

Project Tirup	Description Beräkningen är gjord med garanterade värden. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området.	Printed/Date 2006.06.01 15:53 / 1
Gösta Tykesson Ångalid 268 90 SVALÖV		Licensed user ENERCON / Energy Converter AB Stenåldersgatan 19 SE-21376 Malmö 040-14 35 80
		Calculated 2006.06.01 15:53/2.5.2.63

DECIBEL - Main Result
Calculation: 2006-02-13

SVENSKA BESTÄMMELSER FÖR EXTERNT BULLER FRÅN LANDBASERADE VINDKRAFTVERK

Beräkningen är baserad på den av Statens Naturvårdsverk rekommenderad metod "Ljud från landbaserade vindkraftverk", 2001 (ISBN 91-620-6249-2)

Roughness class: 1,5
Roughness length: 0,055
K: 1.0 dB/(m/s)



WTGs

RN	East	North	Z	Row data/Description	WTG type		Type	Power [kW]	Diam [m]	Height [m]	Noise data				Wind speed [m/s]	LwA.ref [dB(A)]	Pure tones	Octave data
					Valid	Manufact					Circle radius [m]	Circle radius [m]	Creator	Name				
1	1326 675	6 199 676	0	ENERCON GmbH E-82 200	Yes	ENERCON GmbH	E-82	2 000	82.0	78.0	400.0	210.0	USER	Octave data for OM I (G)	8.0	104.0	No	Yes
2	1326 277	6 199 634	0	ENERCON GmbH E-82 200	Yes	ENERCON GmbH	E-82	2 000	82.0	78.0	400.0	210.0	USER	Octave data for OM I (G)	8.0	104.0	No	Yes

Calculation Results

Sound Level

Noise sensitive area No.	Name	RN	East	North	Z	Imission height [m]	Demands		Sound Level From WTGs [dB(A)]	Demands fulfilled ?		
							Noise [dB(A)]	Distance [m]		Noise	Distance	All
A	Noise Sensitive Point: 40 dB Dist: 700 m (2)	1 326 879	6 200 777	0	1.5	40.0	700	32.8	Yes	Yes	Yes	
B	Noise Sensitive Point: 40 dB Dist: 700 m (3)	1 327 740	6 200 592	0	1.5	40.0	700	30.0	Yes	Yes	Yes	
C	Noise Sensitive Point: 40 dB Dist: 700 m (4)	1 328 380	6 200 058	0	1.5	40.0	700	27.6	Yes	Yes	Yes	
D	Noise Sensitive Point: 40 dB Dist: 700 m (5)	1 328 491	6 199 542	0	1.5	40.0	700	27.1	Yes	Yes	Yes	
E	Noise Sensitive Point: 40 dB Dist: 700 m (6)	1 327 671	6 199 023	0	1.5	40.0	700	31.7	Yes	Yes	Yes	
F	Noise Sensitive Point: 40 dB Dist: 700 m (7)	1 327 163	6 198 718	0	1.5	40.0	700	33.1	Yes	Yes	Yes	
G	Noise Sensitive Point: 40 dB Dist: 700 m (8)	1 326 779	6 198 902	0	1.5	40.0	700	36.5	Yes	Yes	Yes	
H	Noise Sensitive Point: 40 dB Dist: 700 m (9)	1 326 417	6 198 749	0	1.5	40.0	700	35.0	Yes	Yes	Yes	
I	Noise Sensitive Point: 40 dB Dist: 700 m (10)	1 325 983	6 198 866	0	1.5	40.0	700	35.5	Yes	Yes	Yes	
J	Noise Sensitive Point: 40 dB Dist: 700 m (11)	1 325 466	6 199 727	0	1.5	40.0	700	35.1	Yes	Yes	Yes	
K	Noise Sensitive Point: 40 dB Dist: 700 m (12)	1 326 013	6 200 400	0	1.5	40.0	700	35.7	Yes	Yes	Yes	
L	Noise Sensitive Point: 40 dB Dist: 700 m (13)	1 326 211	6 200 436	0	1.5	40.0	700	36.3	Yes	Yes	Yes	
M	Noise Sensitive Point: 40 dB Dist: 700 m (14)	1 326 662	6 200 524	0	1.5	40.0	700	35.4	Yes	Yes	Yes	
N	Noise Sensitive Point: 40 dB Dist: 700 m (15)	1 326 431	6 200 605	0	1.5	40.0	700	34.4	Yes	Yes	Yes	

