

Project:

Debnica Kaszubska

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Biuro Projektów i Wdrożeń Proekologicznych PROEKO Maciej Przewozniak

Szymanowskiego 2/12

PL-80-280 Gdansk

+48 58 558 40 10

Marcin Kulik / km.proeko@proeko.gda.pl

Calculated:

2013-01-24 10:55/2.8.579

SHADOW - Main Result**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) [GDYNIA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,34	1,85	3,61	5,29	7,09	8,59	7,69	7,57	4,82	2,77	1,47	1,06

Operational time

0 Sum

1 600 1 600

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

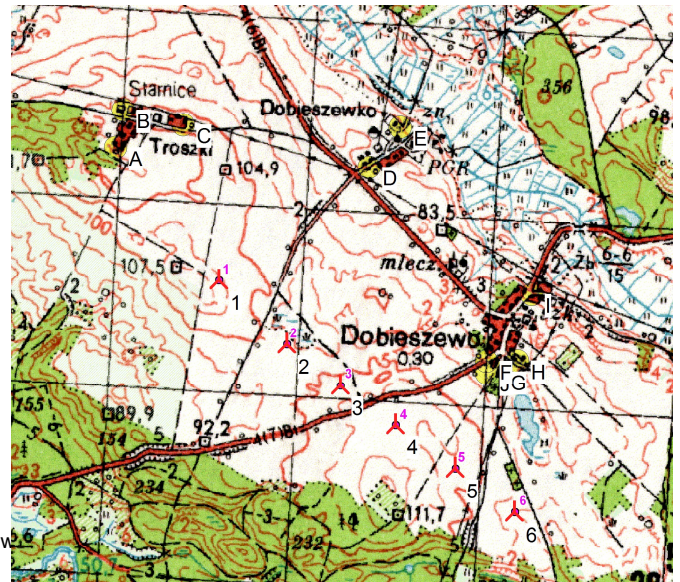
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Height Contours: CONTOURLINE_ONLINEDATA_10.w

Obstacles used in calculation

Eye height: 1,5 m

Grid resolution: 10,0 m



New WTG

Shadow receptor

WTGs

Polish GK 1992/19-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	387 612	725 233	101,6 GAMESA G128 4500 128.0 !O! hub: ... Yes	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	2 000	12,0
2	387 972	724 893	92,5 GAMESA G128 4500 128.0 !O! hub: ... Yes	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	2 000	12,0
3	388 257	724 674	99,2 GAMESA G128 4500 128.0 !O! hub: ... Yes	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	2 000	12,0
4	388 550	724 465	103,7 GAMESA G128 4500 128.0 !O! hub: ... Yes	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	2 000	12,0
5	388 866	724 232	99,5 GAMESA G128 4500 128.0 !O! hub: ... Yes	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	2 000	12,0
6	389 181	723 999	90,6 GAMESA G128 4500 128.0 !O! hub: ... Yes	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	2 000	12,0

Shadow receptor-Input

Polish GK 1992/19-ETRS89									
No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	387 065	725 939	96,4	1,0	1,0	1,0	0,0	90,0	"Green house mode"
B	387 105	726 138	94,2	1,0	1,0	1,0	0,0	90,0	"Green house mode"
C	387 423	726 060	98,4	1,0	1,0	1,0	0,0	90,0	"Green house mode"
D	388 410	725 834	78,4	1,0	1,0	1,0	0,0	90,0	"Green house mode"
E	388 575	726 046	73,5	1,0	1,0	1,0	0,0	90,0	"Green house mode"
F	389 032	724 800	91,4	1,0	1,0	1,0	0,0	90,0	"Green house mode"
G	389 088	724 745	91,2	1,0	1,0	1,0	0,0	90,0	"Green house mode"
H	389 196	724 802	90,6	1,0	1,0	1,0	0,0	90,0	"Green house mode"
I	389 272	725 156	81,7	1,0	1,0	1,0	0,0	90,0	"Green house mode"
J	389 032	724 739	92,1	1,0	1,0	1,0	0,0	90,0	"Green house mode"

Calculation Results

Shadow receptor

Shadow, worst case				Shadow, expected values	
No.	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]	
A	48:14	82	0:54	1:05	
B	58:15	68	1:05	1:19	

To be continued on next page...

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SHADOW - Main Result

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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]
C	44:20	52	1:22	1:05
D	39:11	96	0:30	1:01
E	22:56	75	0:24	0:33
F	186:15	261	1:23	5:36
G	193:42	261	1:20	5:52
H	143:57	246	1:01	4:03
I	69:20	192	0:31	1:45
J	215:02	268	1:27	6:40

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	GAMESA G128 4500 128.0 !O! hub: 140,0 m (TOT: 204,0 m) (1)	133:02	2:58
2	GAMESA G128 4500 128.0 !O! hub: 140,0 m (TOT: 204,0 m) (2)	95:42	1:45
3	GAMESA G128 4500 128.0 !O! hub: 140,0 m (TOT: 204,0 m) (3)	80:10	1:21
4	GAMESA G128 4500 128.0 !O! hub: 140,0 m (TOT: 204,0 m) (4)	101:54	2:45
5	GAMESA G128 4500 128.0 !O! hub: 140,0 m (TOT: 204,0 m) (5)	176:35	5:10
6	GAMESA G128 4500 128.0 !O! hub: 140,0 m (TOT: 204,0 m) (6)	72:59	1:57