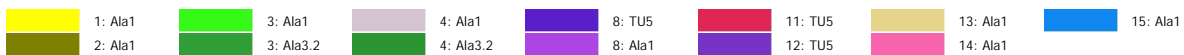


## SHADOW - Calendar, graphical

Calculation: varjutus\_lõuna\_real case\_29042024



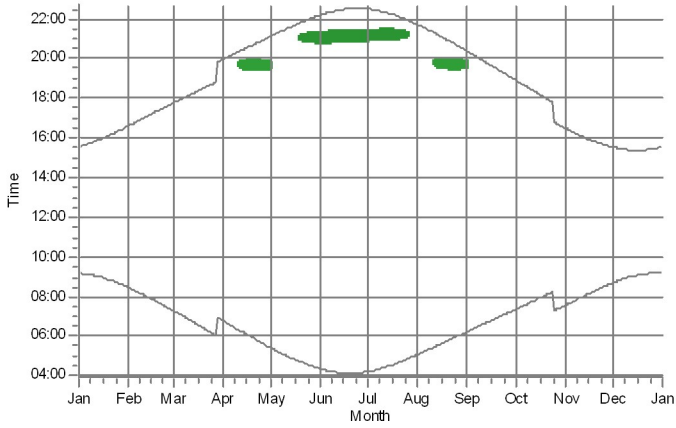
WTGs



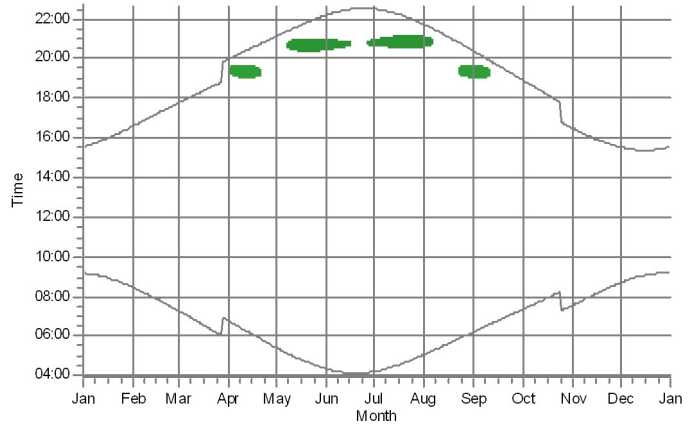
## SHADOW - Calendar, graphical

Calculation: varjutus\_lõuna\_real case\_29042024

