

# Catalogue of European Urban Wind Turbine Manufacturers



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# Aircon

## HAWT - 10 kW

Contact name: Aircon GmbH & Co.KG  
 Address: Nessestraße 27, 26789 Leer  
 Telephone: +49 491 454 44 84  
 Country : **Germany**

### Aircon 10 references

Site	Use	Country
Nordhausen	University	Germany
Bremerhaven	University	Germany
Hamburg	Greenpeace building	Germany
Warnungs	Solartechn. Hubert Kuhn	Austria
Sopelana	Zero CO2/ Environmental assoc	Spain

## Aircon 10/ 10 kW



### Technical information

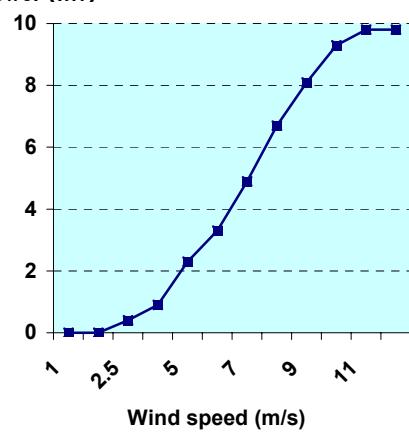
POWER			Unit
1) Rated power	10	kW	
2) Rated wind speed	11	m/s	
3) Cut-in wind speed	2,5	m/s	
4) Cut-out wind speed	32	m/s	
5) Maximum wind speed the turbine can withstand	190	Km/h	
DIMENSIONS			
6) Rotor weight	144	kg	
7) Rotor diameter	7,1	m	
8) Rotor height (for VAWT only)		m	
9) Swept area	39,6	m <sup>2</sup>	
10) Height of the mast	12/18/24/30	m	
OTHER INFORMATION			
11) Maximum rpm	130	At rated wind speed	
12) Gear box type		Gearless	
13) Brake system	Pitch-control + generator overload regulation		
14) Number of blades		3	
15) Blades material	Composite fibre glass		
16) Output voltage	400	V	
17) Minimum operation temperature	- 20	°C	
18) Maximum operation temperature	+ 40	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	< 40	DB	
20) Lifetime	> 20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system	Azimut motor		
24) Upwind or downwind	Upwind turbine		

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0
2,5	0,4
4	0,9
5	2,3
6	3,3
7	4,9
8	6,7
9	8,1
10	9,3
11	9,8
11,5- 25	9,8

### Power curve:

Power (kW)



# Ampair

## HAWT – 0,1 to 0,3 kW

Contact name: George Durrant

Address: The Doughty Building, Crow Arch Lane,  
Ringwood, Hampshire, BH24 1NZ

Telephone: +44 (0) 1425 480 780

Country: United Kingdom

### Ampair 0,1 kW references

Site	Use	Country
Regis Road Recycling Centre, Camden, London	Electricity generation	UK

## Ampair Pacific Hawk / 0,1 kW



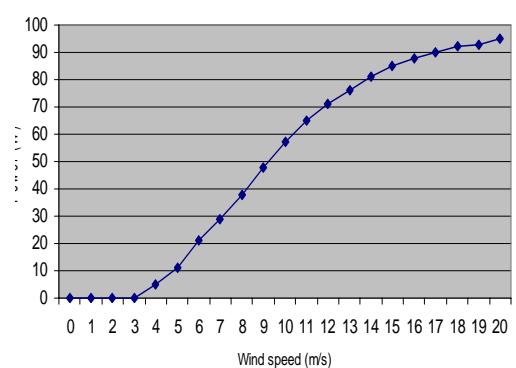
## Technical information

POWER	Unit	
1) Rated power	0,1	kW
2) Rated wind speed	20	m/s
3) Cut-in wind speed	3,5	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	Storm-proof	km/h
DIMENSIONS		
6) Nacelle and rotor weight	12,6	kg
7) Rotor diameter	0,928	m
8) Rotor height (for VAWT only)	-	m
9) Swept area	0,68	m <sup>2</sup>
10) Height of the mast	Variable	m
OTHER INFORMATION		
11) Maximum rpm	DK	At rated wind speed
12) Gear box type		None
13) Brake system		Inductors
14) Number of blades		6
15) Blades material	Glass filled polypropylene	
16) Output voltage	12 / 24	V
17) Minimum operation temperature	- 30	°C
18) Maximum operation temperature	High temperatures not a problem	°C
19) Acoustic levels at a distance of 20 m? at nacelle? (wind = 5 m/s)	20 at nacelle in strong winds	DB
20) Lifetime	10	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system	Wind vane, free yaw	
24) Upwind or downwind	Upwind	

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	0
4	05
5	11
6	21
7	29
8	38
9	48
10	57
11	65
12	71
13	76
14	81
15	85
16	88
17	90
18	92
19	93
20	95

## Power curve



# Ampair

## HAWT – 0,1 to 0,3 kW

Contact name: George Durrant

Address: The Doughty Building, Crow Arch Lane,  
Ringwood, Hampshire, BH24 1NZ

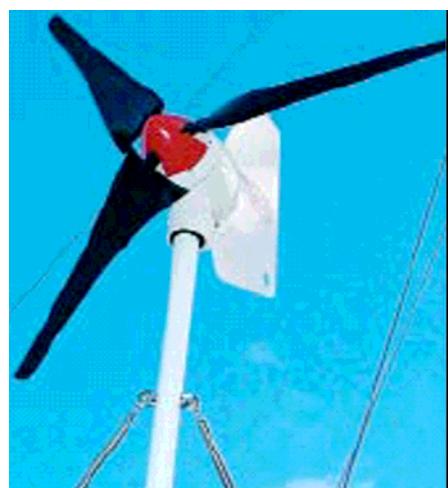
Telephone: +44 (0) 1425 480 780

Country: United Kingdom

### Ampair 0,3 kW references

Site	Use	Country
None available yet		

## Ampair Pacific Hawk / 0,3 kW



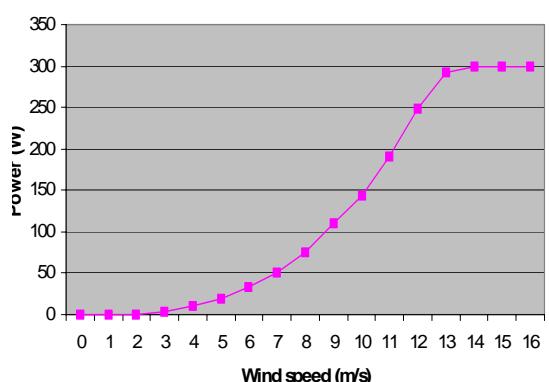
## Technical information

POWER		Unit	
1) Rated power	0,3	kW	
2) Rated wind speed	12,6	m/s	
3) Cut-in wind speed	3	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	180	km/h	
DIMENSIONS			
6) Nacelle and rotor weight	12	kg	
7) Rotor diameter	1,2	m	
8) Rotor height (for VAWT only)	.	m	
9) Swept area	1.13	m <sup>2</sup>	
10) Height of the mast	Variable	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type	None		
13) Brake system	Blade pitch control		
14) Number of blades	3		
15) Blades material	Glass filled polypropylene		
16) Output voltage	12 / 24, or grid-connected	V	
17) Minimum operation temperature	Perhaps - 20	°C	
18) Maximum operation temperature	Perhaps + 35	°C	
19) Acoustic levels at a distance of 20 m? at nacelle ? (wind = 5 m/s)	Not dB tested yet	dB	
20) Lifetime	10	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	No		
23) Yaw control system	Wind vane, free yaw		
24) Upwind or downwind	Upwind		

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	4
4	10
5	20
6	34
7	51
8	76
9	110
10	144
11	192
12	248
13	293
14	300
15	300
16	300

## Power curve



# ATLANTIS Windkraft

HAWT from 0,3 kW to 0,6 kW.

WB 15 / 0,3 kW

Contact name: Kottwitz Raimund  
 Address: Holzstr. 10, 31556 Wölpinghausen  
 Telephone: +49 5037 988 03  
 Country : Germany

## Atlantis WB 15 references

Site	Use	Country
Berlin	About 20 projects in Berlin ( 7 schools, 1 high school, 4 practical education centres, ... ).	Germany

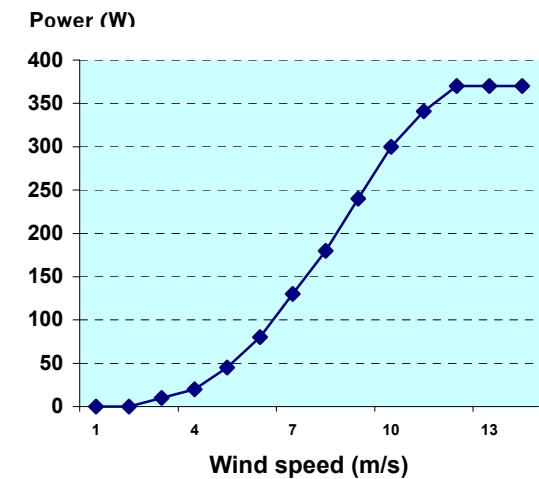
## Technical information

	Unit	
1) Rated power	0,3	kW
2) Rated wind speed	10	m/s
3) Cut-in wind speed	3	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	No limit	Km/h
DIMENSIONS		
6) Rotor weight	23	kg
7) Rotor diameter	1,5	m
8) Rotor height (for VAWT only)		m
9) Swept area	1,8	m <sup>2</sup>
10) Height of the mast	3/6/ 9/12	m
OTHER INFORMATION		
11) Maximum rpm		At rated wind speed
12) Gear box type		
13) Brake system		
14) Number of blades		3
15) Blades material	Composite fibre glass	
16) Output voltage	12 – 24	V
17) Minimum operation temperature	Tested in arctic	°C
18) Maximum operation temperature	+ 90	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	78	DB
20) Lifetime	20	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system	Wind vane	
24) Upwind or downwind		

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	10
4	20
5	
6	80
7	
8	180
9	
10	300
11	
12	370
13	
14	370

## Power curve:



# ATLANTIS Windkraft

HAWT from 0,3 kW to 0,6 kW.

Contact name: Kottwitz Raimund  
 Address: Holzstr. 10, 31556 Wölpinghausen  
 Telephone: +49 5037 988 03  
 Country : Germany

## Atlantis WB 20 references

Site	Use	Country
Berlin	About 20 projects in Berlin: 7 schools, 1 high school, 4 practical education centres, ...	Germany

## WB 20 / 0,6 kW



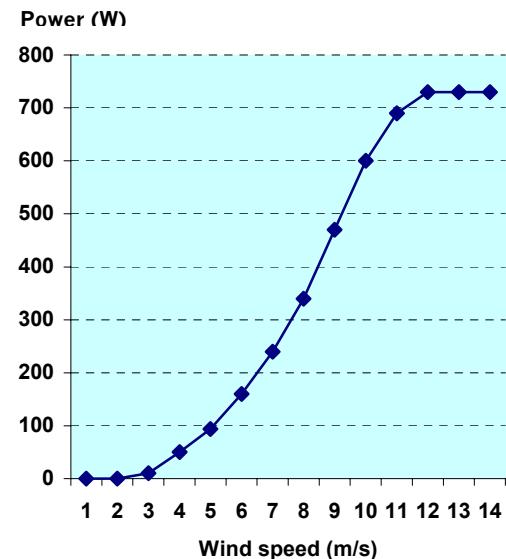
## Technical information

POWER		Unit	
1) Rated power	0,6	kW	
2) Rated wind speed	10	m/s	
3) Cut-in wind speed	3	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	No limit	Km/h	
DIMENSIONS			
6) Rotor weight	37	kg	
7) Rotor diameter	2	m	
8) Rotor height (for VAWT only)		m	
9) Swept area	3,14	m <sup>2</sup>	
10) Height of the mast	3/6/ 9/12	m	
OTHER INFORMATION			
11) Maximum rpm		At rated wind speed	
12) Gear box type			
13) Brake system			
14) Number of blades		4	
15) Blades material		Carbon fibre	
16) Output voltage	24- 48	V	
17) Minimum operation temperature	Tested in arctic	°C	
18) Maximum operation temperature	+ 90	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	78	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Wind vane	
24) Upwind or downwind			

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	10
4	50
5	
6	160
7	
8	340
9	
10	600
11	
12	730
13	
14	730

## Power curve:



# Eclectic Energy

## HAWT – 0,4 kW

Contact name: Peter Anderson  
 Address: Edwinstowe House, High Street,  
 Edwinstowe, Nottinghamshire NG21  
 9PR  
 Telephone: +44 (0) 162 382 15 35

### D400 – 0,4 kW references

Site	Use	Country
Nottingham University	Testing / monitoring	UK
Building Research Establishment (BRE), Watford	Testing / Monitoring	UK

## Stealth Gen D400 / 0,4 kW



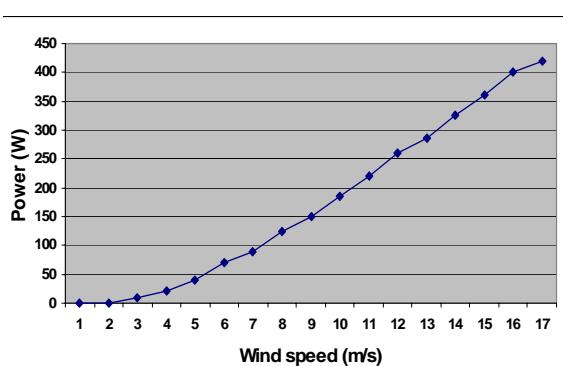
### Technical information

POWER		Unit
1) Rated power	0,4	kW
2) Rated wind speed	16	m/s
3) Cut-in wind speed	2	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	130	km/h
DIMENSIONS		
6) Nacelle and rotor weight	15	kg
7) Rotor diameter	1,1	m
8) Rotor height (for VAWT only)	-	m
9) Swept area	0,95	m <sup>2</sup>
10) Height of the mast	Variable	m
OTHER INFORMATION		
11) Maximum rpm	1 200	At rated wind speed
12) Gear box type		None
13) Brake system		Electrical
14) Number of blades		5
15) Blades material	Glass reinforced nylon	
16) Output voltage	12/24/48/150	V
17) Minimum operation temperature	-20	°C
18) Maximum operation temperature	120	°C
19) Acoustic levels at a distance of 20 m? at nacelle? (wind = 5 m/s)	3 above background	dB
20) Lifetime	20	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system	Wind vane, free yaw	
24) Upwind or downwind	Upwind	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	10
4	20
5	40
6	70
7	90
8	125
9	150
10	185
11	220
12	260
13	285
14	325
15	360
16	400

### Power curve:



# Ecofys

## VAWT 3 kW.

Contact name: Geert Timmers  
 Address: PO Box 8408, 3503 RK Utrecht  
 Telephone: +31-30 3808300  
 Country : Netherlands

