

Project: **Oltava**
 Description: **Tornator Oyj**
Pyhäjoki

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 Calculated:
 15.10.2014 12:24/2.9.269

VE1

SHADOW - Main Result

Calculation: 26 x Nordex N131 x hh144m

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

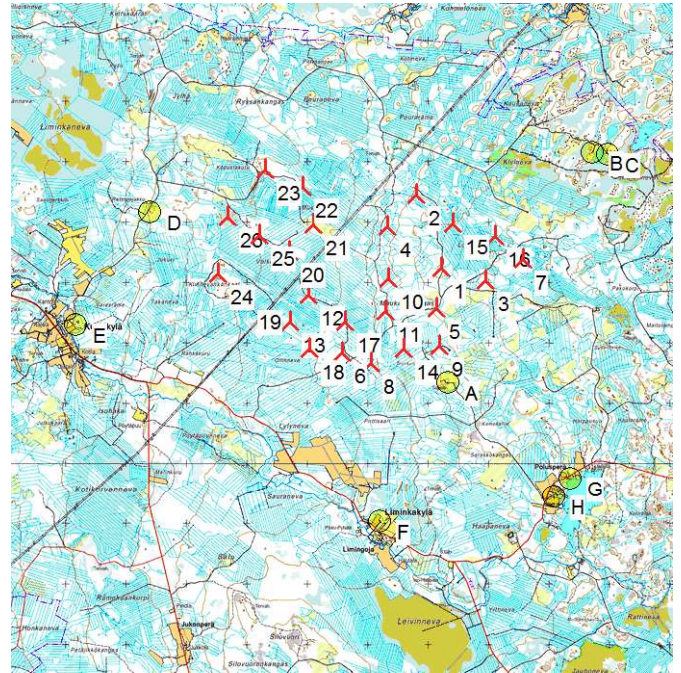
Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [LULEA]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational hours are calculated from WTGs in calculation and wind distribution:
 MERRA_basic_E24.002_N64.500

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 757 622 502 508 569 734 945 1306 935 639 542 622 8 678
 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: KV_Paltusmäki.wpo (1)
 Obstacles not used in calculation
 Eye height: 1,5 m
 Grid resolution: 25,0 m



Scale 1:125 000
 ▲ New WTG ● Shadow receptor

WTGs

	Finish TM ETRS-TM35FIN-ETRS89				WTG type				Shadow data			
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]
	[m]											
1	387 221	7 149 244	95,0	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
2	386 809	7 150 450	85,4	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
3	387 953	7 149 035	96,1	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
4	386 320	7 149 923	82,6	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
5	387 134	7 148 564	90,3	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
6	385 578	7 147 845	77,5	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
7	388 565	7 149 378	97,6	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
8	386 062	7 147 666	79,6	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
9	387 188	7 147 949	87,4	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
10	386 348	7 149 066	83,3	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
11	386 293	7 148 530	82,5	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
12	385 021	7 148 797	75,0	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
13	384 716	7 148 351	75,0	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
14	386 590	7 147 897	82,5	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
15	387 411	7 149 971	90,0	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
16	388 113	7 149 769	94,2	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
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22	384 924	7 150 580	72,5	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
23	384 310	7 150 872	72,5	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
24	383 520	7 149 147	70,0	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
25	384 200	7 149 785	70,0	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
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VE1

SHADOW - Main Result

Calculation: 26 x Nordex N131 x hh144m

Shadow receptor-Input

No.	Name	Finish TM ETRS-TM35FIN-ETRS89							Degrees from south cw [°]	Slope of window [°]	Direction mode
		East	North	Z	Width	Height	Height a.g.l. [m]	Height [m]			
A	Asuinrakennus Siipeläntie 270	387 326	7 147 344	86,6	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
B	Loma-asunto Haukilampi 1	389 711	7 151 147	101,0	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
C	Loma-asunto Haukilampi 2	389 968	7 151 123	100,0	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
D	Loma-asunto Riemulantie 267	382 399	7 150 171	60,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
E	Asuinrakennus Riemulantie 19	381 160	7 148 307	55,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
F	Asuinrakennus Uusitalonkuja 14	386 198	7 145 042	81,0	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
G	Loma-asunto Vihannintie 2491	389 357	7 145 748	95,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
H	Asuinrakennus Vihannintie 2437	389 083	7 145 445	94,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"	

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values	
		Shadow hours per year [h/year]	
A	Asuinrakennus Siipeläntie 270	21:16	
B	Loma-asunto Haukilampi 1	0:00	
C	Loma-asunto Haukilampi 2	0:00	
D	Loma-asunto Riemulantie 267	3:33	
E	Asuinrakennus Riemulantie 19	0:00	
F	Asuinrakennus Uusitalonkuja 14	0:00	
G	Loma-asunto Vihannintie 2491	0:00	
H	Asuinrakennus Vihannintie 2437	0:00	