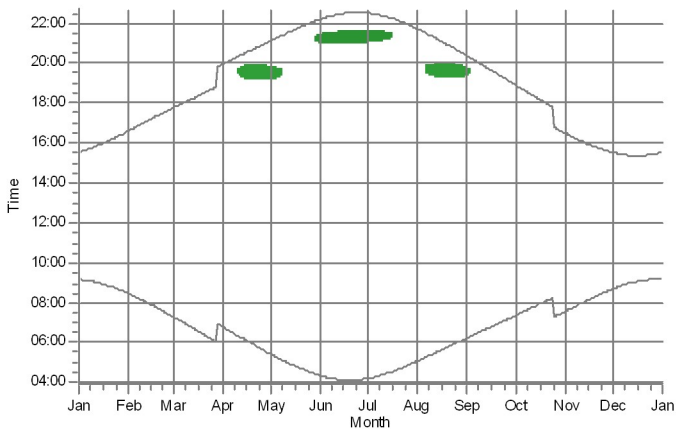
BE: Viljandi mnt 9b



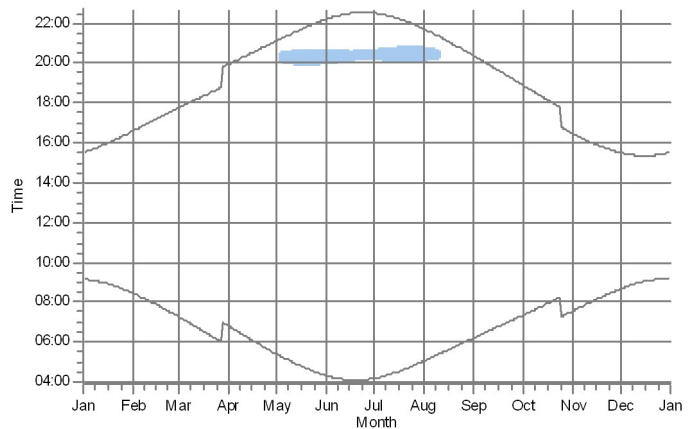
BG: Kodutare tee 1



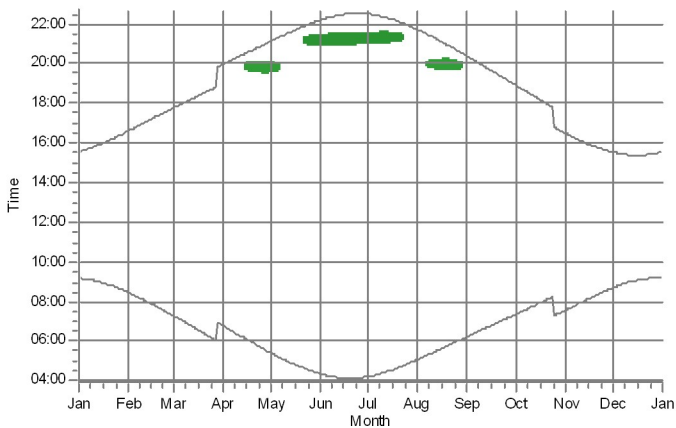
BH: Kodunurme tee 6



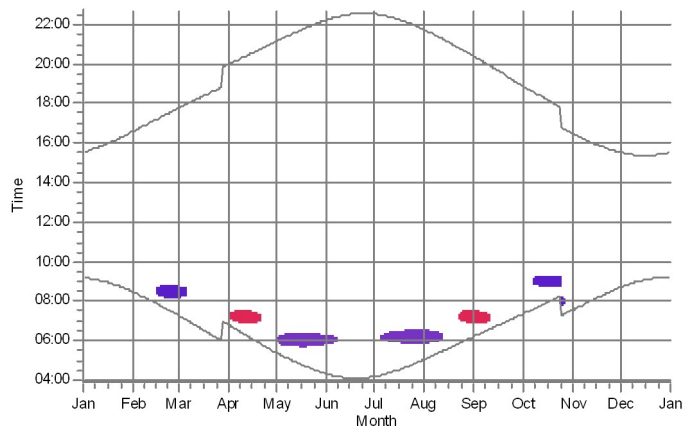
BK: Kaeramaa/1