### Neoga references: no references

Site	Use	Country

# Neoga 3 kW



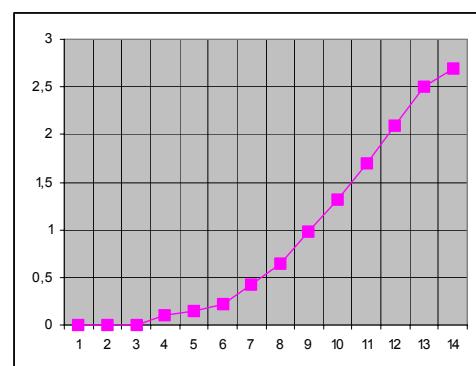
### Technical information

POWER			Unit
1) Rated power	3	kW	
2) Rated wind speed	14	m/s	
3) Cut-in wind speed	3,5	m/s	
4) Cut-out wind speed	20	m/s	
5) Maximum wind speed the turbine can withstand	Not available	Km/h	
DIMENSIONS			
6) Rotor weight	200	kg	
7) Rotor diameter	2,8	m	
8) Rotor height (for VAWT only)	4	m	
9) Swept area	5,5	m <sup>2</sup>	
10) Height of the mast	Variable 1-12	m	
OTHER INFORMATION			
11) Maximum rpm	300	At rated wind speed	
12) Gear box type		No gear box	
13) Brake system		Electrical brake + disc brake	
14) Number of blades		5	
15) Blades material		Aluminium	
16) Output voltage	230	V	
17) Minimum operation temperature	- 30	°C	
18) Maximum operation temperature	+ 50	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Not available	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Independent of wind direction	
24) Upwind or downwind		Not applicable	

### Calculated power curve

Wind speed (m/s)	Power* (W)
1	0
2	0
3	0
4	100
5	
6	220
7	420
8	650
9	980
10	1320
11	1700
12	2100
13	2500
14	2700
15	

### Power curve



# Eoltec

## HAWT from 6 kW to 250 kW.

Contact name: Thomas Schulthess  
 Address: 455, promenade des Anglais, 06299 Nice  
 Telephone: +33 6 85 30 35 05  
 Country : France

### Eoltec Sirocco 6 kW references

Site	Use	Country
Nice	Demonstration turbine connected to the grid	France
Orkney Island	Extreme winds test site	UK
	Hybrid electrification stand-alone or grid-tied, water pumping, heating,...	4 continents

## Sirocco/ 6 kW



### Technical information

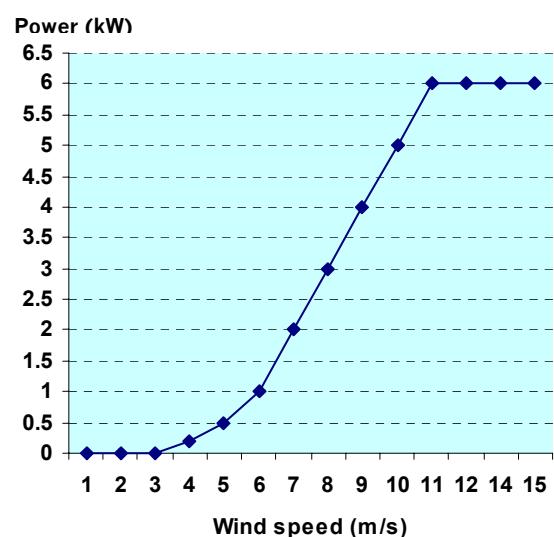
POWER		Unit
1) Rated power	6	kW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	4	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	216	Km/h
DIMENSIONS		
6) Rotor weight (+ generator)	202	kg
7) Rotor diameter	5,6	m
8) Rotor height (for VAWT only)		m
9) Swept area	24,7	m <sup>2</sup>
10) Height of the mast	18/24/30	m
OTHER INFORMATION		
11) Maximum rpm	245	At rated wind speed
12) Gear box type		
13) Brake system	Optional remote control at tower base	
14) Number of blades		2
15) Blades material	Composite fibre glass	
16) Output voltage	230	V
17) Minimum operation temperature	- 40	°C
18) Maximum operation temperature	+ 50	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	65	DB
20) Lifetime	25	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	No	
23) Yaw control system	Wind vane	
24) Upwind or downwind	Upwind turbine	

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0
3	0
4	0,2
5	0,5
6	1,1
7	1,8
8	2,7
9	3,8
10	5
11	5,7
12	6
13	6
14	6
15	6

Inland site, altitude 300 m, 18 m tower  
 Rayleigh distribution (k= 2)  
 Shear ratio 0,143 / Turbulence factor 10 %

### Power curve:



# Eoltec

## HAWT from 6 kW to 250 kW.

Contact name: Thomas Schulthess  
 Address: 455, promenade des Anglais, 06299 Nice  
 Telephone: +33 6 85 30 35 05  
 Country : France

### Wind Runner/ 25 kW



#### Eoltec Wind runner 25 kW references

Site	Use	Country
Orkney Island	Prototype	UK

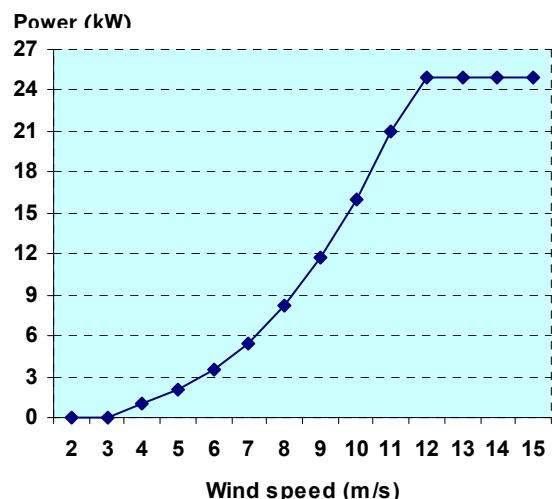
### Technical information

POWER		Unit
1) Rated power	25	kW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	3	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	216	Km/h
DIMENSIONS		
6) Rotor weight (+ generator)	620	kg
7) Rotor diameter	10	m
8) Rotor height (for VAWT only)		m
9) Swept area	78,6	m <sup>2</sup>
10) Height of the mast	18/24/32	m
OTHER INFORMATION		
11) Maximum rpm	140	At rated wind speed
12) Gear box type		none – direct drive
13) Brake system		Optional remote control (blades stalling)
14) Number of blades		2
15) Blades material		Composite fiber glass
16) Output voltage	400	V
17) Minimum operation temperature	- 40	°C
18) Maximum operation temperature	+ 50	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	65	DB
20) Lifetime	25	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system		Wind vane
24) Upwind or downwind		Upwind turbine

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0
3	0.5
4	1
5	2
6	3.5
7	5.5
8	8.2
9	11.7
10	16
11	21
12	25
13	25
14	25
15	25

### Power curve:



# Eurowind Small Turbines Ltd

## VAWT – from 1,3 kW to 30 kW

Contact name: Steven Peace

Address: 38 Kings Avenue, Newhaven, East Sussex BN9 0NA

Telephone: +44 (0) 12 73 61 23 83

Country: United Kingdom

### Eurowind 1,3 kW references

Site	Use	Country
Unknown	Prototype	UK

### Eurowind / 1,3 kW



### Technical information

POWER		Unit	
1) Rated power	1,3	kW	
2) Rated wind speed	12	m/s	
3) Cut-in wind speed	3 to 4	m/s	
4) Cut-out wind speed	28 to 32	m/s	
5) Maximum wind speed the turbine can withstand	255	km/h	
DIMENSIONS			
6) Nacelle and rotor weight	DK	kg	
7) Rotor diameter	2,25	m	
8) Rotor height (for VAWT only)	2	m	
9) Swept area	4,5	m <sup>2</sup>	
10) Height of the mast	Site dependent	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type			
13) Brake system	DK		
14) Number of blades	3		
15) Blades material	Composite fibre glass		
16) Output voltage	24 – 240	V	
17) Minimum operation temperature	Not known	°C	
18) Maximum operation temperature	Not known	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Dk	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	No		
23) Yaw control system	Not necessary		
24) Upwind or downwind	N/a		

### Calculated power curve

Not available

Wind speed (m/s)	Power (kW)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

### Power curve

Not available



# Eurowind Small Turbines Ltd

## VAWT – from 1,3 kW to 30 kW

Contact name: Steven Peace  
 Address: 38 Kings Avenue, Newhaven, East Sussex BN9 0NA  
 Telephone: +44 (0) 12 73 61 23 83  
 Country : United Kingdom

### Eurowind 5 kW references

Site	Use	Country

### Technical information

POWER	Unit	
1) Rated power	5	kW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	3 to 4	m/s
4) Cut-out wind speed	28 to 32	m/s
5) Maximum wind speed the turbine can withstand	255	km/h
DIMENSIONS		
6) Nacelle and rotor weight	DK	kg
7) Rotor diameter	4,25	m
8) Rotor height (for VAWT only)	4	m
9) Swept area	17	m <sup>2</sup>
10) Height of the mast	Site dependent	m
OTHER INFORMATION		
11) Maximum rpm	DK	At rated wind speed
12) Gear box type		DK
13) Brake system		DK
14) Number of blades		3
15) Blades material	Composite fibre glass	
16) Output voltage	24 – 240	V
17) Minimum operation temperature	Not known	°C
18) Maximum operation temperature	Not known	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)		DB
20) Lifetime	20	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system	Not necessary	
24) Upwind or downwind	N/a	

### Eurowind / 5 kW

### Calculated power curve

Not available

Wind speed (m/s)	Power (kW)
1	
2	
2,5	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

### Power curve

Not available

# Eurowind Small Turbines Ltd

## VAWT – from 1,3 kW to 30 kW

Contact name: Steven Peace

Address: 38 Kings Avenue, Newhaven, East Sussex BN9 0NA

Telephone: +44 (0) 12 73 61 23 83

Country: United Kingdom

Eurowind / 10,8 kW

### Eurowind 10,8 kW references

Site	Use	Country

### Technical information

POWER		Unit	
1) Rated power	10,8	kW	
2) Rated wind speed	12	m/s	
3) Cut-in wind speed	3 to 4	m/s	
4) Cut-out wind speed	28 to 32	m/s	
5) Maximum wind speed the turbine can withstand	255	Km/h	
DIMENSIONS			
6) Nacelle and rotor weight	DK	kg	
7) Rotor diameter	6,26	m	
8) Rotor height (for VAWT only)	5	m	
9) Swept area	37	m <sup>2</sup>	
10) Height of the mast	Site dependent	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type	DK		
13) Brake system	DK		
14) Number of blades	3		
15) Blades material	Composite fibre glass		
16) Output voltage	24 – 240	V	
17) Minimum operation temperature	DK	°C	
18) Maximum operation temperature	DK	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	DK	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	No		
23) Yaw control system	Not necessary		
24) Upwind or downwind	N/a		

### Calculated power curve

Not available

Wind speed (m/s)	Power (kW)
1	
2	
2,5	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

### Power curve

Not available

# Eurowind Small Turbines Ltd

## VAWT – from 1,3 kW to 30 kW

Contact name: Steven Peace

Address: 38 Kings Avenue, Newhaven, East Sussex BN9 0NA

Telephone: +44 (0) 12 73 61 23 83

Country: United Kingdom

### Eurowind 19 kW references

Site	Use	Country
No references available yet		

## Eurowind / 19 kW



Photo Montage

### Technical information

POWER		Unit	
1) Rated power	19	kW	
2) Rated wind speed	12	m/s	
3) Cut-in wind speed	3 to 4	m/s	
4) Cut-out wind speed	28 to 32	m/s	
5) Maximum wind speed the turbine can withstand	255	Km/h	
DIMENSIONS			
6) Nacelle and rotor weight	DK	kg	
7) Rotor diameter	8,25	m	
8) Rotor height (for VAWT only)	8	m	
9) Swept area	66	m <sup>2</sup>	
10) Height of the mast	Site dependent	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type		DK	
13) Brake system		DK	
14) Number of blades		3	
15) Blades material	Composite fibre glass		
16) Output voltage	24 – 240	V	
17) Minimum operation temperature	DK	°C	
18) Maximum operation temperature	DK	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	DK	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system	Not necessary		
24) Upwind or downwind		N/a	

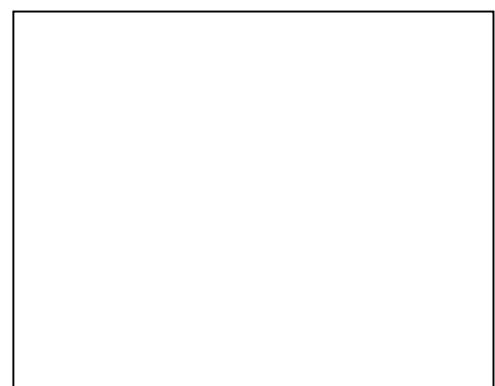
### Calculated power curve

Not available

Wind speed (m/s)	Power (kW)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

### Power curve

Not available



# Eurowind Small Turbines Ltd

## VAWT – from 1,3 kW to 30 kW

Contact name: Steven Peace

Address: 38 Kings Avenue, Newhaven, East Sussex BN9 0NA

Telephone: +44 (0) 12 73 61 23 83

Country: United Kingdom

### Eurowind 30 kW references

Site	Use	Country
No references available yet		

## Eurowind / 30 kW



Photo Montage

### Technical information

POWER		Unit	
1) Rated power	30	kW	
2) Rated wind speed	12	m/s	
3) Cut-in wind speed	3 to 4	m/s	
4) Cut-out wind speed	28 to 32	m/s	
5) Maximum wind speed the turbine can withstand	255	Km/h	
DIMENSIONS			
6) Nacelle and rotor weight	DK	kg	
7) Rotor diameter	10,25	m	
8) Rotor height (for VAWT only)	10	m	
9) Swept area	102,5	m <sup>2</sup>	
10) Height of the mast	Site dependent	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type		DK	
13) Brake system		DK	
14) Number of blades		3	
15) Blades material	Composite fibre glass		
16) Output voltage	24 – 240	V	
17) Minimum operation temperature	DK	°C	
18) Maximum operation temperature	DK	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	DK	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system	Not necessary		
24) Upwind or downwind	N/a		

### Calculated power curve

Not available

Wind speed (m/s)	Power (kW)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

### Power curve

Not available



# Fortis Wind Energy

## HAWT from 0,8 kW to 10 kW.

Contact name: Johan Kuikman  
 Address: Botanicuslaan 14, 9751 AC Haren  
 Telephone: +31 – 50 5340104  
 Country : Netherlands

### Espada references

Site	Use	Country
Xingang Nat. Machinery Corp.	Technology transfer	China
Windsund, Sunderland	Offshore application	UK
Brussel	Ecole Royale Miltaire	Belgium
Galeforce	Stand alone application	UK