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

No.	Name	Worst case [h/year]	Expected [h/year]
2	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (125)	0:00	0:00
3	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (126)	0:00	0:00
4	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (127)	0:00	0:00
5	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (128)	0:00	0:00
6	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (129)	0:00	0:00
7	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (130)	0:00	0:00
8	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (131)	10:52	2:31
9	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (132)	0:00	0:00
10	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (133)	0:00	0:00
11	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (134)	17:45	5:23
12	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (135)	0:00	0:00
13	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (136)	0:00	0:00
14	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (137)	44:46	13:23
15	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (138)	0:00	0:00
16	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (139)	0:00	0:00
17	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (140)	0:00	0:00
18	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (141)	0:00	0:00
19	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (142)	0:00	0:00
20	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (143)	0:00	0:00
21	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (144)	0:00	0:00
22	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (145)	0:00	0:00
23	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (146)	0:00	0:00
24	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (147)	7:55	1:25
25	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (148)	0:00	0:00
26	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (149)	10:05	2:07

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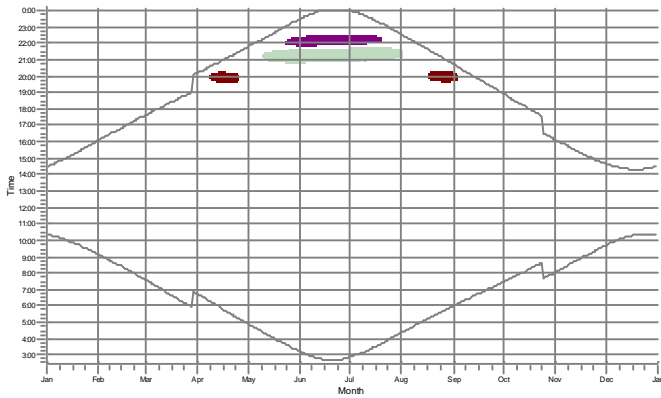
Licensed user:
FCG Suunnittelu ja tekniikka Oy
 Osmontie 34, PO Box 950
 FI-00601 Helsinki
 +358104095666
 Janne Märsylä / janne.marsyla@fcg.fi
 Calculated:
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VE1