BP: Antsu tee 17



BS: Lombi

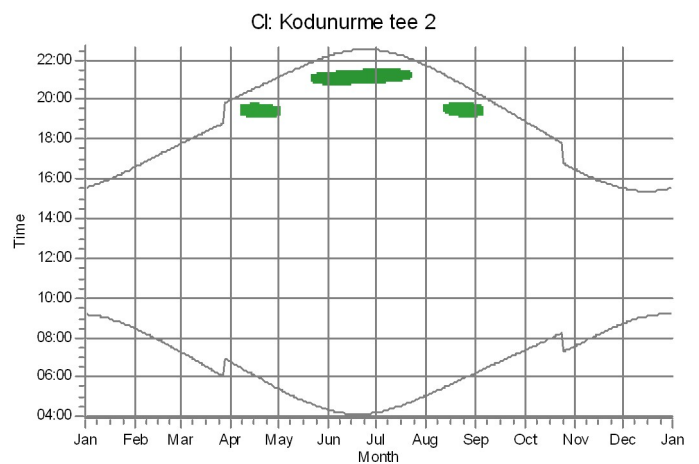
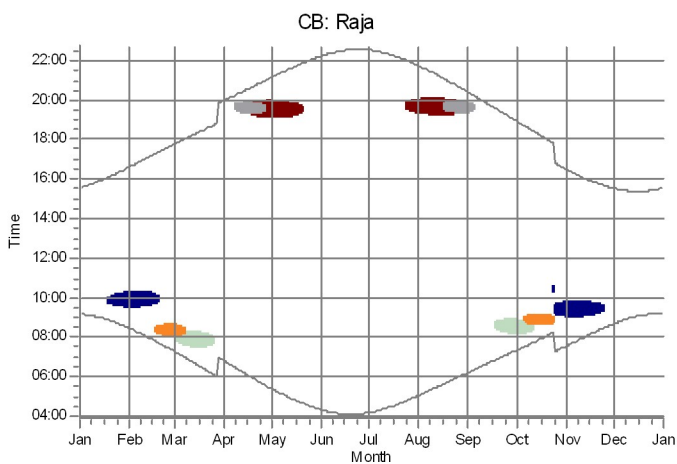
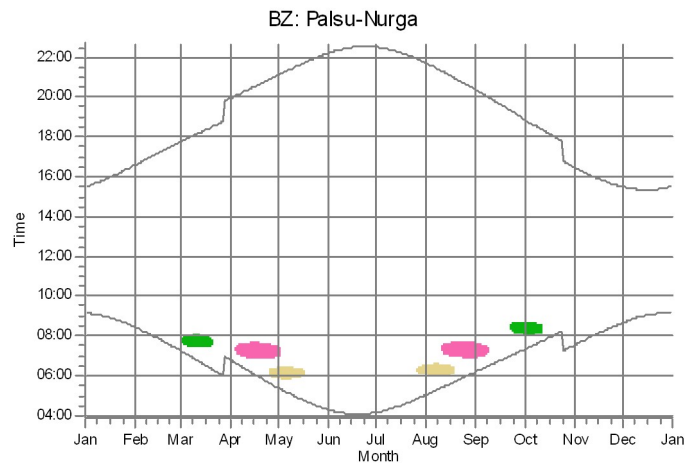
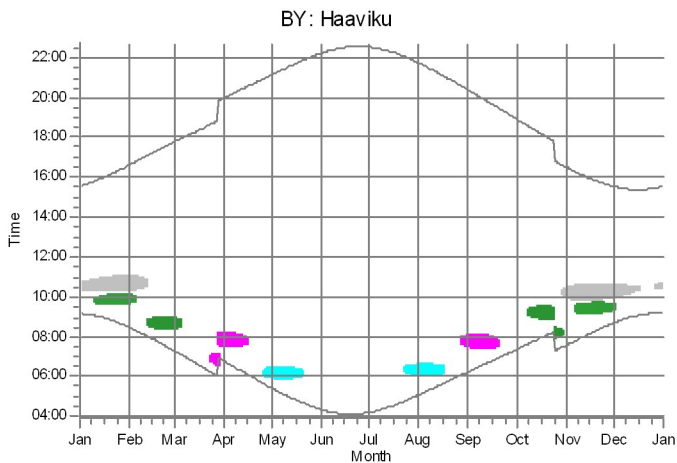
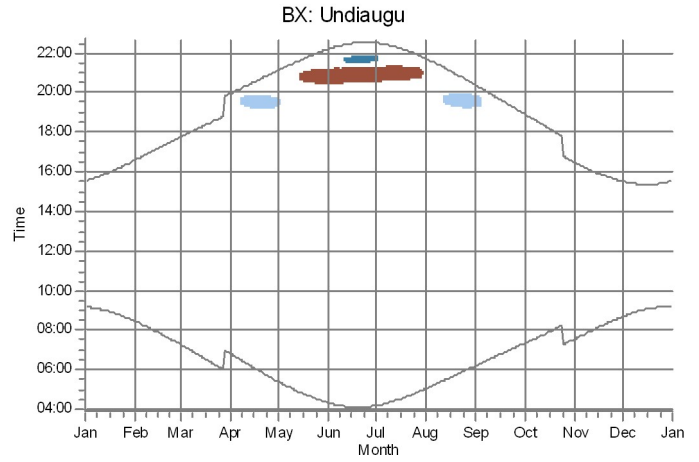
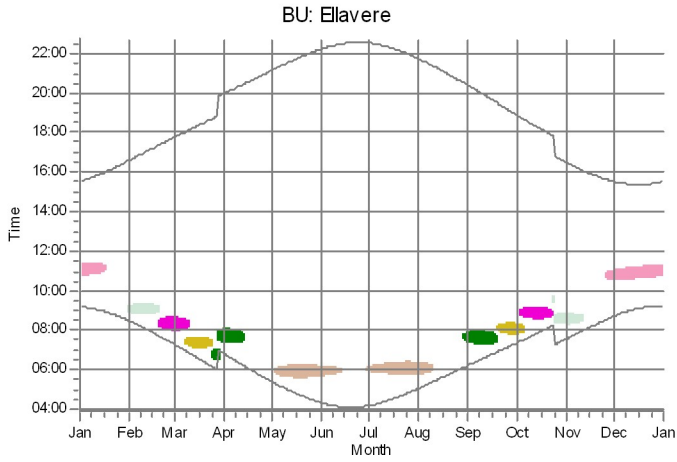