## Espada / 0,8 kW



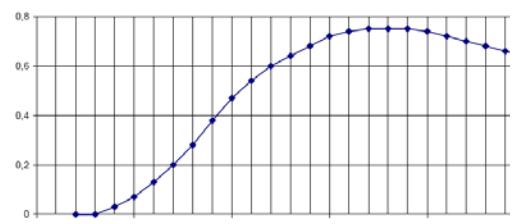
### Technical information

POWER			Unit
1) Rated power	0,8		kW
2) Rated wind speed	14		m/s
3) Cut-in wind speed	3		m/s
4) Cut-out wind speed	No		m/s
5) Maximum wind speed the turbine can withstand	60		Km/h
DIMENSIONS			
6) Rotor weight	52		kg
7) Rotor diameter	2,2		m
8) Rotor height (for VAWT only)	---		m
9) Swept area	3,80		m <sup>2</sup>
10) Height of the mast	12 – 18		m
OTHER INFORMATION			
11) Maximum rpm	1000	At rated wind speed	
12) Gear box type	No brake system		
13) Brake system	Short circuit in generator		
14) Number of blades	2		
15) Blades material	Composite fibre glass		
16) Output voltage	12 - 240	V (DC)	
17) Minimum operation temperature	- 30	°C	
18) Maximum operation temperature	+ 50	°C	
19) Acoustic levels at a distance of 20 m ? (wind = 10 m/s)	< 60	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	No		
23) Yaw control system	Wind vane		
24) Upwind or downwind	Upwind		

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	0
4	0,03
5	0,07
6	0,13
7	0,20
8	0,28
9	0,38
10	0,47
11	0,57
12	0,66
13	0,74
14	0,78
15	0,8

### Power curve



# Fortis Wind Energy

## HAWT from 0,8 kW to 10 kW.

Contact name: Johan Kuikman  
 Address: Botanicuslaan 14, 9751 AC Haren  
 Telephone: +31-50 5340104  
 Country : Nethrelands

### Passaat references

Site	Use	Country
Dieren	Stand alone electricity	Netherlands
Split	Roof university building	Croatia
Lapan	Rural electrification	Indonesia
Trondheim	Radio repeaters	Norway

### Passaat 1,4 kW



### Technical information

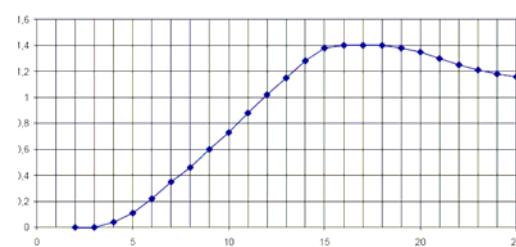
POWER			Unit
1) Rated power	1,4		kW
2) Rated wind speed	16		m/s
3) Cut-in wind speed	2,5		m/s
4) Cut-out wind speed	None		m/s
5) Maximum wind speed the turbine can withstand	60		Km/h
DIMENSIONS			
6) Rotor weight	75		kg
7) Rotor diameter	3,12		m
8) Rotor height (for VAWT only)	---		m
9) Swept area	7,65		m <sup>2</sup>
10) Height of the mast	12 - 24		m
OTHER INFORMATION			
11) Maximum rpm	775	At rated wind speed	
12) Gear box type		No gear box	
13) Brake system		Short circuit of generator	
14) Number of blades		3	
15) Blades material		Composite fibre glass	
16) Output voltage	24-240	V (DC)	
17) Minimum operation temperature	- 30	°C	
18) Maximum operation temperature	+ 50	°C	
19) Acoustic levels at a distance of 20 m ? (wind = 10 m/s)	< 60	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Wind vane	
24) Upwind or downwind		Upwind	

### Calculated power curve

Wind speed (m/s)	Power* (W)
1	0
2	0
3	0,001
4	0,040
5	0,110
6	0,220
7	0,350
8	0,460
9	0,600
10	0,730
11	0,880
12	1,020
13	1,150
14	1,280
15	1,400

\*power on axis, sea level, temp. 15°C

### Power curve



# Fortis Montana

HAWT from 0,8 kW to 10 kW.

Contact name: Johan Kuikman  
 Address: Botanicuslaan 14, 9751 AC Haren  
 Telephone: +31 – 50 5340104  
 Country : Netherlands

## Montana references

Site	Use	Country
Stompetoren	Demonstration at installation company	Netherlands
Waregem	On the roof of industrial building	Belgium
Perugia	Plasto Work and Wind Engineering	Italy
CREST	Stand alone electricity	Greece

## Montana 5,6 kW



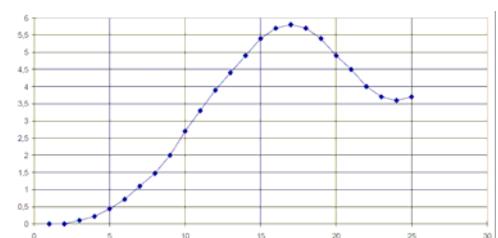
## Technical information

POWER			Unit
1) Rated power	5,6		kW
2) Rated wind speed	17		m/s
3) Cut-in wind speed	2,5		m/s
4) Cut-out wind speed	No		m/s
5) Maximum wind speed the turbine can withstand	60		Km/h
DIMENSIONS			
6) Rotor weight	170		kg
7) Rotor diameter	5		m
8) Rotor height (for VAWT only)	...		m
9) Swept area	19,6		m <sup>2</sup>
10) Height of the mast	18		m
OTHER INFORMATION			
11) Maximum rpm	450	At rated wind speed	
12) Gear box type		No gear box	
13) Brake system		Short circuit at generator	
14) Number of blades		3	
15) Blades material		Composite fibre glass	
16) Output voltage	24 - 400	V (DC)	
17) Minimum operation temperature	- 30	°C	
18) Maximum operation temperature	+ 50	°C	
19) Acoustic levels at a distance of 20 m ? (wind = 10 m/s)	< 60	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Wind vane	
24) Upwind or downwind		Upwind	

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	0,10
4	0,22
5	0,44
6	0,72
7	1,10
8	1,43
9	2,00
10	2,70
11	3,30
12	3,90
13	4,40
14	4,90
15	5,40

## Power curve



# Fortis Wind Energy

HAWT from 0,8 kW to 10 kW.

Contact name: Johan Kuikman  
 Address: Botanicuslaan 14, 9751 AC Haren  
 Telephone: +31-50 5340104  
 Country : Netherlands

## Alize references

Site	Use	Country
Dronrijp	Farm	Netherlands
Lutjegast	Farm	Netherlands
Opende	Farm	Netherlands
St. Cruz de la Palma	Desalination plant	Spain, Canary Islands

## Alize, 10 kW



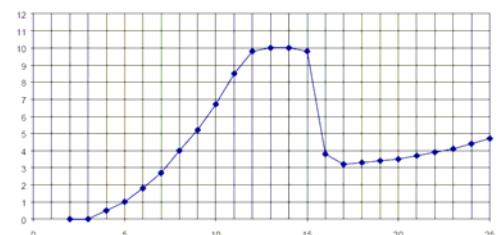
## Technical information

POWER			Unit
1) Rated power	10		kW
2) Rated wind speed	12		m/s
3) Cut-in wind speed	3		m/s
4) Cut-out wind speed	No		m/s
5) Maximum wind speed the turbine can withstand	60		Km/h
DIMENSIONS			
6) Rotor weight	285		kg
7) Rotor diameter	7		m
8) Rotor height (for VAWT only)	...		m
9) Swept area	38,5		m <sup>2</sup>
10) Height of the mast	18 – 36		m
OTHER INFORMATION			
11) Maximum rpm	300	At rated wind speed	
12) Gear box type		No gear box	
13) Brake system		Short circuit of generator	
14) Number of blades		3	
15) Blades material		Composite fibre glass	
16) Output voltage	120 - 400	V (DC)	
17) Minimum operation temperature	- 30	°C	
18) Maximum operation temperature	+ 50	°C	
19) Acoustic levels at a distance of 20 m ? (wind = 10 m/s)	< 60	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Wind vane	
24) Upwind or downwind		Upwind	

## Calculated power curve

Wind speed (m/s)	Power* (W)
1	0
2	0
3	0
4	0,4
5	1,0
6	1,8
7	2,8
8	3,9
9	5,2
10	6,8
11	8,5
12	9,8
13	10,0
14	10,0
15	10,0

## Power curve



# Fuhrländer

HAWT from 30 kW to 2 700 kW.

Contact name: Carina Demuth / A. Kloos  
 Address: Auf der Höhe 4, 56477 Waigandshain  
 Telephone: +49 266 49 96 60  
 Country : Germany

## Führländer FL30 references

Site	Use	Country
Zistersdorf	Government	Austria
Cody / Wyoming	Privat Ranch	USA
Köln	Public Services	Germany

## FL 30/ 30 kW



## Technical information

POWER		Unit	
1) Rated power	30	kW	
2) Rated wind speed	12	m/s	
3) Cut-in wind speed	2,5	m/s	
4) Cut-out wind speed	25	m/s	
5) Maximum wind speed the turbine can withstand	55	m/s	
DIMENSIONS			
6) Rotor weight	640	kg	
7) Rotor diameter	13	m	
8) Rotor height (for VAWT only)		m	
9) Swept area	133	m <sup>2</sup>	
10) Height of the mast	18/27	m	
OTHER INFORMATION			
11) Maximum rpm	70	At rated wind speed	
12) Gear box type		Spur gear/planet gears	
13) Brake system		Disk brake+ Mech tip brake	
14) Number of blades		3	
15) Blades material		Glass Fibre Composite	
16) Output voltage	400	V	
17) Minimum operation temperature	-20°C	°C	
18) Maximum operation temperature	+ 50°C	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	93	DB	
20) Lifetime		Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		Yes	
23) Yaw control system		1 gearbox motors	
24) Upwind or downwind			

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	

## Power curve



# Fuhrländer

HAWT from 30 kW to 2 700 kW.

Contact name: Carina Demuth / A. Kloos  
 Address: Auf der Höhe 4, 56477 Waigandshain  
 Telephone: +49 266 49 96 60  
 Country : Germany

## Fuhrländer FL 100 references

Site	Use	Country
Rennerod	Company " Spedition Pracht"	Germany
Iwata / Shizuoka	Iwata Factory	Japan
Vilemov	Orthodox Akademie	Czech Republic
Boston	IBEW Local	USA

## FL 100/ 100 kW



## Technical information

POWER			Unit
1) Rated power	100		kW
2) Rated wind speed	13		m/s
3) Cut-in wind speed	2,5		m/s
4) Cut-out wind speed	25		m/s
5) Maximum wind speed the turbine can withstand	67		m/s
DIMENSIONS			
6) Rotor weight (incl. hub)	2 300		kg
7) Rotor diameter	21		m
8) Rotor height (for VAWT only)			m
9) Swept area	346		m <sup>2</sup>
10) Height of the mast	35		m
OTHER INFORMATION			
11) Maximum rpm	47	At rated wind speed	
12) Gear box type	Combined spur gear/planet gears		
13) Brake system	Disc brake + rotor tip brake + parking brake system + aerodynamic safety system "stall"		
14) Number of blades	3		
15) Blades material	Glass Fibre Composite		
16) Output voltage	400		V
17) Minimum operation temperature	-20°C		°C
18) Maximum operation temperature	+ 50°C		°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	95		DB
20) Lifetime	25		Years
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	Yes		
23) Yaw control system	Wind vane		
24) Upwind or downwind	Upwind		

## Calculated power curve

Wind speed (m/s)	Power (W)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	

## Power curve



# Gaia-Wind A/S

## HAWT 11 kW.

Contact name: Jesper Andersen  
 Address: Håndværkervej 1, 8840 Rødkærbsbro  
 Telephone: +45 87 76 22 00  
 Country : Denmark

**Gaia 11 kW references:** have not provided any references

Site	Use	Country

## Gaia/ 11 kW



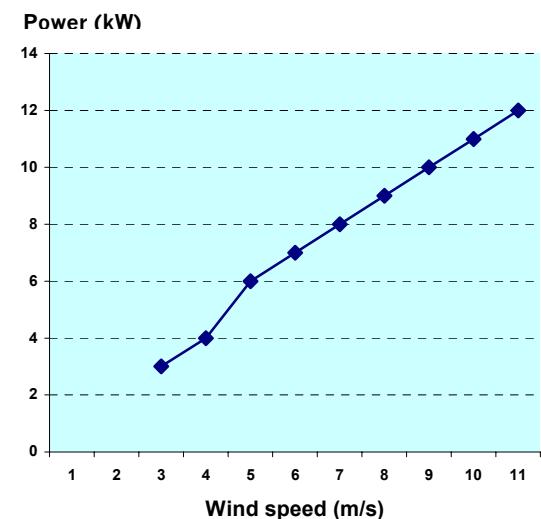
### Technical information

POWER		Unit
1) Rated power	11	kW
2) Rated wind speed	10	m/s
3) Cut-in wind speed	3	m/s
4) Cut-out wind speed	25	m/s
5) Maximum wind speed the turbine can withstand	65	Km/h
DIMENSIONS		
6) Rotor weight	208-248	kg
7) Rotor diameter	13	m
8) Rotor height (for VAWT only)	Not relevant	m
9) Swept area	132	m <sup>2</sup>
10) Height of the mast	18	m
OTHER INFORMATION		
11) Maximum rpm	56	At rated wind speed
12) Gear box type	Compact shaft mounted gear	
13) Brake system	Disc brake	
14) Number of blades	2	
15) Blades material	Composite fiber glass	
16) Output voltage	380-400	V
17) Minimum operation temperature	- 20	°C
18) Maximum operation temperature	+ 50	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	45 Db at 59 meters	DB
20) Lifetime	20	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	Yes	
23) Yaw control system	Wind vane	
24) Upwind or downwind	Downwind turbine	

### Calculated power curve

Wind speed (m/s)	Power(kW)
1	
2	
3	3
4	4
5	6
6	7
7	8
8	9
9	10
10	11
11	12

### Power curve:



# Gazelle Wind Turbines Ltd

## HAWT – 20 kW

Contact name: Ken Chaplin  
 Address: Stargate Ind Est, Ryton, Tyne & Wear, NE40 3 EX  
 Telephone: +44 (0) 191 413 00 12  
 Country: United Kingdom

## Gazelle / 20 kW



### Gazelle 20 kW references

Site	Use	Country
Southport Eco Centre,	Electricity generation for building	UK
Montagne Jeunesse Eco Factory, Swansea	Electricity generation for building	UK
Sunderland Enterprise Park, Sunderland	Electricity generation for building	UK

### Technical information

POWER		Unit
1) Rated power	20	kW
2) Rated wind speed	13	m/s
3) Cut-in wind speed	4	m/s
4) Cut-out wind speed	20	m/s
5) Maximum wind speed the turbine can withstand	DK	km/h
DIMENSIONS		
6) Nacelle and rotor weight	1600	kg
7) Rotor diameter	11	m
8) Rotor height (for VAWT only)	-	m
9) Swept area	95	m <sup>2</sup>
10) Height of the mast	12,5 to 20	m
OTHER INFORMATION		
11) Maximum rpm	106	At rated wind speed
12) Gear box type		None
13) Brake system		-
14) Number of blades		3
15) Blades material	Carbon fibre epoxy	
16) Output voltage	400	V
17) Minimum operation temperature	DK	°C
18) Maximum operation temperature	DK	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	DK	DB
20) Lifetime	20 to 25	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		Yes
23) Yaw control system	Free yaw	
24) Upwind or downwind	Downwind	