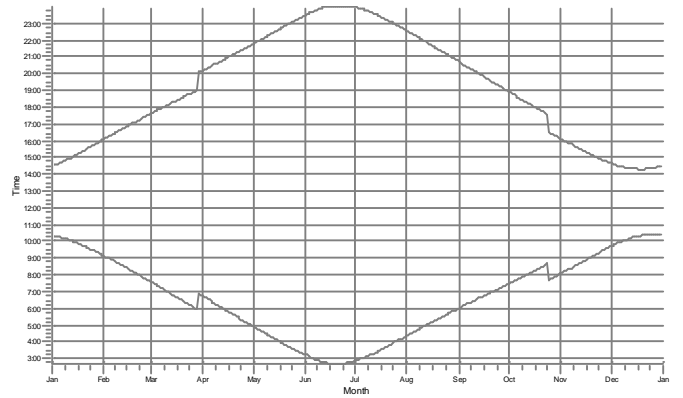
SHADOW - Calendar, graphical

Calculation: 26 x Nordex N131 x hh144m

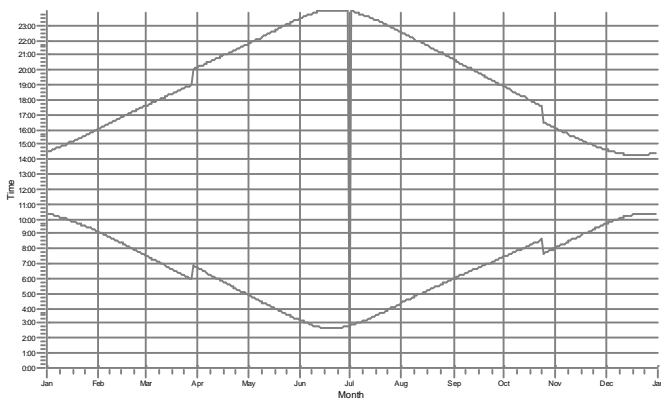
A: Asuinrakennus Siipeläntie 270



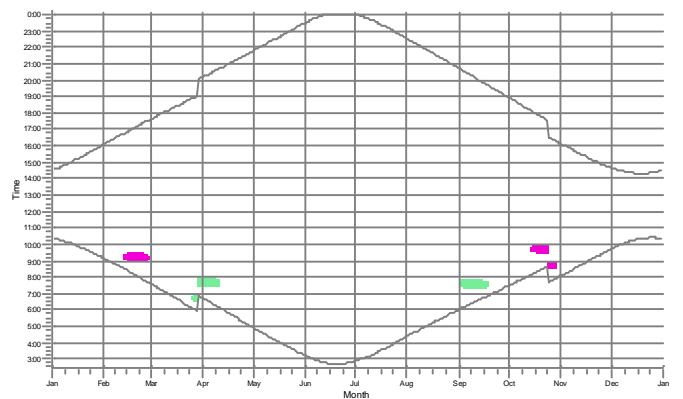
B: Loma-asunto Haukilampi 1



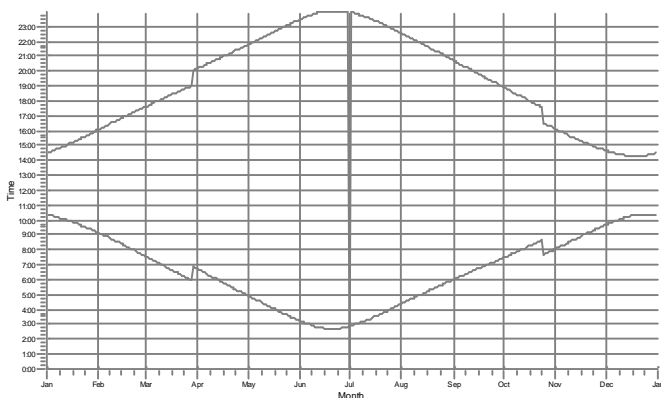
C: Loma-asunto Haukilampi 2



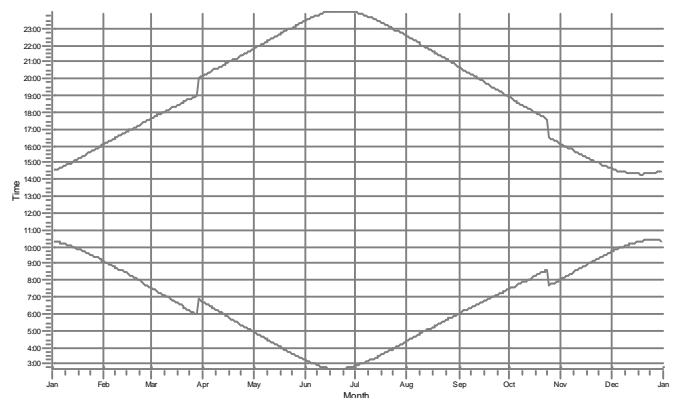
D: Loma-asunto Riemulantie 267



E: Asuinrakennus Riemulantie 19



F: Asuinrakennus Uusitalonkuja 14



WTGs

- 8: NORDEX N131/3000 3000 131.0 IO! hub: 144.0 m (TOT: 209.5 m) (131)
- 14: NORDEX N131/3000 3000 131.0 IO! hub: 144.0 m (TOT: 209.5 m) (137)
- 26: NORDEX N131/3000 3000 131.0 IO! hub: 144.0 m (TOT: 209.5 m) (149)
- 11: NORDEX N131/3000 3000 131.0 IO! hub: 144.0 m (TOT: 209.5 m) (134)
- 24: NORDEX N131/3000 3000 131.0 IO! hub: 144.0 m (TOT: 209.5 m) (147)

Project: Oltava
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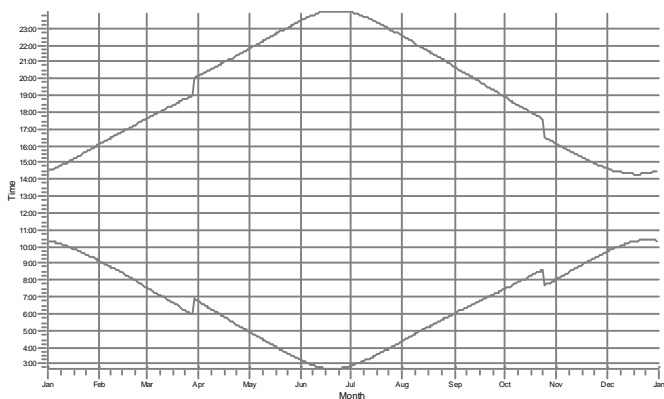
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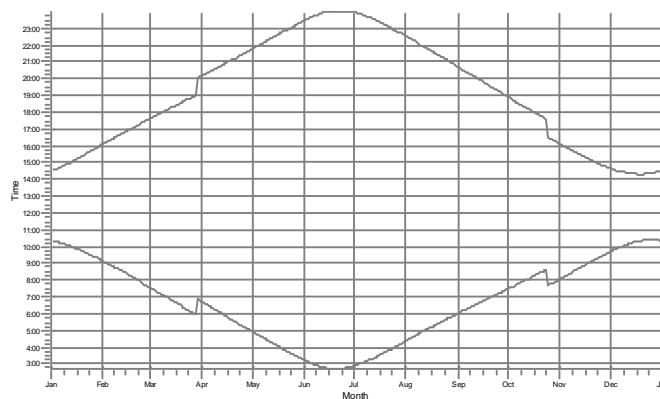
SHADOW - Calendar, graphical