Distances (m)

NSA	WTG	1	2
A		1119	1292
B		1404	1749
C		1747	2145
D		1821	2216
E		1191	1522
F		1075	1274
G		781	888
H		963	896
I		1066	822

Project Tirup	Description Beräkningen är gjord med garanterade värden. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området.	PrintedPage 2006.06.01 15:53 / 2
Gösta Tykesson Ångalid 268 90 SVALÖV		Licensed user ENERCON / Energy Converter AB Stenåldersgatan 19 SE-21376 Malmö 040-14 35 80
		Calculated 2006.06.01 15:53/2.5.2.63

DECIBEL - Main Result

Calculation: 2006-02-13

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WTG		
NSA	1	2
J	1210	816
K	981	810
L	890	805
M	848	970
N	960	983



Project:

Tirup

Description:

Beräkningen är gjord med garanterade värden. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området.

Gösta Tykesson
Ängalid
268 90 SVALÖV

SVALÖVS KOMMUN
Samhällsbyggnadskontoret

2006-09-13

1004-2006-30

Dnr

Printed/Page

2006.06.01 15:14 / 1

Licensed user:

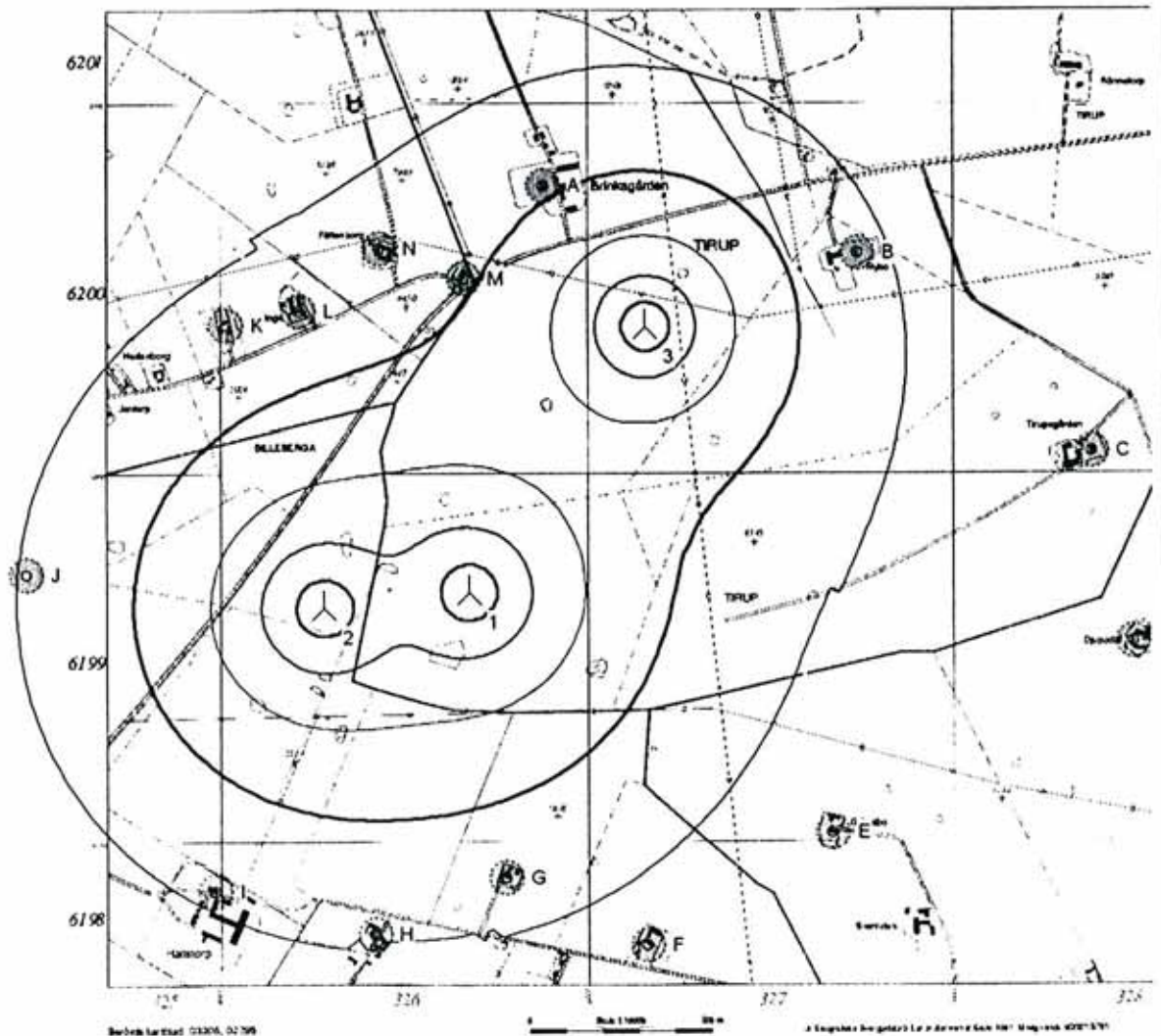
ENERCON / Energy Converter AB
Stenåldersgatan 19
SE-21376 Malmö
040-14 35 80