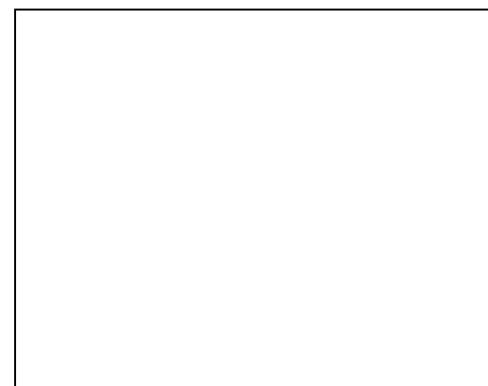
### Calculated power curve

Not available

Wind speed (m/s)	Power (kW)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

### Power curve

Not available



# Iskra Wind Turbines

## HAWT – 5 kW

Contact name: John Balson

Address: 261, Woodborough Road, St Anns,  
Nottingham, NG3 4 JZ

Telephone: +44 (0) 115 841 32 83

Country: United Kingdom

### Iskra / 5 kW



#### Iskra 5 kW references

Site	Use	Country
The Turbine, Shireoaks Business Innovation Centre, Worksop	Electricity generation for building	UK
Westergate Business Centre, Brighton	Electricity generation for building	UK
Hockerton Housing Project, Hockerton	Electricity generation for homes and visitor centre	UK

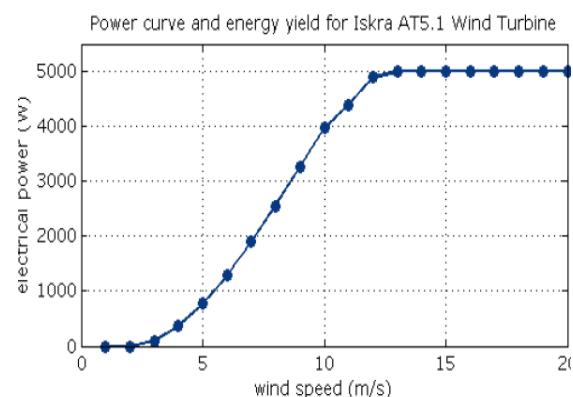
#### Technical information

POWER			Unit
1) Rated power	5		kW
2) Rated wind speed	11		m/s
3) Cut-in wind speed	3		m/s
4) Cut-out wind speed	60		m/s
5) Maximum wind speed the turbine can withstand	216		km/h
DIMENSIONS			
6) Nacelle and rotor weight	280		kg
7) Rotor diameter	5.4		m
8) Rotor height (for VAWT only)	-		m
9) Swept area	22.9		m <sup>2</sup>
10) Height of the mast	12 to 30		m
OTHER INFORMATION			
11) Maximum rpm	200	At rated wind speed	
12) Gear box type		None	
13) Brake system		Electro-dynamic	
14) Number of blades		3	
15) Blades material		Composite fibre glass	
16) Output voltage	Variable	V	
17) Minimum operation temperature	-20	°C	
18) Maximum operation temperature	+50	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	DK	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Tail vane	
24) Upwind or downwind		Upwind	

#### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	96
4	367
5	771
6	1284
7	1901
8	2547
9	3253
10	3965
11	4397
12	4888
13	5000
14	5000
15	5000

#### Power curve:



# Jonica Impianti

## HAWT of 20 kW.

Contact name: Nicola De Luca  
 Address: Via Poerio 226, 74020 Lizzano  
 Telephone: +39 099 955 12 08  
 Country : Italy

## Jonica Impianti/ 20 kW



### Jonica Impianti 20 kW references

City (Province)	Use	Country
Lizzano (Taranto)	Jonica Impianti factory	Italy
Perarolo di Cadore (Belluno)	Industrial area	Italy
Pos al Pago (Belluno)	Industrial area	Italy
Quero (Belluno)	Industrial area	Italy
Colle Salvetti (Livorno)	AGIP Service station	Italy

### Technical information

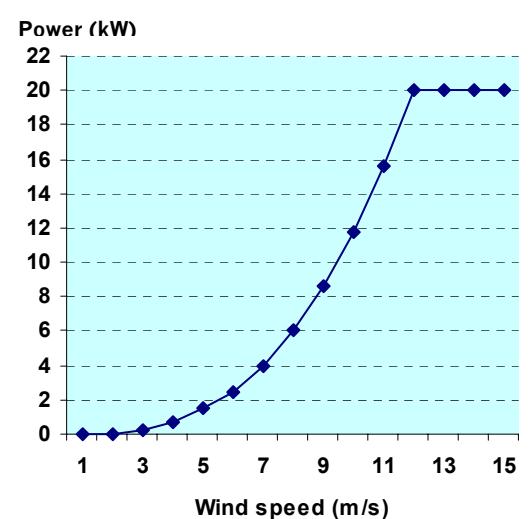
POWER	Unit	
1) Rated power	20	KW
2) Rated wind speed	12,5	m/s
3) Cut-in wind speed	3,5	m/s
4) Cut-out wind speed	37,5	m/s
5) Maximum wind speed the turbine can withstand	153	Km/h
DIMENSIONS		
6) Rotor weight (blades)	100	Kg
7) Rotor diameter	8	m
8) Rotor height (for VAWT only)		m
9) Swept area	50,3	m <sup>2</sup>
10) Height of the mast	12/18	m
OTHER INFORMATION		
11) Maximum rpm	200	At rated wind speed
12) Gear box type	Not present	
13) Brake system	Aerodynamic with pitch control	
14) Number of blades	3	
15) Blades material	Composite fiber glass	
16) Output voltage	380	V
17) Minimum operation temperature	- 20	°C
18) Maximum operation temperature	+ 50	°C
19) Acoustic levels at a distance of 50 m (wind = 9 m/s)	50	DB
20) Lifetime	20	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	No	
23) Yaw control system	Wind vane	
24) Upwind or downwind	Upwind turbine	

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0
3	0,25
4	0,50
5	1,5
6	2,5
7	4
8	6
9	8,6
10	11,8
11	15,6
12	20
13	20
14	20
15	20

Sea level, Raleygh distrib k = 2  
 Tower height= 18 m, Shear coef = 0,14  
 Turbulence factor = 15%

### Power curve:



# Marlec Engineering Co Ltd

## HAWT – From 0,025 kW to 0,34 kW

Contact name: Teresa Auciello  
 Address: Rutland House, Trevithick Rd, Corby,  
 Northants NN17 5XY  
 Telephone: +44 (0) 1536 201 588  
 Country: United Kingdom

### Rutland 503 / 0,025 kW



#### Rutland 503 – 0,025 kW references

Site	Use	Country
Elliott Durham Comprehensive School, Nottingham	Educational	UK
Sandy Upper School and Community Sports College	Educational	UK
Cromwell Park Primary School, Huntingdon	Educational	UK

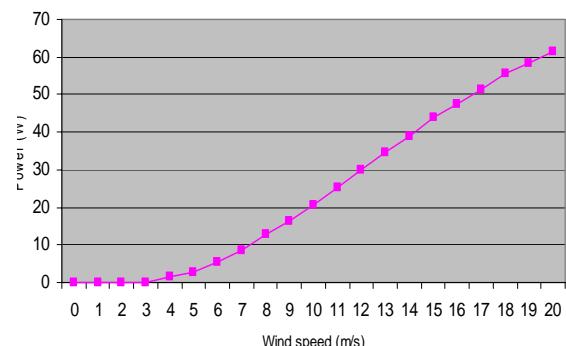
#### Technical information

POWER		Unit	
1) Rated power	0, 025	kW	
2) Rated wind speed	10	m/s	
3) Cut-in wind speed	2,6	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	> 137	km/h	
DIMENSIONS			
6) Nacelle and rotor weight	3	kg	
7) Rotor diameter	0,500	m	
8) Rotor height (for VAWT only)	-	m	
9) Swept area	0,196	m <sup>2</sup>	
10) Height of the mast	Variable up to 6,5	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type		None	
13) Brake system		DK	
14) Number of blades		6	
15) Blades material	Glass reinforced plastic		
16) Output voltage	12 or 24	V	
17) Minimum operation temperature	-25	°C	
18) Maximum operation temperature	DK	°C	
19) Acoustic levels at a distance of 20 m? at nacelle? (wind = 5 m/s)	DK	DB	
20) Lifetime	15	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Wind vane	
24) Upwind or downwind		Upwind	

#### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	1
4	2
5	4
6	6
7	10
8	14
9	20
10	26
11	28
12	36
13	39
14	44
15	56

#### Power curve:



# Marlec Engineering Co Ltd

HAWT – From 0,025 kW to 0,34 kW

Contact name: Teresa Auciello  
 Address: Rutland House, Trevithick Rd, Corby,  
 Northants NN17 5XY  
 Telephone: +44 (0) 1536 201 588  
 Country : United Kingdom

Rutland 910-3 / 0,09 kW



## Rutland 910-3 – 0,09 kW references

Site	Use	Country
Hagbourne Primary School, Oxon	Educational and Electricity generation	UK
A43 roadside	Traffic signals	UK
Tokyo	Street lighting	Japan

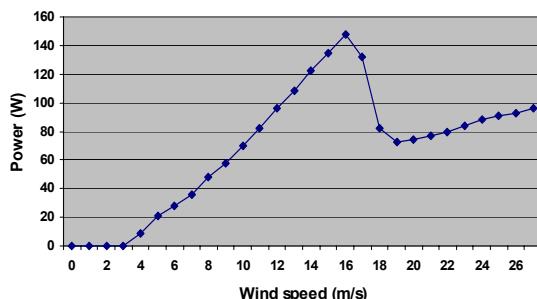
## Technical information

POWER			Unit
1) Rated power	0,09	kW	
2) Rated wind speed	10	m/s	
3) Cut-in wind speed	2,6	m/s	
4) Cut-out wind speed	It furls at 15 m/s but no real cut out	m/s	
5) Maximum wind speed the turbine can withstand	> 137	km/h	
DIMENSIONS			
6) Nacelle and rotor weight	17	kg	
7) Rotor diameter	0,910	m	
8) Rotor height (for VAWT only)	-	m	
9) Swept area	0,655	m <sup>2</sup>	
10) Height of the mast	Up to 6,5	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type		None	
13) Brake system		DK	
14) Number of blades		6	
15) Blades material	Glass reinforced plastic		
16) Output voltage	12 or 24	V	
17) Minimum operation temperature	Artic	°C	
18) Maximum operation temperature	Sahara	°C	
19) Acoustic levels at a distance of 20 m? at nacelle? (wind = 5 m/s)	DK	DB	
20) Lifetime	15	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system	Wind vane		
24) Upwind or downwind	Upwind		

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	2
4	14
5	21
6	28
7	44
8	50
9	66
10	83
11	87
12	92
13	121
14	138
15	159

## Power curve:



# Marlec Engineering Co Ltd

## HAWT – From 0,025 kW to 0,34 kW

Contact name: Teresa Auciello  
 Address: Rutland House, Trevithick Rd, Corby,  
 Northants NN17 5XY  
 Telephone: +44 (0) 1536 201 588  
 Country : United Kingdom

### Rutland 913 – 0,09 kW references

Site	Use	Country
Rutland Water	Water level monitoring	UK
Southampton	Sailing boat	UK
	Street lighting	Taiwan
A6006 road sign	Safety sign	UK

### Rutland 913 / 0,09 kW



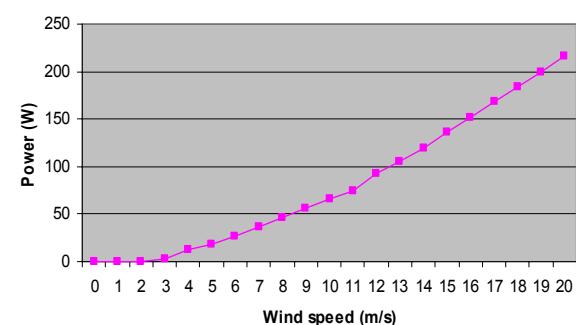
### Technical information

POWER		Unit	
1) Rated power	0,09	kW	
2) Rated wind speed	10	m/s	
3) Cut-in wind speed	2,6	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	> 137	Km/h	
DIMENSIONS			
6) Nacelle and rotor weight	13	Kg	
7) Rotor diameter	0,913	m	
8) Rotor height (for VAWT only)	-	m	
9) Swept area	0,655	m <sup>2</sup>	
10) Height of the mast	Variable up to 6,5	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type		None	
13) Brake system		DK	
14) Number of blades		6	
15) Blades material	Glass reinforced plastic		
16) Output voltage	12 or 24	V	
17) Minimum operation temperature	-25	°C	
18) Maximum operation temperature	DK	°C	
19) Acoustic levels at a distance of 20 m? at nacelle? (wind = 5 m/s)	DK	DB	
20) Lifetime	15	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Wind vane	
24) Upwind or downwind		Upwind	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	2
4	14
5	21
6	28
7	44
8	50
9	66
10	83
11	87
12	92
13	121
14	138
15	159

### Power curve:



# OY Windside Production Ltd

VAWT from 1 kW to 8 kW.

Contact name: Risto Joutsiniemi  
 Address: Niemenharjuntie 85, 44800 Pihtipudas  
 Telephone: +358 208 350 700  
 Country : Finland

**WS-4B & 4C/ 1-2 kW**



## Oy Windside WS-4B/4C references

Site	Use	Country
Doncaster	Earth Centre	England
Helsinki	Arabianranta	Finland
Chicago	Millenium Park	U.S.A
Yurigaoka, Fukuoka	Sports centre	Japan
Oulu	In a Park wind art work Synergia	Finland

## Technical information

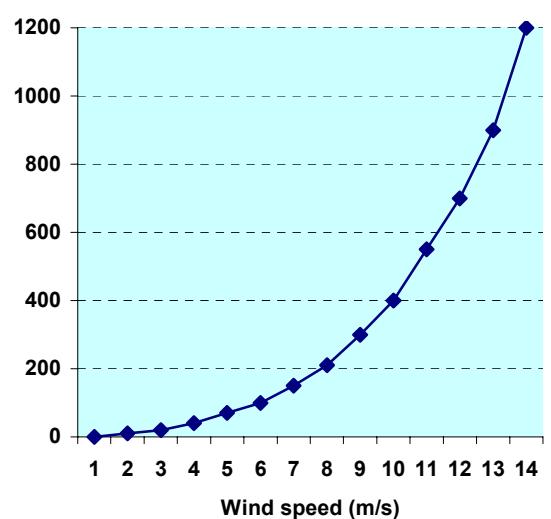
POWER		
1) Rated power	1	KW
2) Rated wind speed	18	m/s
3) Cut-in wind speed	2	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	144	Km/h
DIMENSIONS		
6) Rotor weight	400	Kg
7) Rotor diameter	1	m
8) Rotor height (for VAWT only)	4	m
9) Swept area	4	m <sup>2</sup>
10) Height of the mast	Not relevant	m
OTHER INFORMATION		
11) Maximum rpm	170 - 400	At rated wind speed
12) Gear box type	No gear box	
13) Brake system	Disk brake	
14) Number of blades	2	
15) Blades material	Composite fibre glass	
16) Output voltage	0 - 200	V
17) Minimum operation temperature	- 60	°C
18) Maximum operation temperature	+ 80	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	0	DB
20) Lifetime	100	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	Yes	
23) Yaw control system	Not needed	
24) Upwind or downwind		

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	10
3	20
4	40
5	70
6	100
7	150
8	210
9	300
10	400
11	550
12	700
13	900
14	1 200

In battery charging the electricity production will be changing according to the voltage level chosen by the client. 3-phase Generator 25 Ampers

## Power curve



# OY Windside Production Ltd

VAWT from 1 kW to 8 kW.