WTGs

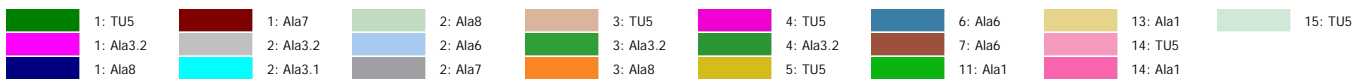


## SHADOW - Calendar, graphical

Calculation: varjutus\_lõuna\_real case\_29042024



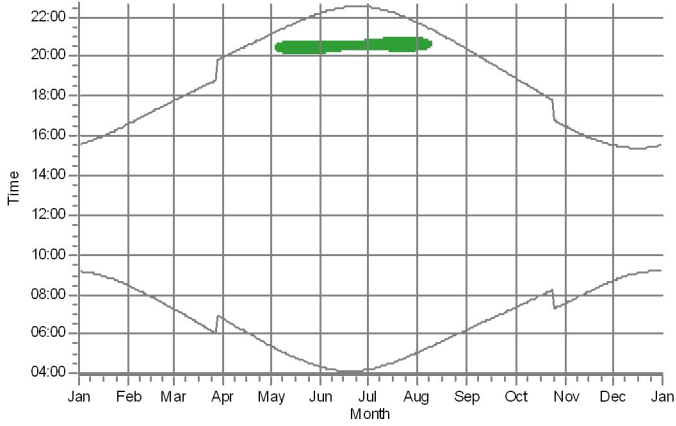
WTGs



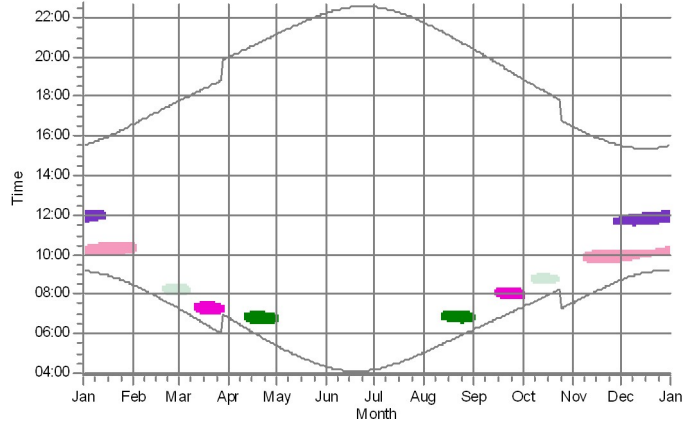
## SHADOW - Calendar, graphical

Calculation: varjutus\_lõuna\_real case\_29042024