Calculated

2006.06.01 15:12/2.5.2.63

DECIBEL - Tirup

Calculation: 2006-02-13 File: Tykesson Gösta, Tirup.bmi



Map: Tirup . Print scale 1:20 000, Map center Rikets Net (SE) East: 1 326 717 North: 6 200 015
Noise calculation model: Swedish, Jan 2002, Land. Wind speed: 8.0 m/s

▲ New WTG

● Noise sensitive area

Height above sea level: 0.0 m

— 35.0 dB(A)

— 40.0 dB(A)

— 45.0 dB(A)

— 50.0 dB(A)

— 55.0 dB(A)

Project Tirup Gösta Tykesson Ängalid 268 90 SVALÖV	Description OBS! Detta är en beräkning. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området. "Expected values" är baserade på Danmarks soldata.	Printed/Date 2006.09.01 14:15 / 1 Printed/Page 2006.09.01 14:05/2.5.4.68 Calculated 2006.09.01 14:05/2.5.4.68
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 Stenåldersgatan 19
 SE-21376 Malmö
 040-14 35 80

SHADOW - Main Result

Calculation: 2006-02-13

1004-2006: 30

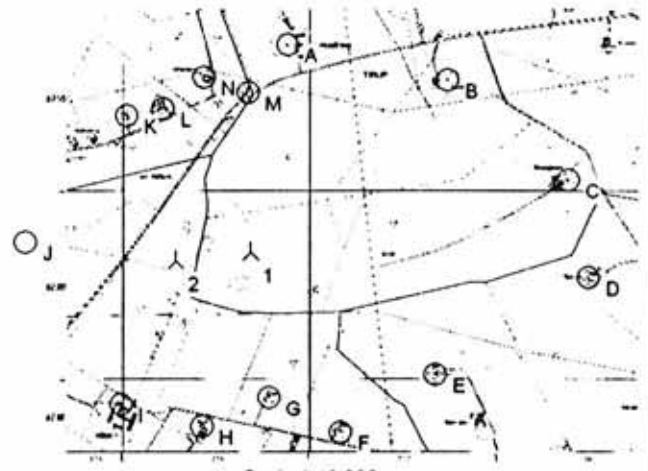
Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 1 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,13 0,22 0,32 0,40 0,42 0,46 0,42 0,49 0,39 0,29 0,18 0,10

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
373	253	501	778	798	859	608	599	1082	1040	825	892	8606