Contact name: Risto Joutsiniemi  
 Address: Niemenharjuntie 85, 44800 Pihtipudas  
 Telephone: +358 208 350 700  
 Country : Finland

**WS-12/ 8 kW**



## Oy Windside WS-12 references

Site	Use	Country
Raisio	Shopping centre	Finland

## Technical information

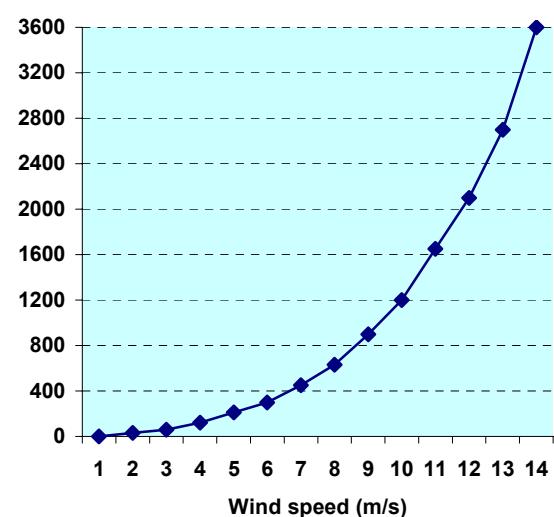
POWER			Unit
1) Rated power	8	kW	
2) Rated wind speed	20	m/s	
3) Cut-in wind speed	2	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	216	Km/h	
DIMENSIONS			
6) Rotor weight	3000	kg	
7) Rotor diameter	2	m	
8) Rotor height (for VAWT only)	6	m	
9) Swept area	12	m <sup>2</sup>	
10) Height of the mast	Not relevant	m	
OTHER INFORMATION			
11) Maximum rpm	100 - 300	At rated wind speed	
12) Gear box type	No gear box		
13) Brake system	Disk brake		
14) Number of blades	2		
15) Blades material	Aluminium		
16) Output voltage	0 - 200	V	
17) Minimum operation temperature	- 60	°C	
18) Maximum operation temperature	+ 80	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	0	DB	
20) Lifetime	100	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	Yes		
23) Yaw control system	Not needed		
24) Upwind or downwind			

## Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	30
3	60
4	120
5	211
6	300
7	450
8	630
9	900
10	1 200
11	1 650
12	2 100
13	2 700
14	3 600

In battery charging the electricity production will be changing according to the voltage level chosen by the client.

## Power curve



# Pitchwind Systems AB

## HAWT from 20 kW to 30 kW

Contact name: Lars Akeson  
 Address: PO Box 89, 44 322 Lerum  
 Telephone: +46 708 237 219  
 Country : Sweden

### Pitchwind 30 kW Grid connected references

Site	Use	Country

### Pitchwind/ 30 kW Grid



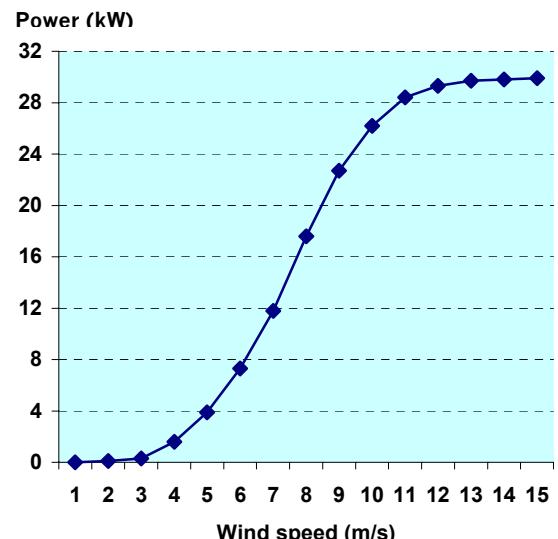
### Technical information

POWER		Unit
1) Rated power	30	kW
2) Rated wind speed	15	m/s
3) Cut-in wind speed	2	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	250	Km/h
DIMENSIONS		
6) Rotor weight	550	kg
7) Rotor diameter	14	m
8) Rotor height (for VAWT only)		m
9) Swept area	154	m <sup>2</sup>
10) Height of the mast	20 / 62	m
OTHER INFORMATION		
11) Maximum rpm	81	At rated wind speed
12) Gear box type		None
13) Brake system	Pitch by electrical actuator at service parking brake	
14) Number of blades		2
15) Blades material	Steel polyster	
16) Output voltage	380 – 500	V
17) Minimum operation temperature	- 40	°C
18) Maximum operation temperature	+ 40	°C
19) Acoustic levels at a distance of 30m from tower base (wind speed 5 m/s & rotor speed = 48 rpm)	50	DB
20) Lifetime	20	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system	Wind wheels	
24) Upwind or downwind	Upwind	

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0,1
3	0,3
4	1,6
5	3,9
6	7,3
7	11,8
8	17,6
9	22,7
10	26,2
11	28,4
12	29,3
13	29,7
14	29,8
15	29,9

### Power curve:



# Proven Energy Products Ltd

## HAWT – From 0,6 kW to 15 kW

Contact name: David Watson

Address: Wardhead Park, Stewarton, Ayrshire, KA3 5 LH, Scotland

Telephone: +44 (0) 1560 485 570

Country : United Kingdom

## Proven WT 600/ 0,6 kW



### Proven WT 600 references

Site	Use	Country

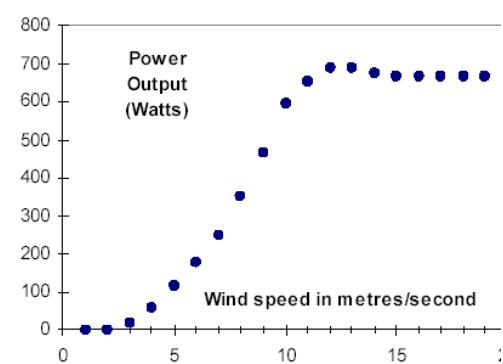
### Technical information

POWER		Unit
1) Rated power	0,6	KW
2) Rated wind speed	10	m/s
3) Cut-in wind speed	2,5	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	234	Km/h
DIMENSIONS		
6) Rotor weight	70	Kg
7) Rotor diameter	2,55	m
8) Rotor height (for VAWT only)		m
9) Swept area	5,11	m <sup>2</sup>
10) Height of the mast	5,5	m
OTHER INFORMATION		
11) Maximum rpm		At rated wind speed
12) Gear box type		
13) Brake system		
14) Number of blades		3
15) Blades material	Polypropylene / P.U.	
16) Output voltage	14 / 24 / 48	V
17) Minimum operation temperature	Artic circle	°C
18) Maximum operation temperature	South America	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	21 at 20 m 35 at mast	DB
20) Lifetime	20-25	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system		
24) Upwind or downwind	Downwind	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	15
4	60
5	110
6	190
7	260
8	350
9	480
10	600
11	660
12	700
13	700
14	700

### Power curve:



# Proven Energy Products Ltd

## HAWT – From 0,6 kW to 15 kW

Contact name: David Watson

Address: Wardhead Park, Stewarton, Ayrshire, KA3 5 LH, Scotland

Telephone: +44 (0) 1560 485 570

Country : United Kingdom

## Proven WT 6 000/ 6 kW



### Proven WT 6 000 references

Site	Use	Country

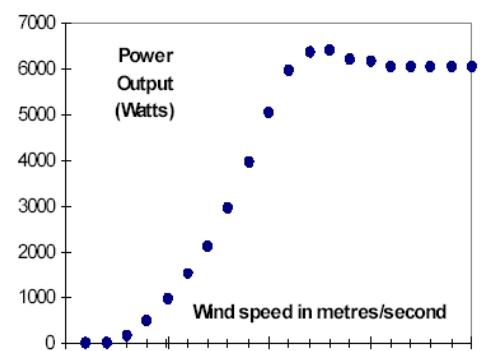
### Technical information

POWER		Unit
1) Rated power	6	KW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	2,5	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	234	Km/h
DIMENSIONS		
6) Rotor weight	539	Kg
7) Rotor diameter	5,5	m
8) Rotor height (for VAWT only)		m
9) Swept area	23,76	m <sup>2</sup>
10) Height of the mast	9 / 15	m
OTHER INFORMATION		
11) Maximum rpm		At rated wind speed
12) Gear box type		
13) Brake system		
14) Number of blades		3
15) Blades material	Wood/ Epoxy / P.U.	
16) Output voltage	48 to 300	V
17) Minimum operation temperature	Artic circle	°C
18) Maximum operation temperature	South America	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	45 dB at mast 36 dB at 20 m	DB
20) Lifetime	20-25	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system		
24) Upwind or downwind	Downwind	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	100
4	450
5	1 000
6	1 500
7	2 050
8	3 000
9	4 000
10	5 000
11	6 000
12	6 200
13	6 250
14	6 150

### Power curve:



# Proven Energy Products Ltd

## HAWT – From 0,6 kW to 15 kW

Contact name: David Watson

Address: Wardhead Park, Stewarton, Ayrshire, KA3 5 LH, Scotland

Telephone: +44 (0) 1560 485 570

Country : United Kingdom

## Proven WT 15 000/ 15 kW

### Proven WT 15 000 references

Site	Use	Country

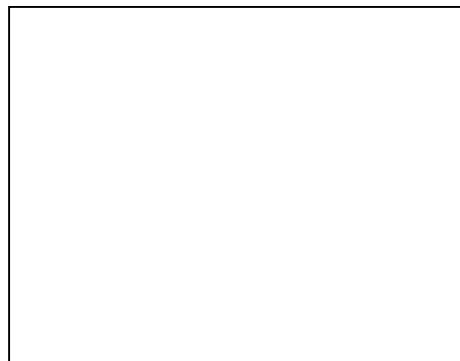
### Technical information

POWER			Unit
1) Rated power	15	KW	
2) Rated wind speed	12	m/s	
3) Cut-in wind speed	2,5	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	234	Km/h	
DIMENSIONS			
6) Rotor weight	1 100	Kg	
7) Rotor diameter	9	m	
8) Rotor height (for VAWT only)		m	
9) Swept area	63,62	m <sup>2</sup>	
10) Height of the mast	15 /20	m	
OTHER INFORMATION			
11) Maximum rpm		At rated wind speed	
12) Gear box type			
13) Brake system			
14) Number of blades		3	
15) Blades material		Glass Epoxy	
16) Output voltage	48 DC or 230 AC or 240 AC	V	
17) Minimum operation temperature	Arctic circle	°C	
18) Maximum operation temperature	South America	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	65 dB at mast 48 dB at 20 m	DB	
20) Lifetime	20-25	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system			
24) Upwind or downwind		Downwind	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	300
4	1 200
5	2 200
6	4 000
7	5 500
8	7 500
9	10 000
10	12 500
11	15 000
12	16 000
13	16 000
14	16 500

### Power curve:



# Renewable Devices Swift Turbines

## HAWT – 1,5 kW

Contact name:

Address: Bush Estate, Edinburgh, EH26 0PH

Telephone: +44 (0) 131 535 33 01

Country : United Kingdom

### Swift Rooftop/ 1,5 kW



#### Swift Rooftop 1,5 kW references

Site	Use	Country
Fife School / Collidean	Primary school (rooftop)	England

#### Technical information

POWER			Unit
1) Rated power	1,5	KW	
2) Rated wind speed	12	m/s	
3) Cut-in wind speed	4	m/s	
4) Cut-out wind speed	17	m/s	
5) Maximum wind speed the turbine can withstand	223	Km/h	
DIMENSIONS			
6) Rotor weight	15	Kg	
7) Rotor diameter	2	m	
8) Rotor height (for VAWT only)		m	
9) Swept area	3,14	m <sup>2</sup>	
10) Height of the mast	5	m	
OTHER INFORMATION			
11) Maximum rpm		At rated wind speed	
12) Gear box type			
13) Brake system			
14) Number of blades	5		
15) Blades material	Moulded carbon fibre		
16) Output voltage	60 DC	V	
17) Minimum operation temperature	DK	°C	
18) Maximum operation temperature	DK	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	DK	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	No		
23) Yaw control system	Wind vane		
24) Upwind or downwind	Upwind		

#### Calculated power curve

Wind speed (m/s)	Power (W)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

#### Power curve:



# Ropatec S.p.a.

VAWT from 0,75 kW to 6 kW.

Contact name: Hannes Riegler  
 Address: Via Siemens 19  
 Telephone: +39 0471 568 180  
 Country : Italy

WRE.007 / 0,75 kW



## Ropatec WRE.007 references

Site	Use	Country
Near Bristol	Battery charging for a LNG-station	England
	Demonstration unit on a rooftop	Korea
Ihoshy	Energy supply for a radio station	Madagascar
Hammerfest	Battery charging	Norway

## Technical information

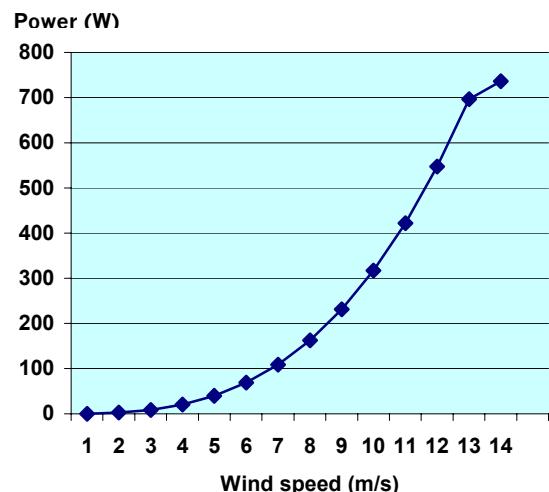
	Unit	
1) Rated power	0,75	kW
2) Rated wind speed	14	m/s
3) Cut-in wind speed	2	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	> 150	Km/h
DIMENSIONS		
6) Rotor weight	150	kg
7) Rotor diameter	1,5	m
8) Rotor height (for VAWT only)	1,5	m
9) Swept area	2,25	m <sup>2</sup>
10) Height of the mast	Not relevant	m
OTHER INFORMATION		
11) Maximum rpm	350	At rated wind speed
12) Gear box type	No gear box – direct driven	
13) Brake system	None	
14) Number of blades	2	
15) Blades material	Aluminium	
16) Output voltage	200	V
17) Minimum operation temperature	- 30	°C
18) Maximum operation temperature	+ 50	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Not audible	DB
20) Lifetime	15/20	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	No	
23) Yaw control system	Independent of wind direction	
24) Upwind or downwind	Upwind turbine	

## Calculated power curve

Wind speed (m/s)	Power* (W)
1	0,32
2	2,54
3	8,56
4	20,28
5	39,62
6	68,46
7	108,71
8	162,28
9	231,05
10	316,94
11	421,85
12	547,68
13	696,33
14	736,27
15	

\*power on axis, sea level, temp. 15°C

## Power curve:



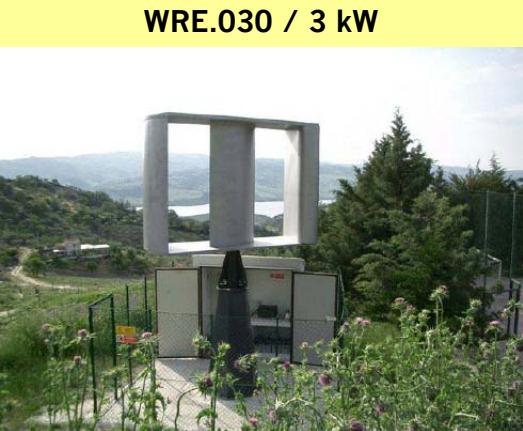
# Ropatec S.p.a.