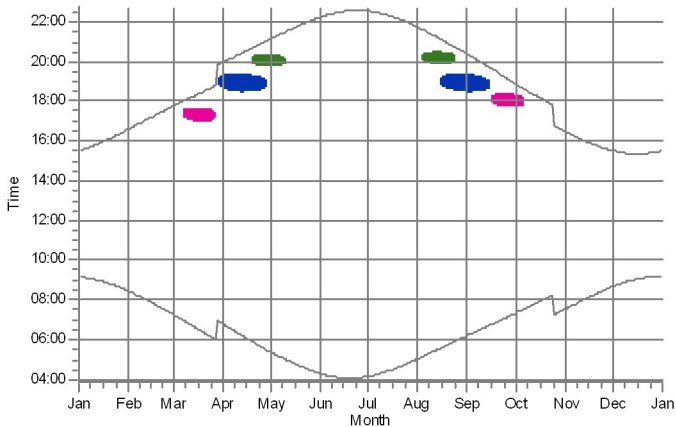
CJ: Kadastiku tee 2



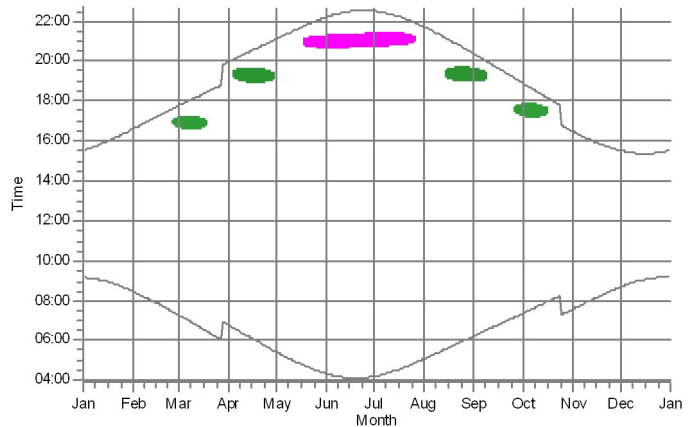
CN: Väandra



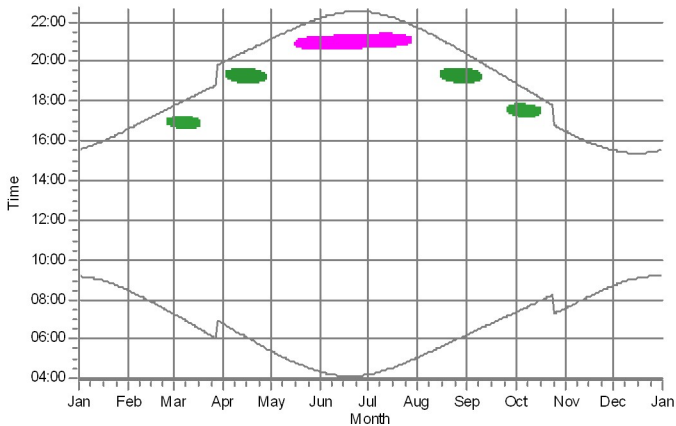
CO: Aru



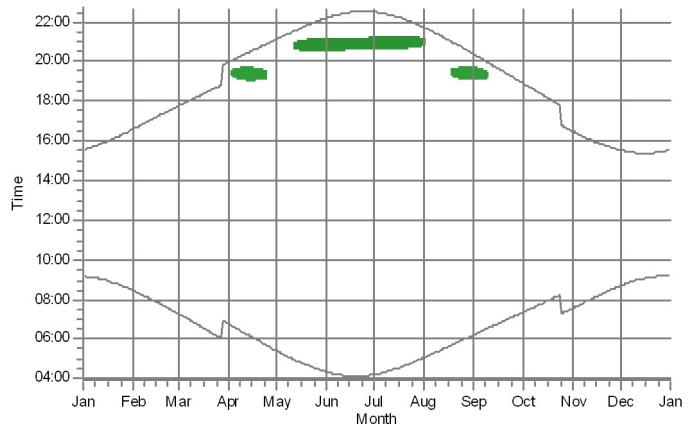
CP: Pappi



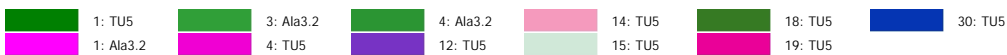