Scale 1:40 000
 ^ New WTG ⊙ Shadow receptor

WTGs

RN	East	North	Z	Row data/Description	WTG type						
					Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM
1	1 326 675	6 199 676	0	ENERCON GmbH E-82 2000 82.0 !O! hub: 78,0 m (14)	Yes	ENERCON GmbH	E-82	2 000	82,0	78,0	19,5
2	1 326 277	6 199 634	0	ENERCON GmbH E-82 2000 82.0 !O! hub: 78,0 m (15)	Yes	ENERCON GmbH	E-82	2 000	82,0	78,0	19,5

Shadow receptor-Input

RN	No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
		[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	1 326 879	6 200 777	0	5,0	5,0	1,0	14,7	0,0	0,0	"Green house mode"
B	1 327 740	6 200 592	0	5,0	5,0	1,0	39,7	0,0	0,0	"Green house mode"
C	1 328 380	6 200 058	0	5,0	5,0	1,0	62,6	0,0	0,0	"Green house mode"
D	1 328 491	6 199 542	0	5,0	5,0	1,0	79,3	0,0	0,0	"Green house mode"
E	1 327 671	6 199 023	0	5,0	5,0	1,0	-212,0	0,0	0,0	"Green house mode"
F	1 327 163	6 198 718	0	5,0	5,0	1,0	-176,8	0,0	0,0	"Green house mode"
G	1 326 779	6 198 902	0	5,0	5,0	1,0	-176,8	0,0	0,0	"Green house mode"
H	1 326 417	6 198 749	0	5,0	5,0	1,0	-130,5	0,0	0,0	"Green house mode"
I	1 325 983	6 198 866	0	5,0	5,0	1,0	-130,5	0,0	0,0	"Green house mode"
J	1 325 466	6 199 727	0	5,0	5,0	1,0	-91,3	0,0	0,0	"Green house mode"
K	1 326 013	6 200 400	0	5,0	5,0	1,0	-25,5	0,0	0,0	"Green house mode"
L	1 326 211	6 200 436	0	5,0	5,0	1,0	-25,5	0,0	0,0	"Green house mode"
M	1 326 662	6 200 524	0	5,0	5,0	1,0	0,0	0,0	0,0	"Green house mode"
N	1 326 431	6 200 605	0	5,0	5,0	1,0	0,0	0,0	0,0	"Green house mode"

Calculation Results

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]
A	0.00	0	0.00	0.00
B	3.44	31	0.14	0.22
C	0.33	8	0.06	0.06
D	0.23	7	0.05	0.05
E	8.37	51	0.17	2.26
F	0.00	0	0.00	0.00

Continued on next page

Project

Tirup

Description

OBS! Detta är en beräkning. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området. "Expected values" är baserade på Danmarks soldata.

Printed/Date

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ENERCON / Energy Converter AB
Stenåldersgatan 19
SE-21376 Malmö
040-14 35 80

Calculated

2006.09.01 14:05/2.5.4.68

SHADOW - Main Result

Calculation: 2006-02-13

...continued from previous page

No.	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
	per year [h/year]	per year [days/year]		per year [h/year]	per year [h/year]
G	0:00	0	0:00	0:00	
H	0:00	0	0:00	0:00	
I	0:00	0	0:00	0:00	
J	12:02	31	0:35	3:01	
K	11:35	53	0:22	1:02	
L	19:58	56	0:25	1:23	
M	0:00	0	0:00	0:00	
N	0:00	0	0:00	0:00	



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

No.	Name	Worst case [h/year]
1	ENERCON GmbH E-82 2000 82.0 !O! hub: 78,0 m (14)	44:07
2	ENERCON GmbH E-82 2000 82.0 !O! hub: 78,0 m (15)	13:04

Project: Tirup Gösta Tykesson Ängalid 268 90 SVALÖV	Description: Beräkningen är gjord med garanterade värden. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området.	Printed Page: 2006.06.01 15:14 / 1 Licensed user: ENERCON / Energy Converter AB Stenåldersgatan 19 SE-21376 Malmö 040-14 35 80 Calculated: 2006.06.01 15:12/2.5.2.63
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SVALÖVS KOMMUN
 Samhällsbyggnadskontoret
 2006-09-13
 Dnr 1004-2006:30