VAWT from 0,75 kW to 6 kW.

Contact name: Hannes Riegler  
 Address: Via Siemens 19  
 Telephone: +39 0471 568 180  
 Country : Italy

## Ropatec WRE.30 references

Site	Use	Country
Monte Cimone	Research station	Italy
Foggia	Support for electrical pumps	Italy
Sennes	Refuge	Italy
Marchetti	Refuge	Italy



## Technical information

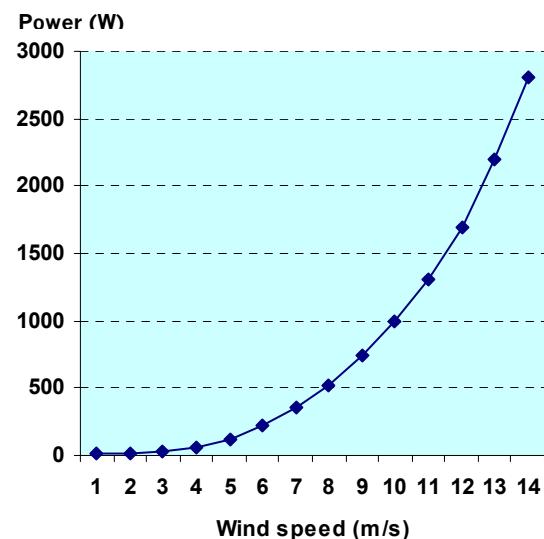
POWER		Unit	
1) Rated power	3	kW	
2) Rated wind speed	14	m/s	
3) Cut-in wind speed	2	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	> 150	Km/h	
DIMENSIONS			
6) Rotor weight	~430	kg	
7) Rotor diameter	3,3	m	
8) Rotor height (for VAWT only)	2,2	m	
9) Swept area	7,26	m <sup>2</sup>	
10) Height of the mast	Not relevant	m	
OTHER INFORMATION			
11) Maximum rpm	100 to 120	At rated wind speed	
12) Gear box type	No gear box – direct driven		
13) Brake system	Not required		
14) Number of blades	2		
15) Blades material	Aluminium		
16) Output voltage	0 - 220	V	
17) Minimum operation temperature	- 30	°C	
18) Maximum operation temperature	+ 50	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Not audible	DB	
20) Lifetime	15/20	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	No		
23) Yaw control system	Independent of wind direction		
24) Upwind or downwind	Upwind turbine		

## Calculated power curve

Wind speed (m/s)	Power* (kW)
1	0,01
2	0,02
3	0,03
4	0,06
5	0,12
6	0,22
7	0,35
8	0,52
9	0,74
10	1
11	1,3
12	1,7
13	2,2
14	2,8
15	

\* electrical output, sea level, temp. 15°C

## Power curve:



# Ropatec S.p.a.

VAWT from 0,75 kW to 6 kW.

Contact name: Hannes Riegler  
 Address: Via Siemens 19  
 Telephone: +39 0471 568 180  
 Country : Italy

## Ropatec WRE.060 references

Site	Use	Country
Valley of Aoste	Water heating system	Italy
Hallau	On-grid system	Switzerland
Townsville	Demonstration unit	Australia

WRE.060 / 6 kW



## Technical information

POWER		Unit	
1) Rated power	6	kW	
2) Rated wind speed	14	m/s	
3) Cut-in wind speed	2	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	> 150	Km/h	
DIMENSIONS			
6) Rotor weight	750	kg	
7) Rotor diameter	3,3	m	
8) Rotor height (for VAWT only)	4,4	m	
9) Swept area	14,52	m <sup>2</sup>	
10) Height of the mast	Not relevant	m	
OTHER INFORMATION			
11) Maximum rpm	110	At rated wind speed	
12) Gear box type	No gear box – direct driven		
13) Brake system	None		
14) Number of blades	2		
15) Blades material	Aluminium		
16) Output voltage	220	V	
17) Minimum operation temperature	- 30	°C	
18) Maximum operation temperature	+ 50	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Not audible	DB	
20) Lifetime	15/20	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	No		
23) Yaw control system	Independent of wind direction		
24) Upwind or downwind	Upwind turbine		

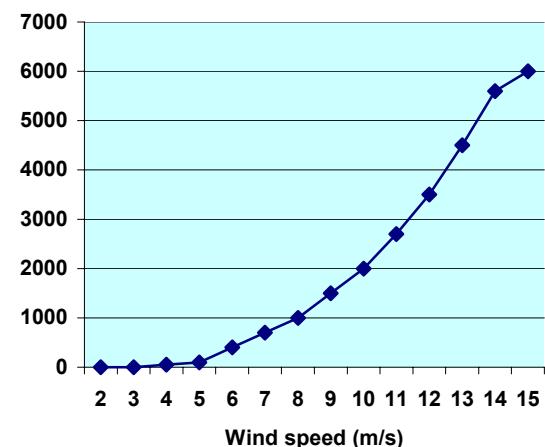
## Calculated power curve

Wind speed (m/s)	Power*( kW)
1	0
2	0
3	0.05
4	0.10
5	0.25
6	0.40
7	0.70
8	1
9	1.5
10	2
11	2.7
12	3.5
13	4.5
14	5.6
15	6

\* electrical output, sea level, temp. 15°C

## Power curve:

Power (W)



# Rugged renewables

## VAWT – 0,4 kW

Contact name: Ken England

Address: Gear House, unit 3, Saltmeadows road,  
Gateshead, NE8 3 AH

Telephone: +44 (0) 191 478 51 11

Country : **England**

**0,4 kW**



### EMAT references

Site	Use	Country

### Technical information

POWER		Unit
1) Rated power	0,4	kW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	~4,5	m/s
4) Cut-out wind speed	DK	m/s
5) Maximum wind speed the turbine can withstand	170	Km/h
DIMENSIONS		
6) Rotor weight	50	kg
7) Rotor diameter	0,8	m
8) Rotor height (for VAWT only)	2,5	m
9) Swept area	n/a	m <sup>2</sup>
10) Height of the mast		m
OTHER INFORMATION		
11) Maximum rpm		At rated wind speed
12) Gear box type		
13) Brake system		
14) Number of blades		2
15) Blades material	Aluminium	
16) Output voltage		V
17) Minimum operation temperature	- 40	°C
18) Maximum operation temperature	+ 100	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Silent	DB
20) Lifetime	20 to 30	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	No	
23) Yaw control system	n/a	
24) Upwind or downwind	n/a	

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	
2	
2,5	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

### Power curve



# Surface Power Technologies

## HAWT – 0,46 kW

Contact name: John Quinn  
 Address: Castlebar, Co.Mayo  
 Telephone: +353 (0) 8795 45117  
 Country: Ireland

### SP 460 – 0,46 kW references

Site	Use	Country
Dorset	Home Electricity	England
Cork	Home Electricity	Ireland
Orkney Island	Home Electricity	Scotland
Donegal	Home Electricity	Ireland

SP 460W / 0,46 kW



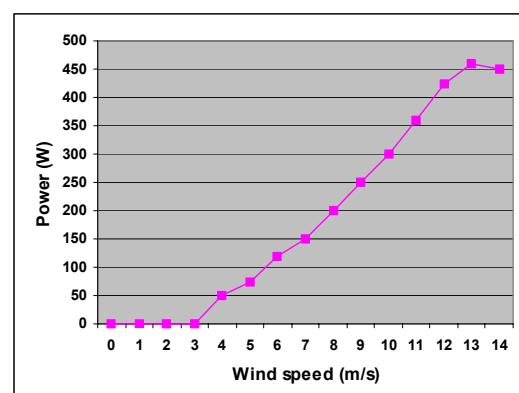
### Technical information

POWER			Unit
1) Rated power	0,46	kW	
2) Rated wind speed	12,5	m/s	
3) Cut-in wind speed	3	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	216	km/h	
DIMENSIONS			
6) Nacelle and rotor weight	17	kg	
7) Rotor diameter	1,4	m	
8) Rotor height (for VAWT only)	-	m	
9) Swept area	1,96	m <sup>2</sup>	
10) Height of the mast	7+	m	
OTHER INFORMATION			
11) Maximum rpm	DK	At rated wind speed	
12) Gear box type	None		
13) Brake system	Electromagnetic		
14) Number of blades	3		
15) Blades material	Composite fibre glass		
16) Output voltage	12	V	
17) Minimum operation temperature	DK	°C	
18) Maximum operation temperature	DK	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Silent	DB	
20) Lifetime	30	Years	
21) Is the machine self-starting	Yes		
22) Use of an asynchronous generator	No		
23) Yaw control system	Wind vane		
24) Upwind or downwind	Upwind		

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	0
4	50
5	75
6	120
7	150
8	200
9	250
10	300
11	360
12	425
13	460
14	450

### Power curve:



# Sviab

## HAWT of 0,75 kW

Contact name: Lars Wikberg  
 Address: Vettershaga, 76010 Bergshamra  
 Telephone: +46 176 26 42 24  
 Country : Sweden

## Sviab VK 240 / 0,75 kW



### Sviab VK 240 references

Site	Use	Country
Orraids Ltd	Radio communication	Canada
Phuket	Test station	Thailand
National Swedish Building Research	Test station	Antarctic
ASEA/ABB	Test station	New Zealand

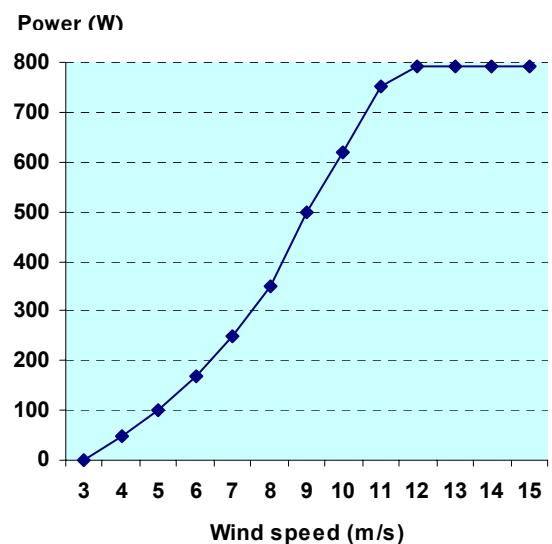
### Technical information

POWER	Unit	
1) Rated power	0,75	kW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	2,5	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	216	Km/h
DIMENSIONS		
6) Rotor weight	18	kg
7) Rotor diameter	2,4	m
8) Rotor height (for VAWT only)		m
9) Swept area	4,91	m <sup>2</sup>
10) Height of the mast	7 / 11	m
OTHER INFORMATION		
11) Maximum rpm	270-1000	At rated wind speed
12) Gear box type	Answer not provided	
13) Brake system	Answer not provided	
14) Number of blades	3	
15) Blades material	Polyuréthane	
16) Output voltage	12 - 24	V
17) Minimum operation temperature	- 40	°C
18) Maximum operation temperature	+ 50	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Answer not provided	DB
20) Lifetime	Answer not provided	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	No	
23) Yaw control system	Answer not provided	
24) Upwind or downwind	Answer not provided	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	0
4	50
5	100
6	170
7	250
8	350
9	500
10	620
11	750
12	790
13	790
14	790
15	790

### Power curve:



Contact name: Eize de Vries  
 Address: Lange Kleiweg 80, 2288 GK Rijswijk  
 Telephone: +31- 70 3401516  
 Country : Netherlands

#### No references

Site	Use	Country



#### Technical information

POWER			Unit
1) Rated power	5		kW
2) Rated wind speed	10,5		m/s
3) Cut-in wind speed	2,75		m/s
4) Cut-out wind speed	>10,5		m/s
5) Maximum wind speed the turbine can withstand	Not available		Km/h
DIMENSIONS			
6) Rotor weight	175		kg
7) Rotor diameter	5		m
8) Rotor height (for VAWT only)	...		m
9) Swept area	19,6		m <sup>2</sup>
10) Height of the mast	6 – 18		m
OTHER INFORMATION			
11) Maximum rpm	Not available	At rated wind speed	
12) Gear box type		No gear box	
13) Brake system		Not available	
14) Number of blades		3	
15) Blades material	Glass fibre reinforced epoxy composite		
16) Output voltage	400		V
17) Minimum operation temperature	- 20		°C
18) Maximum operation temperature	+ 50		°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Not available	DB	
20) Lifetime	20		Years
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		Yes	
23) Yaw control system		Wind vane	
24) Upwind or downwind		Upwind	

#### Calculated power curve n.a.

Wind speed (m/s)	Power* (W)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

#### Power curve



# Traverse Industries

TI/2.4/0.9 (0.9Kw/h)

## HAWT from 0,9 kW to 50 kW.

Contact name: Adrien Orieux  
 Address: 27 bis imp. Pichon, 83 140 Six Fours  
 Telephone: +33 4 94 10 10 29  
 Country : France

### Traverse 0,9 kW references

Site	Use	Country
Corsica	Radio station	France
Guadeloupe	Dwelling	Overseas Departments
South of France	Dwelling	France
	Dwelling	Morocco



### Technical information

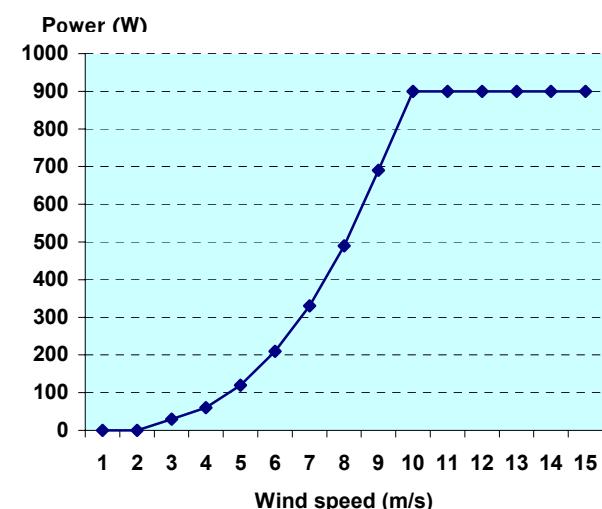
POWER			Unit
1) Rated power	0.9	kW	
2) Rated wind speed	10	m/s	
3) Cut-in wind speed	2.3	m/s	
4) Cut-out wind speed	60	m/s	
5) Maximum wind speed the turbine can withstand	216	Km/h	
DIMENSIONS			
6) Rotor weight (+ generator)	50	kg	
7) Rotor diameter	2.4	m	
8) Rotor height (for VAWT only)	0.2	m	
9) Swept area	4.52	m <sup>2</sup>	
10) Height of the mast	12	m	
OTHER INFORMATION			
11) Maximum rpm	750	At rated wind speed	
12) Gear box type		None	
13) Brake system		Electronic	
14) Number of blades		2	
15) Blades material	Carbon composite		
16) Output voltage	55	V	
17) Minimum operation temperature	-20	°C	
18) Maximum operation temperature	80	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	<40	DB	
20) Lifetime	25	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		Yes	
23) Yaw control system	“Variable stall” commanded centrifugal system / Rudder		
24) Upwind or downwind	Upwind		