CQ: Magasi-Aida



CR: Viljandi mnt 15

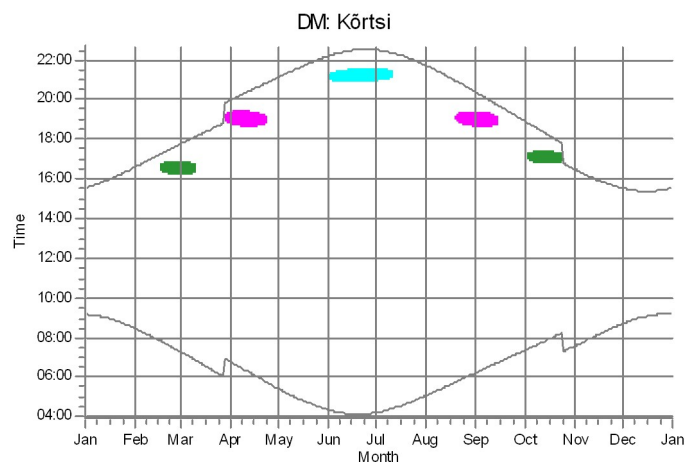
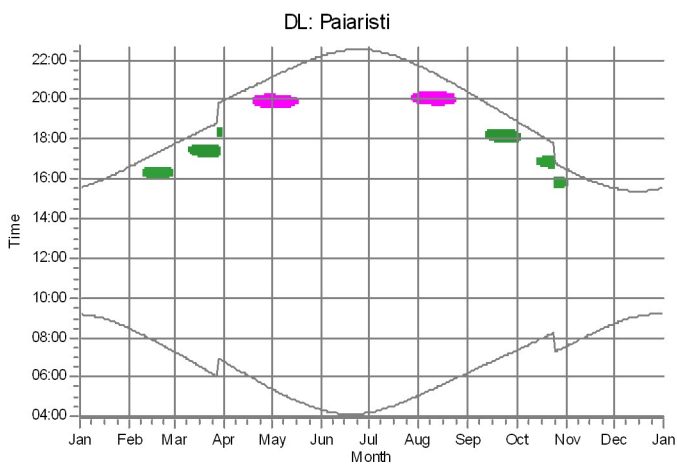
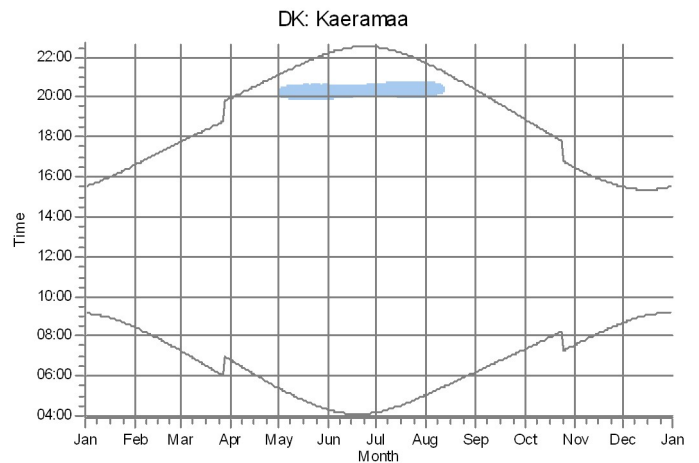
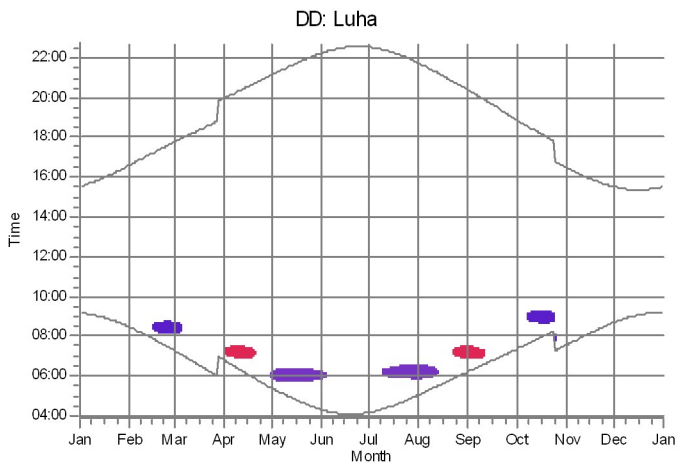
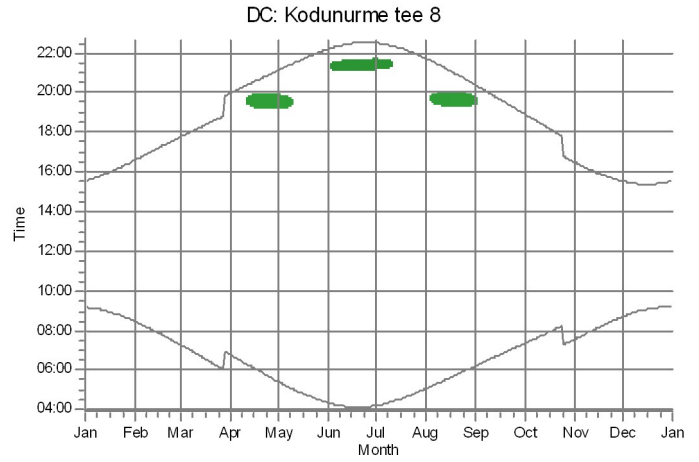
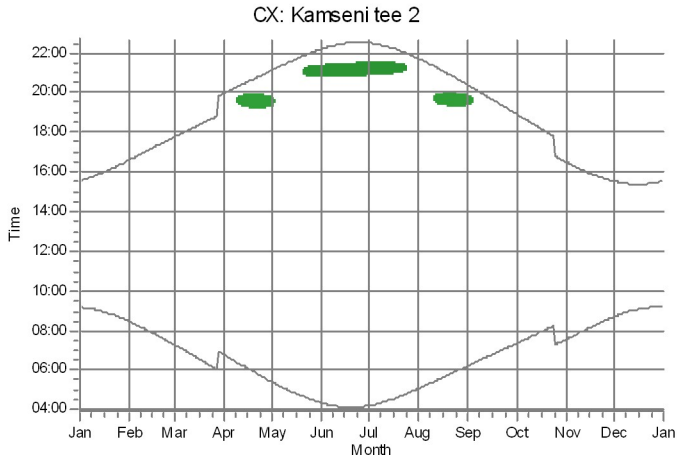