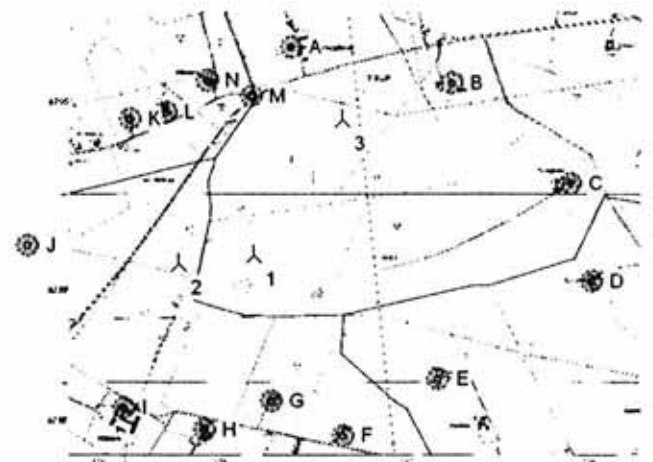
DECIBEL - Main Result

Calculation: 2006-02-13

SVENSKA BESTÄMMELSER FÖR EXTERNT BULLER FRÅN LANDBASERADE VINDKRAFTVERK

Beräkningen är baserad på den av Statens Naturvårdsverk rekommenderad metod "Ljud från landbaserade vindkraftverk", 2001 (ISBN 91-620-6249-2)

Roughness class: 1,5
 Roughness length: 0,055
 K: 1.0 dB/(m/s)



▲ New WTG ■ Noise sensitive area

WTGs

RN	East	North	Z	Row data/Description	WTG type		Type	Power	Diam.	Height	Circle radius	Circle radius	Noise data		Wind speed	LwA.ref	Pure tones	Octave data
					Valid	Manufact.							Creator	Name				
1	326 675	6 199 676	0	ENERCON GmbH E-82 2000	Yes	ENERCON	GmbH E-82	2 000	82,0	78,0	400,0	210,0	USER	Octave data for OM I (G)	8,0	104,0	No	Yes
2	326 277	6 199 634	0	ENERCON GmbH E-82 2000	Yes	ENERCON	GmbH E-82	2 000	82,0	78,0	400,0		USER	Octave data for OM I (G)	8,0	104,0	No	Yes
3	327 156	6 200 395	0	VESTAS V47 660/200 47,0	Yes	VESTAS	V47	660/200	47,0	55,0			USER	Oktavdata 8 m/s (O)	8,0	102,0	No	Yes

Calculation Results

Sound Level

Noise sensitive area	No.	Name	RN			Demands		Sound Level	Demands fulfilled ?			
			East	North	Z	Imission height	Noise		Distance	From WTGs	Noise	Distance
A Noise Sensitive Point: 40 dB Dist: 700 m (2)			1 326 879	6 200 777	0	1,5	40,0	700	39,2	Yes	No	No
B Noise Sensitive Point: 40 dB Dist: 700 m (3)			1 327 740	6 200 592	0	1,5	40,0	700	36,3	Yes	No	No
C Noise Sensitive Point: 40 dB Dist: 700 m (4)			1 328 380	6 200 058	0	1,5	40,0	700	30,1	Yes	Yes	Yes
D Noise Sensitive Point: 40 dB Dist: 700 m (5)			1 328 491	6 199 542	0	1,5	40,0	700	28,8	Yes	Yes	Yes
E Noise Sensitive Point: 40 dB Dist: 700 m (6)			1 327 671	6 199 023	0	1,5	40,0	700	32,5	Yes	Yes	Yes
F Noise Sensitive Point: 40 dB Dist: 700 m (7)			1 327 163	6 198 718	0	1,5	40,0	700	33,5	Yes	Yes	Yes
G Noise Sensitive Point: 40 dB Dist: 700 m (8)			1 326 779	6 198 902	0	1,5	40,0	700	36,7	Yes	Yes	Yes
H Noise Sensitive Point: 40 dB Dist: 700 m (9)			1 326 417	6 198 749	0	1,5	40,0	700	35,3	Yes	Yes	Yes
I Noise Sensitive Point: 40 dB Dist: 700 m (10)			1 325 983	6 198 866	0	1,5	40,0	700	35,7	Yes	Yes	Yes
J Noise Sensitive Point: 40 dB Dist: 700 m (11)			1 325 466	6 199 727	0	1,5	40,0	700	35,3	Yes	Yes	Yes
K Noise Sensitive Point: 40 dB Dist: 700 m (12)			1 326 013	6 200 400	0	1,5	40,0	700	36,3	Yes	Yes	Yes
L Noise Sensitive Point: 40 dB Dist: 700 m (13)			1 326 211	6 200 436	0	1,5	40,0	700	37,1	Yes	Yes	Yes
M Noise Sensitive Point: 40 dB Dist: 700 m (14)			1 326 662	6 200 524	0	1,5	40,0	700	39,4	Yes	No	No
N Noise Sensitive Point: 40 dB Dist: 700 m (15)			1 326 431	6 200 605	0	1,5	40,0	700	36,6	Yes	Yes	Yes