Calculation: 26 x Nordex N131 x hh144m

G: Loma-asunto Vihannintie 2491



H: Asuinrakennus Vihannintie 2437



WTGs

Project: Oltava
 Description: Tornator Oyj
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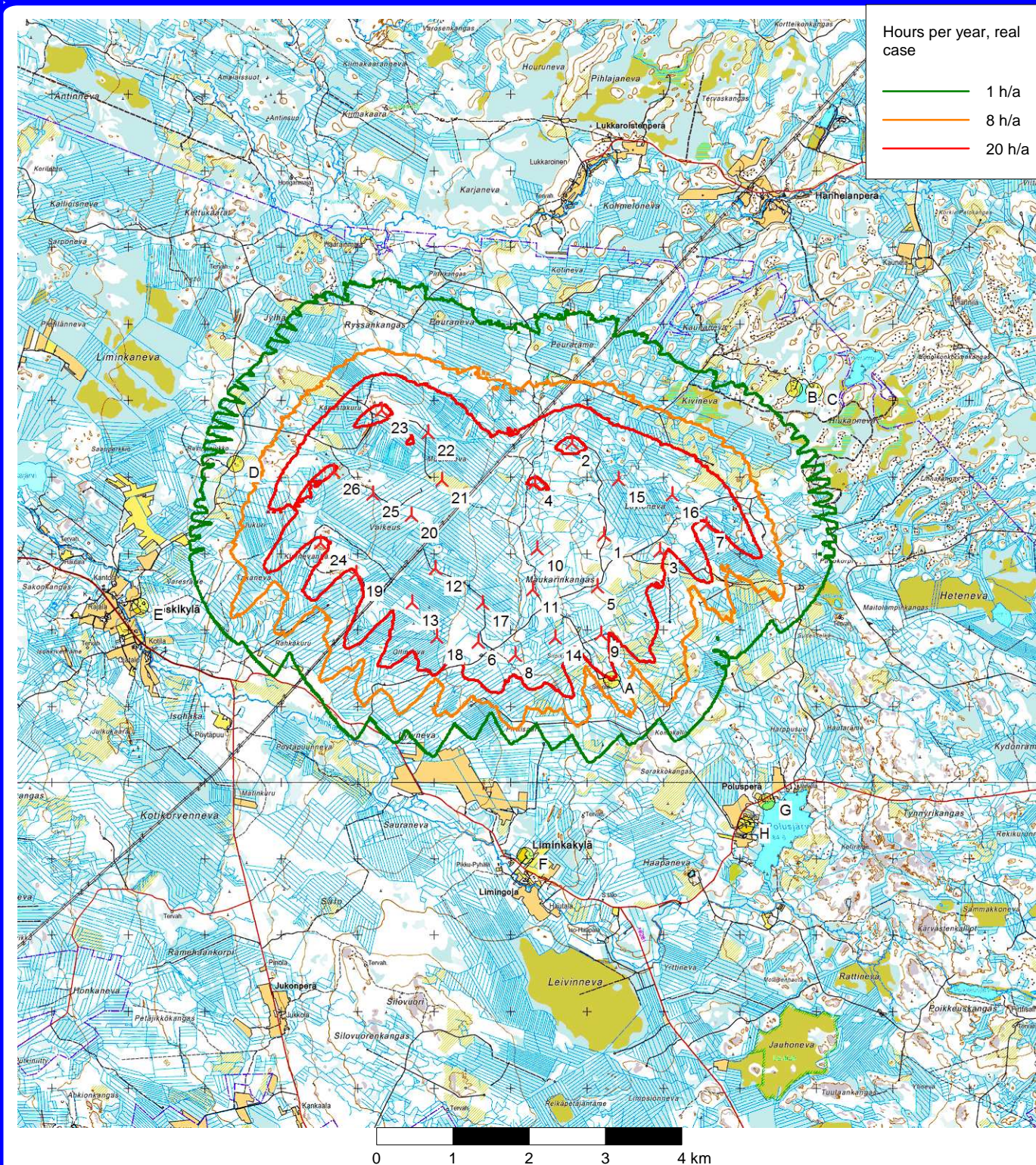
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VE1