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0
3	0,03
4	0,60
5	0,12
6	0,21
7	0,33
8	0,49
9	0,69
10	0,90
11	0,90
12	0,90
13	0,90
14	0,90
15	0,90

Altitude 300 m, Tower height = 10 m  
 Shear coeff = 0,11 ; Weibull K = 2  
 Turbulence factor = 10 %

### Power curve:



# Traverse Industries

## HAWT from 0,9 kW to 50 kW.

Contact name: Adrien Orieux  
 Address: 27 bis imp. Pichon, 83 140 Six Fours  
 Telephone: +33 4 94 10 10 29  
 Country : France

TI/3.2/1.6 (1.6Kw/h)



### Traverse 1.6 kW references

Site	Use	Country
Ciotat	University	France
	University	India
South of France	Dwellings + pumping	France
South Pacific	Dwellings	Overseas Departments

### Technical information

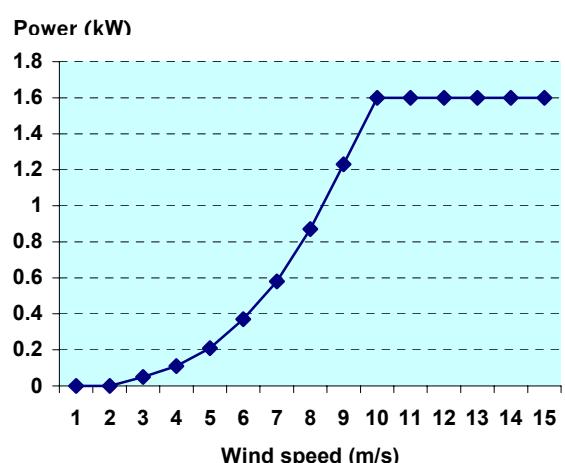
POWER		Unit
1) Rated power	1.6	kW
2) Rated wind speed	10	m/s
3) Cut-in wind speed	2.5	m/s
4) Cut-out wind speed	60	m/s
5) Maximum wind speed the turbine can withstand	216	Km/h
DIMENSIONS		
6) Rotor weight (+ generator)	60	kg
7) Rotor diameter	3.2	m
8) Rotor height (for VAWT only)	0.3	m
9) Swept area	8.04	m <sup>2</sup>
10) Height of the mast	12	m
OTHER INFORMATION		
11) Maximum rpm	600	At rated wind speed
12) Gear box type		No
13) Brake system		Electronic
14) Number of blades		2
15) Blades material		Carbon composit
16) Output voltage	220 to 380	V
17) Minimum operation temperature	-20	°C
18) Maximum operation temperature	80	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	<40	DB
20) Lifetime	25	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		Yes
23) Yaw control system	“Variable stall” commanded centrifugal system / Rudder	
24) Upwind or downwind	Upwind	

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0
3	0,05
4	0,11
5	0,21
6	0,37
7	0,58
8	0,87
9	1,23
10	1,60
11	1,60
12	1,60
13	1,60
14	1,60
15	1,60

Altitude 300 m ; Tower height = 10 m  
 Shear coeff = 0,11 ; Weibull K = 2  
 Turbulence factor = 10 %

### Power curve:



# Traverse Industries

## HAWT from 0.9 kW to 50 kW.

Contact name: Adrien Orieux  
 Address: 27 bis imp. Pichon, 83 140 Six Fours  
 Telephone: +33 4 94 10 10 29  
 Country : France

TI/3.6/3 (3Kw/h)



### Traverse 3 kW references

Site	Use	Country
North	Grid connection	France
	Direct heating	Turkey
North	Grid connection	France
North	Grid connection	France

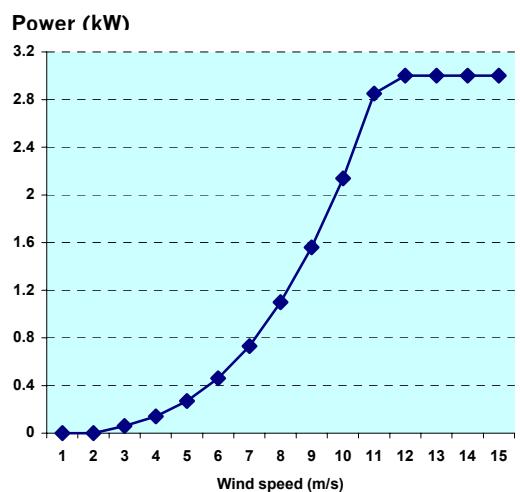
### Technical information

POWER		Unit
1) Rated power	3	kW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	2.8	m/s
4) Cut-out wind speed	60	m/s
5) Maximum wind speed the turbine can withstand	216	Km/h
DIMENSIONS		
6) Rotor weight (+ generator)	60	kg
7) Rotor diameter	3.6	m
8) Rotor height (for VAWT only)	0.6	m
9) Swept area	10.18	m <sup>2</sup>
10) Height of the mast	12	m
OTHER INFORMATION		
11) Maximum rpm	550	At rated wind speed
12) Gear box type		No
13) Brake system		Electronic
14) Number of blades		2
15) Blades material		Carbon composit
16) Output voltage	220 to 380	V
17) Minimum operation temperature	-20	°C
18) Maximum operation temperature	80	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	<40	DB
20) Lifetime	25	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		Yes
23) Yaw control system	“Variable stall” commanded centrifugal system / Rudder	
24) Upwind or downwind	Upwind	

### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0
3	0.06
4	0.14
5	0.27
6	0.46
7	0.73
8	1.10
9	1.56
10	2.14
11	2.85
12	3.00
13	3.00
14	3.00
15	3.00
Altitude = 300 m ; Tower height = 10 m	
Shear coeff = 0,11 ; Weibull K = 2	
Turbulence factor = 10 %	

### Power curve:



# Traverse Industries

## HAWT from 0,9 kW to 50 kW.

Contact name: Adrien Orieux  
 Address: 27 bis imp. Pichon, 83 140 Six Fours  
 Telephone: +33 4 94 10 10 29  
 Country : France

TI/6/2.1 (2.1Kw/h)



### Traverse 2.1 kW references

Site	Use	Country
Off shore	Platform Total Energie	Nigeria
Center	Habitation	France
South	Pumping + Dwelling	France
Center	Grid connexion	France

### Technical information

POWER		Unit
1) Rated power	2.1	kW
2) Rated wind speed	8	m/s
3) Cut-in wind speed	2.5	m/s
4) Cut-out wind speed	60	m/s
5) Maximum wind speed the turbine can withstand	216	Km/h
DIMENSIONS		
6) Rotor weight (+ generator)	60	kg
7) Rotor diameter	6	m
8) Rotor height (for VAWT only)	0.9	m
9) Swept area	28.27	m <sup>2</sup>
10) Height of the mast	12	m
OTHER INFORMATION		
11) Maximum rpm	440	At rated wind speed
12) Gear box type		No
13) Brake system		Electronic
14) Number of blades		2
15) Blades material		Carbon composite
16) Output voltage	220 to 380	V
17) Minimum operation temperature	-20	°C
18) Maximum operation temperature	80	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	<40	DB
20) Lifetime	25	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		Yes
23) Yaw control system	“Variable stall” commanded centrifugal system / Rudder	
24) Upwind or downwind	Upwind	

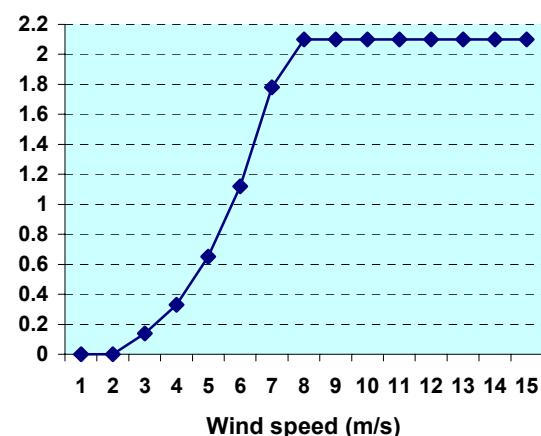
### Calculated power curve

Wind speed (m/s)	Power (kW)
1	0
2	0
3	0,14
4	0,33
5	0,65
6	1,12
7	1,78
8	2,10
9	2,10
10	2,10
11	2,10
12	2,10
13	2,10
14	2,10
15	2,10

Altitude = 300 m ; Tower height = 10 m  
 Shear coeff = 0,11 ; Weibull K = 2  
 Turbulence factor = 10 %

### Power curve:

#### Power (kW)



# Traverse Industries

## HAWT from 0,9 kW to 50 kW.

Contact name: Adrien Orieux  
 Address: 27 bis imp. Pichon, 83 140 Six Fours  
 Telephone: +33 4 94 10 10 29  
 Country : France

TI/6/5.5 ( 5.5Kw/h )



### Traverse 5.5 kW references

Site	Use	Country
Aude	EDF-GDF	France
Pacific	Dwelling	Overseas Departments
	CETMEF/ Ligth House	France
South/Addrar	Pumping	Algérie

### Technical information

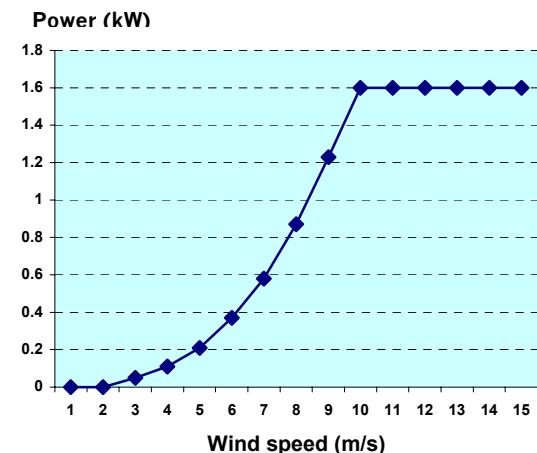
POWER			Unit
1) Rated power	5.5	kW	
2) Rated wind speed	10	m/s	
3) Cut-in wind speed	3	m/s	
4) Cut-out wind speed	60	m/s	
5) Maximum wind speed the turbine can withstand	216	Km/h	
DIMENSIONS			
6) Rotor weight (+ generator)	60	kg	
7) Rotor diameter	6	m	
8) Rotor height (for VAWT only)	0.9	m	
9) Swept area	28.27	m <sup>2</sup>	
10) Height of the mast	12	m	
OTHER INFORMATION			
11) Maximum rpm	240	At rated wind speed	
12) Gear box type		No	
13) Brake system		Electronic	
14) Number of blades		2	
15) Blades material		Carbon composite	
16) Output voltage	220 to 380	V	
17) Minimum operation temperature	-30	°C	
18) Maximum operation temperature	80	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	<40	DB	
20) Lifetime	25	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		Yes	
23) Yaw control system	“Variable stall” commanded centrifugal system / Rudder		
24) Upwind or downwind	Upwind		

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	0.16
4	0.38
5	0.74
6	1.29
7	2.04
8	3.05
9	4.34
10	5.50
11	5.50
12	5.50
13	5.50
14	5.50
15	5.50

Altitude = 300 m ; Tower height = 10 m ; Shear coeff = 0,11 ; Weibull K = 2 ; Turbulence factor = 10 %.

### Power curve:



# Tulipower

## HAWT 2,5 kW

Contact name: Hans Duivenvoorden  
 Address: Van der Palmkade 44, 1051 RE Amsterdam  
 Telephone: +31 – 6 19618369  
 Country : Netherlands

### Tulipower references

Site	Use	Country
Boxtel	Environmental Information Centre	Netherlands
Elst	Installer company, demonstration	Netherlands
Zevenbergen	Turbine distributor, demonstration	Netherlands

### Tulipower / 2,5 kW



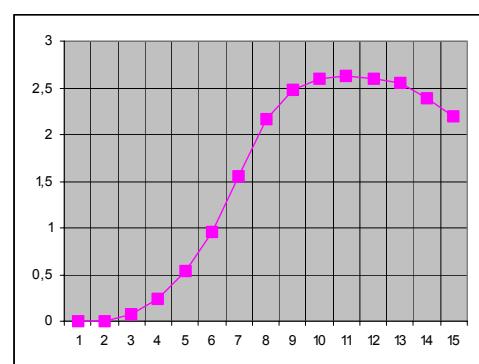
### Technical information

POWER			Unit
1) Rated power	2,5		KW
2) Rated wind speed	10		m/s
3) Cut-in wind speed	3		m/s
4) Cut-out wind speed	18		m/s
5) Maximum wind speed the turbine can withstand	42,5		m/s
DIMENSIONS			
6) Total weight	200		Kg
7) Rotor diameter	5		M
8) Rotor height (for VAWT only)	...		M
9) Swept area	19,6		m <sup>2</sup>
10) Height of the mast	12,5		M
OTHER INFORMATION			
11) Maximum rpm	140	At rated wind speed	
12) Gear box type		No gear box	
13) Brake system		spring powered electro magnetic brake	
14) Number of blades		3	
15) Blades material		Composite fibre glass	
16) Output voltage	230		V
17) Minimum operation temperature	- 20		°C
18) Maximum operation temperature	+ 40		°C
19) Acoustic levels at a distance of 20 m ? (wind = 5 m/s)	< 35		DB
20) Lifetime	15		Years
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		Yes	
23) Yaw control system		Independent of wind direction	
24) Upwind or downwind		Upwind	

### Calculated power curve

Wind speed (m/s)	Power* (W)
1	0
2	0
3	68
4	243
5	530
6	958
7	1553
8	2159
9	2474
10	2595
11	2625
12	2598
13	2552
14	2382
15	2192

### Power curve



# Turby B.V.

## VAWT 2,5 kW

Contact name: Dick Sidler  
 Address: Heuvelenweg 18, 7241 HZ Lochem  
 Telephone: +31 - 6-55822169  
 Country : Netherlands

### Turby 2,5 kW references

Site	Use	Country
Amsterdam	Proof public building (former school)	Netherlands
Tilburg	Roof flat building	Netherlands
Den Haag	Roof town hall	Netherlands
Delft	Technical University	Netherlands

## Turby 2,5 kW



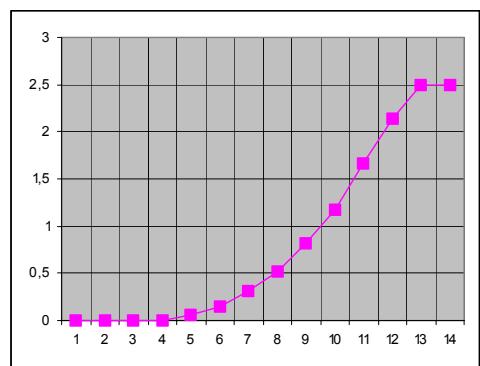
### Technical information

POWER			Unit
1) Rated power	2,5	kW	
2) Rated wind speed	14	m/s	
3) Cut-in wind speed	4	m/s	
4) Cut-out wind speed	14	m/s	
5) Maximum wind speed the turbine can withstand	55	m/s	
DIMENSIONS			
6) Rotor weight	135	kg	
7) Rotor diameter	1,99	m	
8) Rotor height (for VAWT only)	2,88	m	
9) Swept area	5,3	m <sup>2</sup>	
10) Height of the mast	6 – 7,5	m	
OTHER INFORMATION			
11) Maximum rpm	400	At rated wind speed	
12) Gear box type		No gears	
13) Brake system		Electrical brake system	
14) Number of blades		3	
15) Blades material		Carbon epoxy composite	
16) Output voltage	230	V	
17) Minimum operation temperature	- 20	°C	
18) Maximum operation temperature	+ 40	°C	
19) Acoustic levels at a distance of 20 m ? wind = 10 m/s)	45	DB	
20) Lifetime	20	Years	
21) Is the machine self-starting		No	
22) Use of an asynchronous generator		No	
23) Yaw control system		Independent	
24) Upwind or downwind		Both	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	0
4	6
5	56
6	155
7	310
8	527
9	812
10	1171
11	1659
12	2136
13	2500
14	2500
15	..