Distances (m)

NSA	WTG		
	1	2	3
A	1119	1292	472
B	1404	1749	616
C	1747	2145	1270
D	1821	2216	1584
E	1191	1522	1465
F	1075	1274	1677
G	781	888	1540
H	963	896	1804

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Project Tirup Gösta Tykesson Ängalid 268 90 SVALÖV	Description Beräkningen är gjord med garanterade värden. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området. SVALÖVS KOMMUN Samnålisbyggnadskontoret 2006-03-13	Printed Page 2006.06.01 15:14 / 2 Licensed user ENERCON / Energy Converter AB Stenåldersgatan 19 SE-21376 Malmö 040-14 35 80 Calculated 2006.06.01 15:12/2.5.2.63
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DECIBEL - Main Result

Dnr 1004-2006: 30

Calculation: 2006-02-13

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WTG			
NSA	1	2	3
I	1066	822	1927
J	1210	816	1817
K	981	810	1143
L	890	805	946
M	848	970	511
N	960	983	755

Project Tirup Gösta Tykesson Ängalid 268 90 SVALÖV	Description OBS! Detta är en beräkning. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området. "Expected values" är baserade på Danmarks soldata.	Printed/Date 2006.06.01 15:55 / 1 Licensed user ENERCON / Energy Converter AB Stenåldersgatan 19 SE-21376 Malmö 040-14 35 80 Calculated 2006.06.01 15:51/2.5.2.63
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SVALÖVS KOMMUN
 Samhällsbyggnadskontoret
 2006-09-13
 1004-2006: 30
 Dnr _____

SHADOW - Main Result

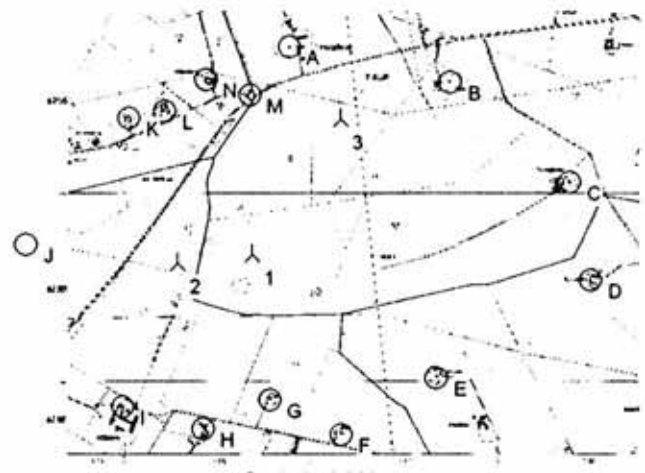
Calculation: 2006-02-13

Assumptions for shadow calculations

Maximum distance for influence 2 000 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 1 minutes

Sun shine probabilities (part of time from sun rise to sun set with sun shine)
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,13 0,22 0,32 0,40 0,42 0,46 0,42 0,49 0,39 0,29 0,18 0,10