SHADOW - Map

Calculation: 26 x Nordex N131 x hh144m



Map: Maastokartta , Print scale 1:75 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 386 260 North: 7 148 720
 ▲ New WTG ● Shadow receptor
 Flicker map level: Height Contours: KV_Paltusmäki.wpo (1)

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 Calculated:
 15.10.2014 13:00/2.9.269

VE2

SHADOW - Main Result

Calculation: 32 x Nordex N131 x hh144m

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

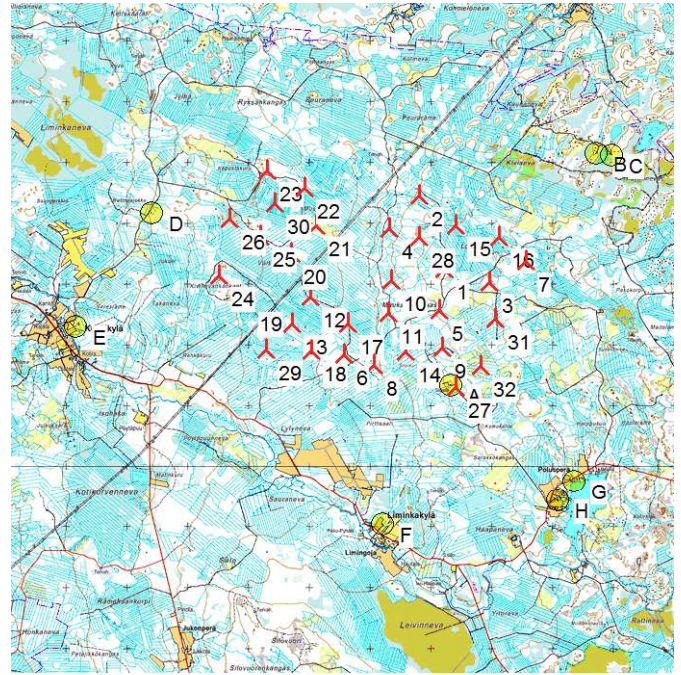
Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [LULEA]
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Operational hours are calculated from WTGs in calculation and wind distribution:
 MERRA_basic_E24.002_N64.500

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 757 622 502 508 569 734 945 1306 935 639 542 622 8678
 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: KV_Paltusmäki.wpo (1)
 Obstacles not used in calculation
 Eye height: 1,5 m
 Grid resolution: 25,0 m



Scale 1:125 000
 ▲ New WTG ● Shadow receptor

WTGs

	Finish TM ETRS-TM35FIN-ETRS89			Row data/Description	WTG type			Shadow data				
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2	386 809	7 150 450	85,4	NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
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Pyhäjoki

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Calculated:
15.10.2014 13:00/2.9.269

VE2

SHADOW - Main Result

Calculation: 32 x Nordex N131 x hh144m

...continued from previous page

Finish TM ETRS-TM35FIN-ETRS89				WTG type			Shadow data				
East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]
			[m]								
30	384 438	7 150 327	72,4 NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
31	388 062	7 148 428	94,8 NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3
32	387 817	7 147 648	91,6 NORDEX N131/3000 3000 131....	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	1 721	10,3

Shadow receptor-Input

No.	Name	Finish TM ETRS-TM35FIN-ETRS89				Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
		East	North	Z	Width [m]						
A	Asuinrakennus Siipeläntie 270	387 326	7 147 344	86,6	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
B	Loma-asunto Haukilampi 1	389 711	7 151 147	101,0	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
C	Loma-asunto Haukilampi 2	389 968	7 151 123	100,0	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
D	Loma-asunto Riemulantie 267	382 399	7 150 171	60,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
E	Asuinrakennus Riemulantie 19	381 160	7 148 307	55,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
F	Asuinrakennus Uusitalonkuja 14	386 198	7 145 042	81,0	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
G	Loma-asunto Vihannintie 2491	389 357	7 145 748	95,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"	
H	Asuinrakennus Vihannintie 2437	389 083	7 145 445	94,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"	

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values	
		Shadow hours per year [h/year]	
A	Asuinrakennus Siipeläntie 270	46:40	
B	Loma-asunto Haukilampi 1	0:00	
C	Loma-asunto Haukilampi 2	0:00	
D	Loma-asunto Riemulantie 267	3:33	
E	Asuinrakennus Riemulantie 19	0:00	
F	Asuinrakennus Uusitalonkuja 14	0:00	
G	Loma-asunto Vihannintie 2491	0:00	
H	Asuinrakennus Vihannintie 2437	0:00	

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

No.	Name	Worst case [h/year]	Expected [h/year]
2	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (153)	0:00	0:00
3	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (154)	0:00	0:00
4	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (155)	0:00	0:00
5	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (156)	0:00	0:00
6	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (157)	0:00	0:00
7	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (158)	0:00	0:00
8	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (159)	10:52	2:31
9	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (160)	0:00	0:00
10	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (161)	0:00	0:00
11	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (162)	17:45	5:22
12	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (163)	0:00	0:00
13	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (164)	0:00	0:00
14	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (165)	44:46	13:23
15	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (166)	0:00	0:00
16	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (167)	0:00	0:00
17	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (168)	0:00	0:00
18	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (169)	0:00	0:00
19	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (170)	0:00	0:00
20	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (171)	0:00	0:00

To be continued on next page...