WTGs



## SHADOW - Calendar, graphical

Calculation: varjutus\_lõuna\_real case\_29042024



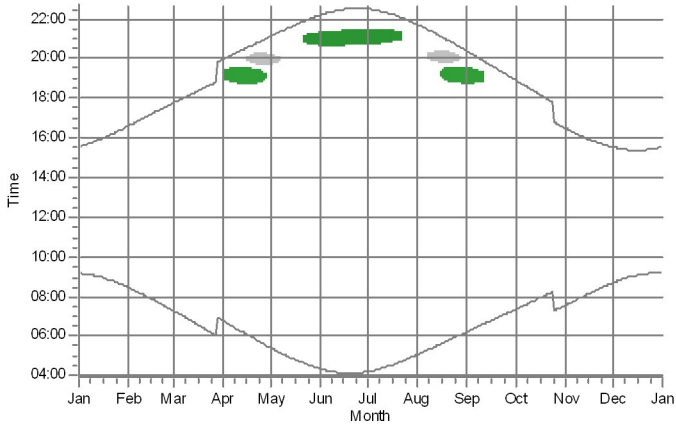
WTGs



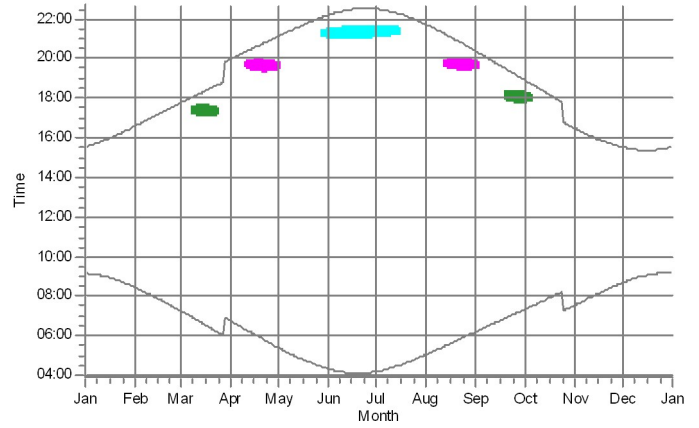
## SHADOW - Calendar, graphical

Calculation: varjutus\_lõuna\_real case\_29042024

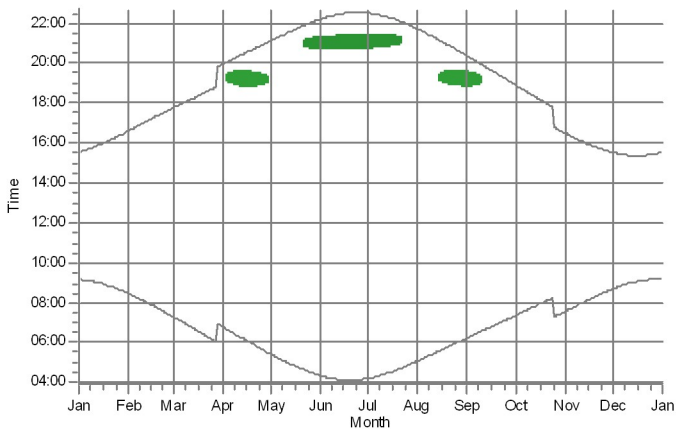
DO: Kamseni tee 6



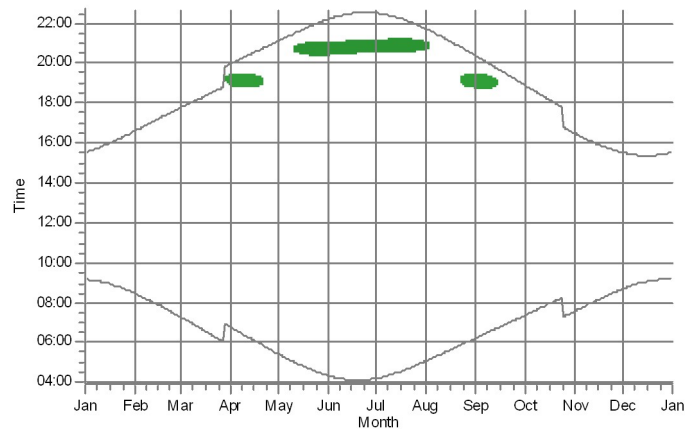
DR: Kase



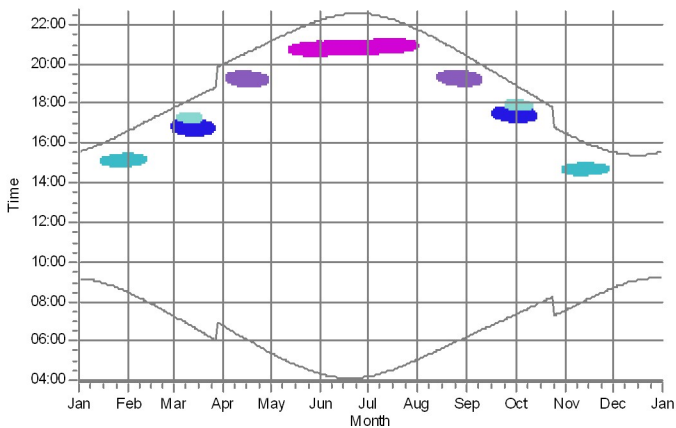
DS: Kamseni tee 4



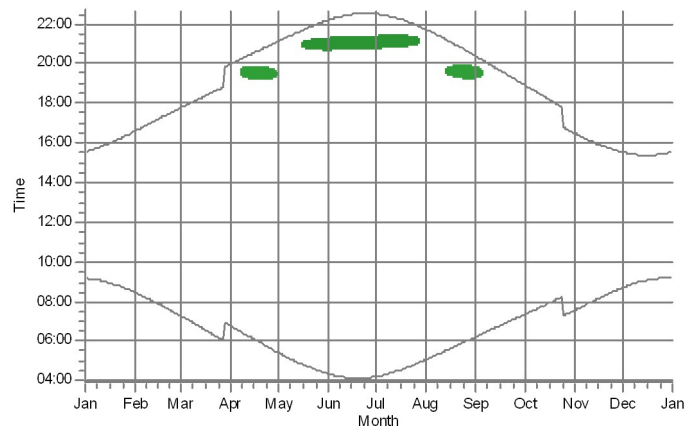
DU: Nurme tee 4



DX: Ristisaare



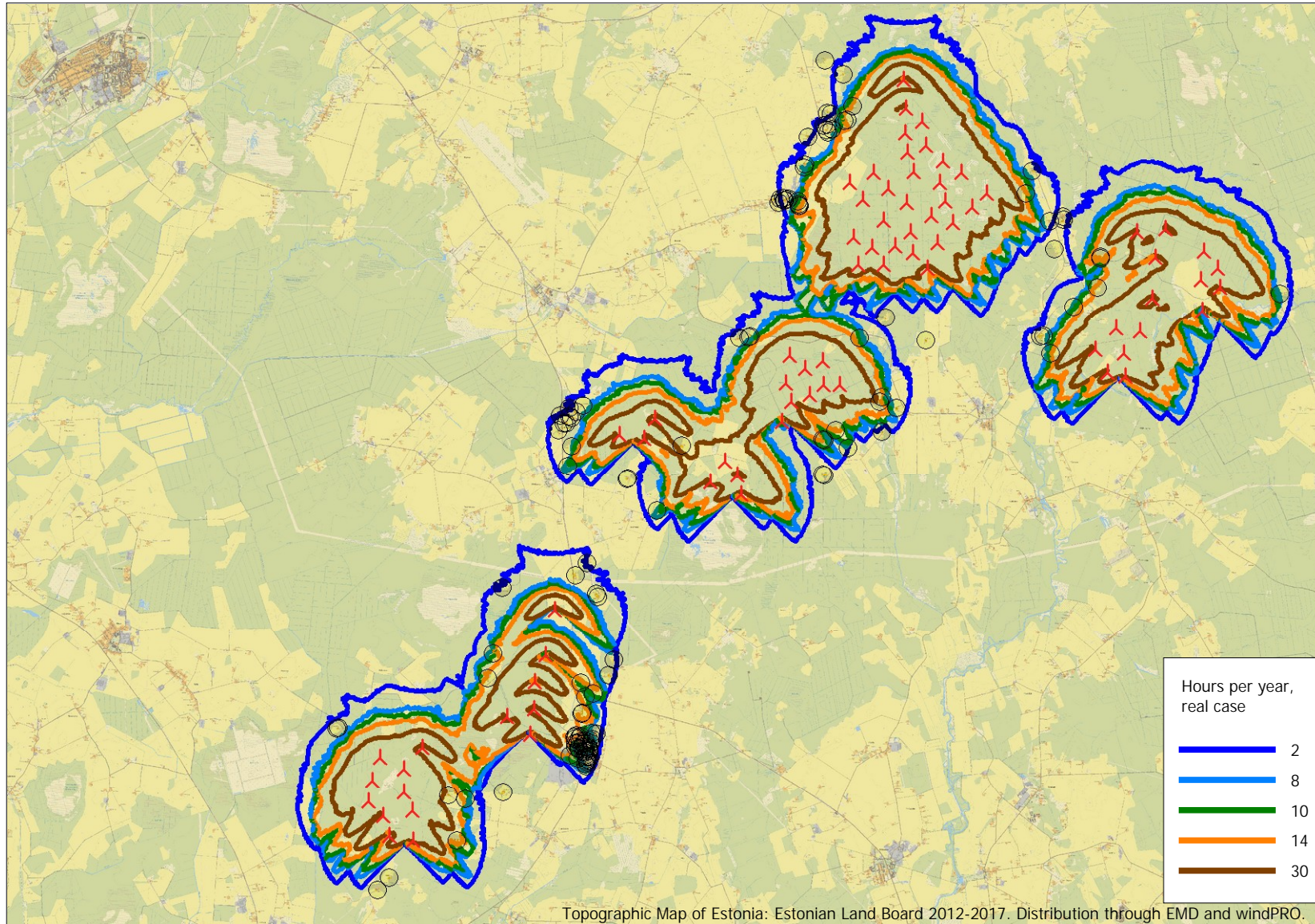
EB: Viljandi mnt 13



WTGs

- |  |   |  |   |  |
|--|---|--|---|--|
| <span style="display:inline-block; width:15px; height:15px; background-color:magenta; border:1px solid black;"></span> 1: Ala3.2 | <span style="display:inline-block; width:15px; height:15px; background-color:cyan; border:1px solid black;"></span> 2: Ala3.1 | <span style="display:inline-block; width:15px; height:15px; background-color:green; border:1px solid black;"></span> 3: Ala3.2     | <span style="display:inline-block; width:15px; height:15px; background-color:blue; border:1px solid black;"></span> 6: Ala3.3       | <span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span> 8: Ala3.3    |