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 373 253 501 778 798 859 608 599 1082 1040 825 892 8606



WTGs

RN	East	North	Z	Row data/Description	WTG type						
					Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]
1	1 326 675	6 199 676	0	ENERCON GmbH E-82 2000 82.0 IO! hub: 78,0 m (...)	Yes	ENERCON GmbH	E-82	2 000	82,0	78,0	19,5
2	1 326 277	6 199 634	0	ENERCON GmbH E-82 2000 82.0 IO! hub: 78,0 m (...)	Yes	ENERCON GmbH	E-82	2 000	82,0	78,0	19,5
3	1 327 156	6 200 395	0	VESTAS V47 660-200 47.0 IO! hub: 55,0 m (17)	Yes	VESTAS	V47	660/200	47,0	55,0	26,0

Shadow receptor-Input

RN	No.	East	North	Z	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
B	1 327 740	6 200 592	0	5,0	5,0	1,0	39,7	0,0	"Green house mode"	
C	1 328 380	6 200 058	0	5,0	5,0	1,0	62,6	0,0	"Green house mode"	
D	1 328 491	6 199 542	0	5,0	5,0	1,0	79,3	0,0	"Green house mode"	
E	1 327 671	6 199 023	0	5,0	5,0	1,0	-212,0	0,0	"Green house mode"	
F	1 327 163	6 198 718	0	5,0	5,0	1,0	-176,8	0,0	"Green house mode"	
G	1 326 779	6 198 902	0	5,0	5,0	1,0	-176,8	0,0	"Green house mode"	
H	1 326 417	6 198 749	0	5,0	5,0	1,0	-130,5	0,0	"Green house mode"	
I	1 325 983	6 198 866	0	5,0	5,0	1,0	-130,5	0,0	"Green house mode"	
J	1 325 466	6 199 727	0	5,0	5,0	1,0	-91,3	0,0	"Green house mode"	
K	1 326 013	6 200 400	0	5,0	5,0	1,0	-25,5	0,0	"Green house mode"	
L	1 326 211	6 200 436	0	5,0	5,0	1,0	-25,5	0,0	"Green house mode"	
M	1 326 662	6 200 524	0	5,0	5,0	1,0	0,0	0,0	"Green house mode"	
N	1 326 431	6 200 605	0	5,0	5,0	1,0	0,0	0,0	"Green house mode"	

Calculation Results

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]	
A	20 50	63	0 27	1 50	
B	9 42	56	0 20	1 30	
C	0 48	14	0 06	0 11	
D	0 23	7	0 05	0 05	
E	8 37	51	0 17	2 26	
F	0 00	0	0 00	0 00	

Continue on next page

Project Tirup	Description OBS! Detta är en beräkning. Vänligen notera att vi ej tagit hänsyn till eventuella höjdskillnader i området. "Expected values" är baserade på Danmarks soldata.	Printed Page 2006.06.01 15:55 / 2
Gösta Tykesson Ängalid 268 90 SVALÖV	Samhällsbyggnadskontoret 2006-06-13 1004-2006:30	Licensed user ENERCON / Energy Converter AB Stenåldersgatan 19 SE-21376 Malmö 040-14 35 80
		Calculated 2006.06.01 15:51/2.5.2.63

SHADOW - Main Result

Calculation: 2006-02-13

...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]
G	0:00	0	0:00	0:00
H	0:00	0	0:00	0:00
I	0:00	0	0:00	0:00
J	12:02	31	0:35	3:01
K	12:12	62	0:22	1:11
L	21:29	68	0:25	1:44
M	8:28	28	0:23	1:59
N	3:23	18	0:16	0:43

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

No.	Name	Worst case [h/year]
1	ENERCON GmbH E-82 2000 82.0 !O! hub: 78,0 m (14)	44:07
2	ENERCON GmbH E-82 2000 82.0 !O! hub: 78,0 m (15)	13:04
3	VESTAS V47 660-200 47.0 !O! hub: 55,0 m (17)	38:52