Project: Oltava
 Description: Tornator Oyj
 Pyhäjoki

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VE2

SHADOW - Main Result

Calculation: 32 x Nordex N131 x hh144m

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
21	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (172)	0:00	0:00
22	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (173)	0:00	0:00
23	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (174)	0:00	0:00
24	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (175)	7:55	1:25
25	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (176)	0:00	0:00
26	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (177)	10:05	2:07
27	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (178)	43:36	13:17
28	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (179)	0:00	0:00
29	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (180)	0:00	0:00
30	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (181)	0:00	0:00
31	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (182)	0:00	0:00
32	NORDEX N131/3000 3000 131.0 !O! hub: 144,0 m (TOT: 209,5 m) (183)	40:09	12:08

Project: Oltava
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 Pyhäjoki

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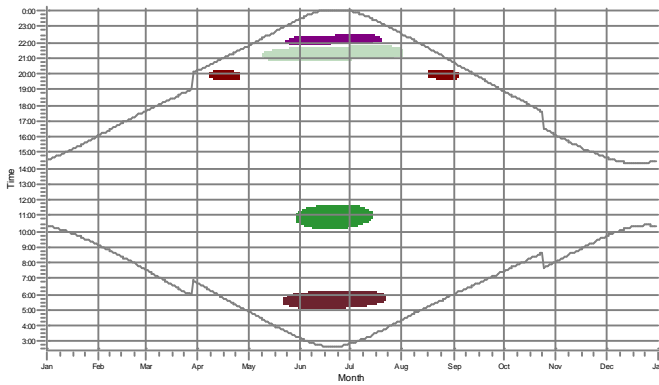
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VE2