| <span style="display:inline-block; width:15px; height:15px; background-color:grey; border:1px solid black;"></span> 2: Ala3.2    | <span style="display:inline-block; width:15px; height:15px; background-color:teal; border:1px solid black;"></span> 3: Ala3.3 | <span style="display:inline-block; width:15px; height:15px; background-color:darkgreen; border:1px solid black;"></span> 4: Ala3.2 | <span style="display:inline-block; width:15px; height:15px; background-color:blueviolet; border:1px solid black;"></span> 7: Ala3.3 | <span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> 9: Ala3.3 |





SHADOW -  
Map  
Calculation:  
varjutus\_lõuna\_real case\_29042024

Licensed user:  
Lemma OÜ  
Värvi 5 - A308  
EE-10621 Tallinn  
+3725059914  
Piret Toonpere / piret@lemma.ee  
Calculated:  
29.04.2024 10:57/4.0.540

Map: Estonian Topographic Map , Print scale 1:150 000, Map center Estonian Lambert L-EST97-EST97 (EE) East: 604 335 North: 6 519 319  
Flicker map level: Height Contours: CONTOURLINE\_ONLINEDATA\_4.wpo (12)  
Time step: 4 minutes, Day step: 14 days, Map resolution: 30 m, Visibility resolution: 15 m, Eye height: 1,5 m

New WTG

Shadow receptor