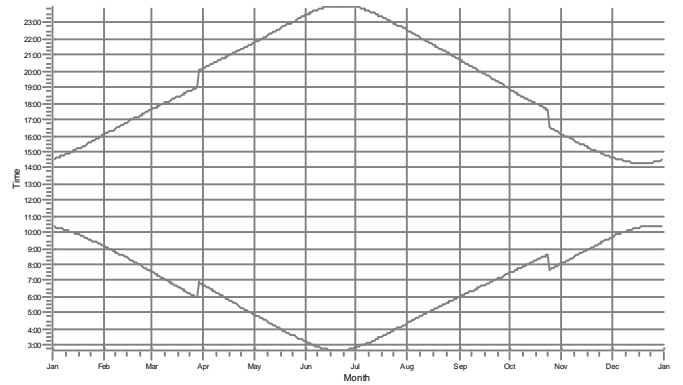
SHADOW - Calendar, graphical

Calculation: 32 x Nordex N131 x hh144m

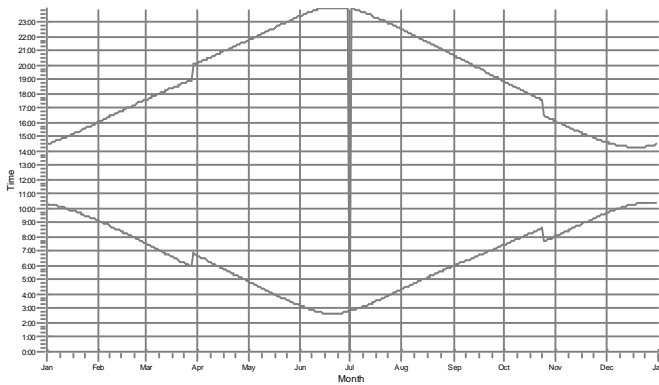
A: Asuinrakennus Siipeläntie 270



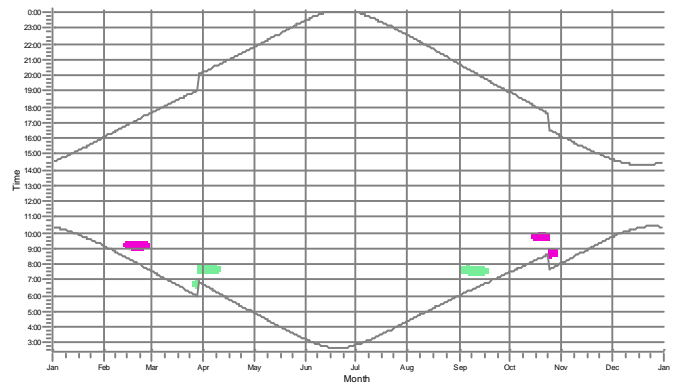
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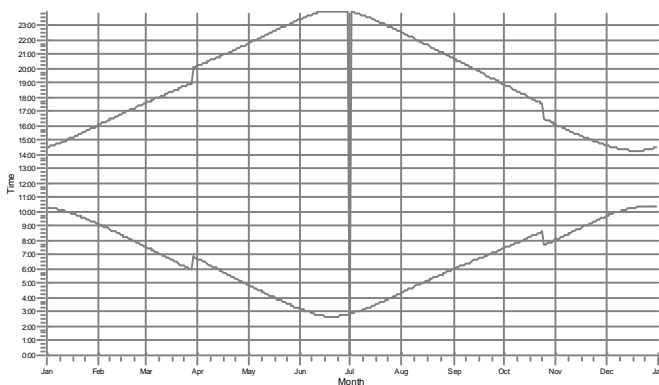
C: Loma-asunto Haukilampi 2



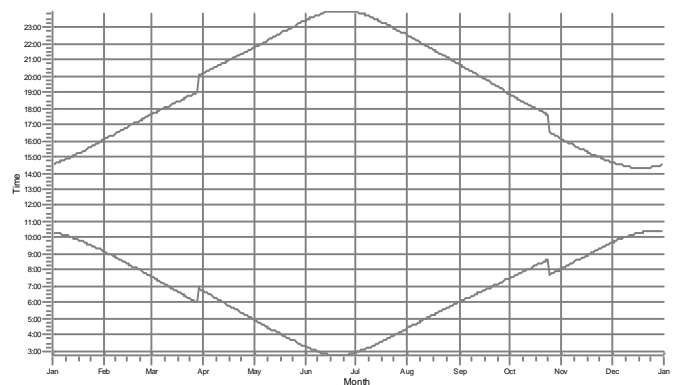
D: Loma-asunto Riemulantie 267










E: Asuinrakennus Riemulantie 19



F: Asuinrakennus Uusitalonkuja 14



WTGs

- | | | |
|---|---|---|
|  8: NORDEX N131/3000 3000 131.0 IO! hub: 144,0 m (TOT: 209,5 m) (159) |  24: NORDEX N131/3000 3000 131.0 IO! hub: 144,0 m (TOT: 209,5 m) (175) |  32: NORDEX N131/3000 3000 131.0 IO! hub: 144,0 m (TOT: 209,5 m) (183) |
|  11: NORDEX N131/3000 3000 131.0 IO! hub: 144,0 m (TOT: 209,5 m) (162) |  26: NORDEX N131/3000 3000 131.0 IO! hub: 144,0 m (TOT: 209,5 m) (177) | |
|  14: NORDEX N131/3000 3000 131.0 IO! hub: 144,0 m (TOT: 209,5 m) (165) |  27: NORDEX N131/3000 3000 131.0 IO! hub: 144,0 m (TOT: 209,5 m) (178) | |

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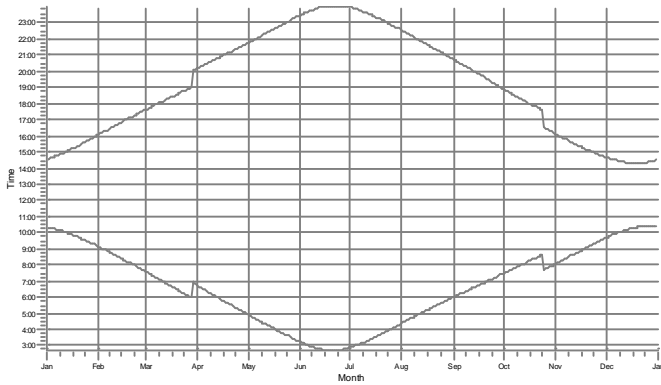
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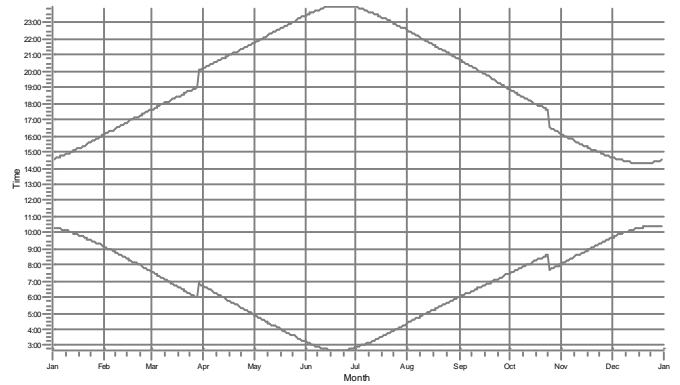
SHADOW - Calendar, graphical

Calculation: 32 x Nordex N131 x hh144m

G: Loma-asunto Vihannintie 2491



H: Asuinrakennus Vihannintie 2437



WTGs

Project: Oltava
 Description: Tornator Oyj
 Pyhäjoki

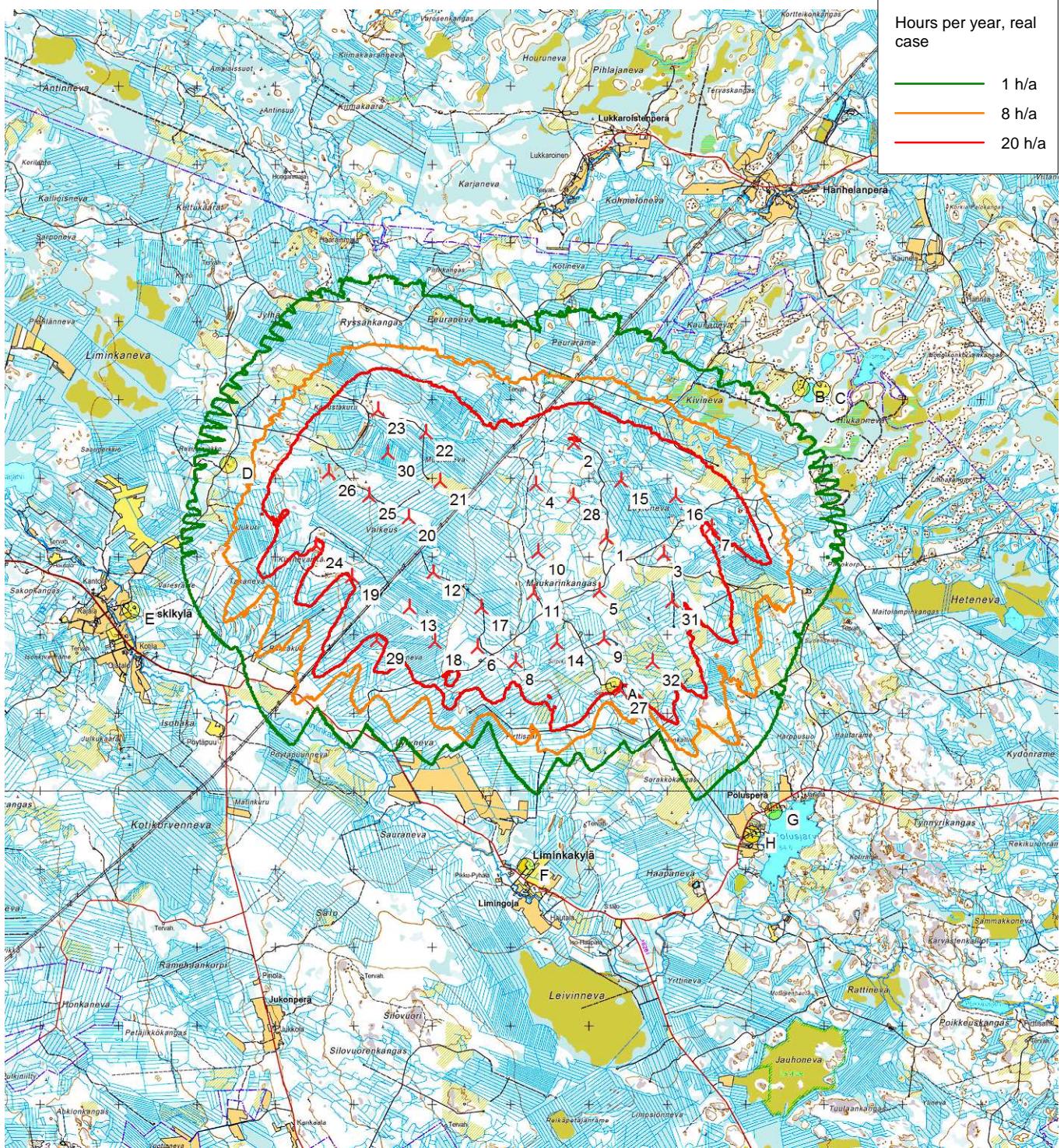
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VE2

SHADOW - Map

Calculation: 32 x Nordex N131 x hh144m



Hours per year, real case

- 1 h/a
- 8 h/a
- 20 h/a

0 1 2 3 4 km

Map: Maastokartta, Print scale 1:75 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 386 260 North: 7 148 720

New WTG Shadow receptor

Flicker map level: Height Contours: KV_Paltusmäki.wpo (1)