### Power curve



# Venturi Wind b.v.(i.o.)

VAWT from 0,11 kW to 0,50 kW

Contact name: D.P. Elzinga

Address: Stationsweg 18-7429 AD Deventer-Colmschate

Telephone: +31 0570-510246

Country : Netherlands

## Venturi 110-500 references

Site	Use	Country
Waalwijk	Test battery charging	Netherlands
Beek & Donk	Test battery charging	Netherlands
Deventer	Test battery charging + grid con.	Netherlands

## Venturi 110-500



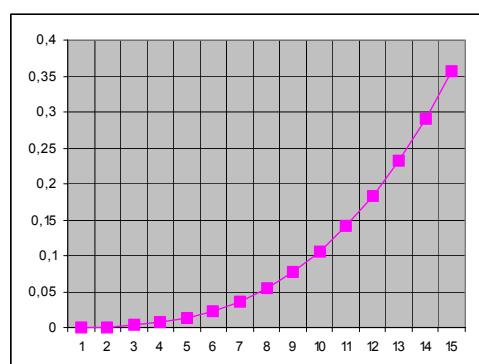
## Technical information

POWER		Unit	
1) Rated power	0,5	kW	
2) Rated wind speed	17	m/s	
3) Cut-in wind speed	2	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	>145	km/h	
DIMENSIONS			
6) Rotor weight	30	Kg	
7) Rotor diameter	1,1	m	
8) Rotor height (for VAWT only)	1,3	m	
9) Swept area	1	m <sup>2</sup>	
10) Height of the mast	11	m	
OTHER INFORMATION			
11) Maximum rpm	803	At rated wind speed	
12) Gear box type		None	
13) Brake system		Electrical	
14) Number of blades		6	
15) Blades material	Flat blade polyester		
16) Output voltage	100	V	
17) Minimum operation temperature	-25	°C	
18) Maximum operation temperature	50	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Not audible	DB	
20) Lifetime	15	Years	
21) Is the machine self-starting		Yes	
22) Use of an asynchronous generator		No	
23) Yaw control system		Vane	
24) Upwind or downwind		Upwind	

## Calculated power curve

Wind speed (m/s)	Power* (W)
1	0
2	0,7
3	3
4	7
5	13
6	23
7	36
8	54
9	77
10	106
11	141
12	183
13	232
14	290
15	357

## Power curve



# VR & Tech

**VAWT from 2,5 kW to 100 kW.**

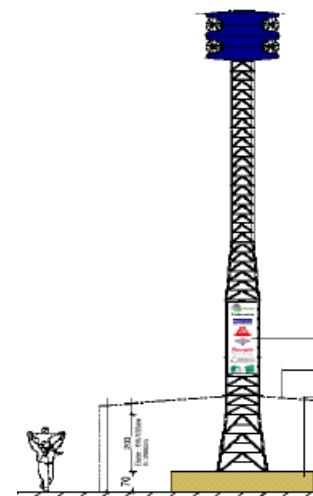
Contact name: Alain Van Ranst

Address: Rue Trou du Sart 5 C-D 5 380 Fernelmont

Telephone: +32 (0) 81 22 42 14

Country : **Belgium**

## Telecom Tower / 2 m



### VR & Tech Telecom tower / 2 m references

Site	Use	Country
Namur	Industrial use in the field of telecom	Belgium

### Technical information

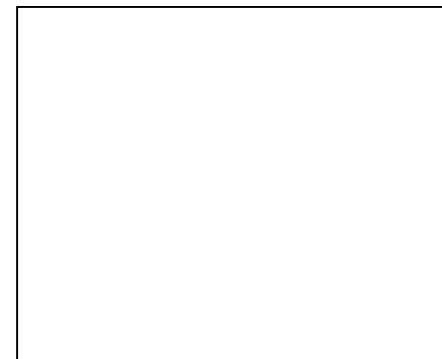
POWER	Unit	
1) Rated power	Minimum 2,5*	kW
2) Rated wind speed	8	m/s
3) Cut-in wind speed	4	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	No limit	Km/h
DIMENSIONS		
6) Rotor weight (+ generator)	Variable *	kg
7) Rotor diameter	2	m
8) Rotor height (for VAWT only)	~2 or 3	m
9) Swept area	Variable *	m <sup>2</sup>
10) Height of the mast	Not relevant	m
OTHER INFORMATION		
11) Maximum rpm	800	At rated wind speed
12) Gear box type	Direct drive	
13) Brake system	Electronic constant braking	
14) Number of blades	9	
15) Blades material	Fibre glass and Epoxy	
16) Output voltage	400	V
17) Minimum operation temperature	n.a	°C
18) Maximum operation temperature	100	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	40	DB
20) Lifetime	15	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	No	
23) Yaw control system	None	
24) Upwind or downwind	Not applicable	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Each project is different because the manufacturer stick several TARP to create a single WARP tower and integrate a mix of renewable energies (solar, CHP) in the same WARP tower.

### Power curve :



\* The rated power and the rotor weight vary accordingly with the number of stacked "TARP" modules vertically piled along the tower. 1 TARP corresponds to ~2,5 kW and a same tower can be designed with more than 10 TARPS depending on the energy needs.

# VR & Tech

## VAWT from 2,5 kW to 100 kW.

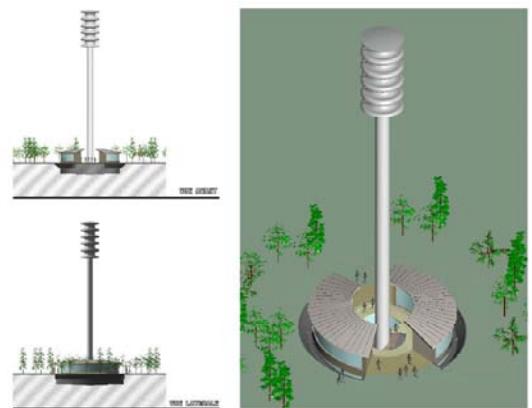
Contact name: Alain Van Ranst

Address: Rue Trou du Sart 5 C-D 5 380 Fernelmont

Telephone: +32 (0) 81 22 42 14

Country : Belgium

### House tower / 4 m



#### VR & Tech House tower/ 4 m references

Site	Use	Country
Bastogne	Training centre in renewable energies	Belgium

#### Technical information

POWER		Unit
1) Rated power	Minimum 10*	kW
2) Rated wind speed	8	m/s
3) Cut-in wind speed	4	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	No limit	Km/h
DIMENSIONS		
6) Rotor weight (+ generator)	Variable *	kg
7) Rotor diameter	4	m
8) Rotor height (for VAWT only)	~4 or 5	m
9) Swept area	Variable	m <sup>2</sup>
10) Height of the mast		m
OTHER INFORMATION		
11) Maximum rpm	800	At rated wind speed
12) Gear box type		Direct drive
13) Brake system		Electronic constant braking
14) Number of blades		9
15) Blades material		Fibre glass and Epoxy
16) Output voltage	400	V
17) Minimum operation temperature	n.a	°C
18) Maximum operation temperature	100	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	40	DB
20) Lifetime	15	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system		None
24) Upwind or downwind		Not applicable

#### Calculated power curve

Wind speed (m/s)	Power (W)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Each project is different because the manufacturer stick several TARP to create a single WARP tower and integrate a mix of renewable energies (solar, CHP) in the same WARP tower.

#### Power curve:



\* The rated power and the rotor weight vary accordingly with the number of stacked "TARP" modules vertically piled along the tower.

# VR & Tech

## VAWT from 2,5 kW to 100 kW.

Contact name: Alain Van Ranst

Address: Rue Trou du Sart 5 C-D 5 380 Fernelmont

Telephone: +32 (0) 81 22 42 14

Country : Belgium

### House tower / 6 m



#### VR & Tech House tower/6 m references

Site	Use	Country
Andenne	Food industry (Interagri)	Belgium

### Technical information

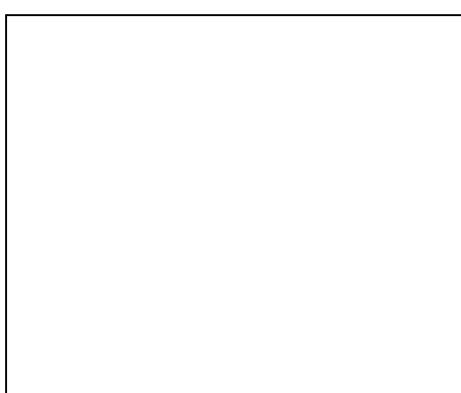
POWER		Unit
1) Rated power	Minimum 25*	kW
2) Rated wind speed	8	m/s
3) Cut-in wind speed	4	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	No limit	Km/h
DIMENSIONS		
6) Rotor weight (+ generator)	Variable*	kg
7) Rotor diameter	6	m
8) Rotor height (for VAWT only)	Minimum 6	m
9) Swept area	Variable*	m <sup>2</sup>
10) Height of the mast		m
OTHER INFORMATION		
11) Maximum rpm	800	At rated wind speed
12) Gear box type		Direct drive
13) Brake system		Electronic constant braking
14) Number of blades		9
15) Blades material		Fibre glass and epoxy
16) Output voltage	400	V
17) Minimum operation temperature	n.a	°C
18) Maximum operation temperature	100	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	40	DB
20) Lifetime	15	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system		None
24) Upwind or downwind		Not applicable

### Calculated power curve

Wind speed (m/s)	Power (W)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Each project is different because the manufacturer stick several TARP to create a single WARP tower and integrate a mix of renewable energies (solar, CHP) in the same WARP tower.

### Power curve :



\* The rated power and the rotor weight vary accordingly with the number of stacked "TARP" modules vertically piled along the tower.

# Wind Energy Solutions (WES)

## HAWT from 2 kW to 250 kW

Contact name: Marcel Kloesmeijer  
 Address: De Weel, 1736 KB Zijdewind  
 Telephone: +31 – 226 425150  
 Country : Netherlands

### WES<sup>5</sup> Tulipo references

Site	Use	Country
Elst	Installer company, demonstration	Netherlands
Zevenbergen	Turbine distributor, demonstration	Netherlands

### WES<sup>5</sup> Tulipo / 2,5 kW



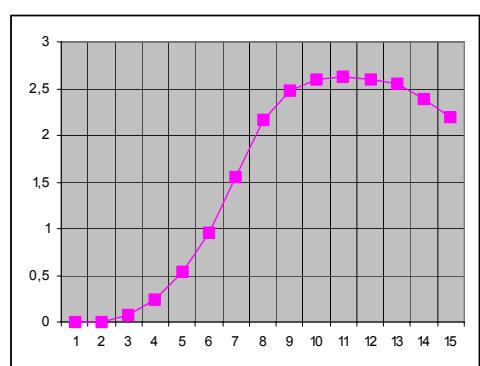
### Technical information

POWER			Unit
1) Rated power	2,5		kW
2) Rated wind speed	8,5		m/s
3) Cut-in wind speed	3		m/s
4) Cut-out wind speed	20		m/s
5) Maximum wind speed the turbine can withstand	35		m/s
DIMENSIONS			
6) Total weight	200		kg
7) Rotor diameter	5		m
8) Rotor height (for VAWT only)	---		m
9) Swept area	19,6		m <sup>2</sup>
10) Height of the mast	6 or 12		m
OTHER INFORMATION			
11) Maximum rpm	140	At rated wind speed	
12) Gear box type		No gear box	
13) Brake system		spring powered electro magnetic brake	
14) Number of blades		3	
15) Blades material		Glass reinforced epoxy	
16) Output voltage	400		V
17) Minimum operation temperature	- 20		°C
18) Maximum operation temperature	+ 40		°C
19) Acoustic levels at a distance of 20 m ? (wind = 5 m/s)	< 35		DB
20) Lifetime	20		Years
21) Is the machine self-starting		Y	
22) Use of an asynchronous generator		Y	
23) Yaw control system		Active yaw control	
24) Upwind or downwind		Upwind	

### Calculated power curve

Wind speed (m/s)	Power* (W)
1	0
2	0
3	68
4	243
5	530
6	958
7	1553
8	2159
9	2474
10	2595
11	2625
12	2598
13	2552
14	2382
15	2192

### Power curve



# Winddam

## VAWT – 2 kW

Contact name: Julie Trevithick  
 Address: 1 Riverside House, Heron Way,  
 Truro, TR1 2 XN  
 Telephone: +44 (0) 180 387 39 56  
 Country: United Kingdom

### Winddam 2 kW references

Site	Use	Country
Moss Side Industrial Estate	Testing	UK

### Technical information

POWER		
1) Rated power	2	kW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	2	m/s
4) Cut-out wind speed	None	m/s
5) Maximum wind speed the turbine can withstand	234	Km/h
DIMENSIONS		
6) Nacelle and Rotor weight	DK	Kg
7) Rotor diameter	2.56	m
8) Rotor height (for VAWT only)	2	m
9) Swept area	5.12	m <sup>2</sup>
10) Height of the mast	DK	m
OTHER INFORMATION		
11) Maximum rpm	108	At rated wind speed
12) Gear box type	None	
13) Brake system	Mechanical	
14) Number of blades	5	
15) Blades material	Resin Composite	
16) Output voltage	12/24/48/120/240	V
17) Minimum operation temperature	DK	°C
18) Maximum operation temperature	DK	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Silent	DB
20) Lifetime	25+	Years
21) Is the machine self-starting	DK	
22) Use of an asynchronous generator	No	
23) Yaw control system	N/A	
24) Upwind or downwind	N/A	

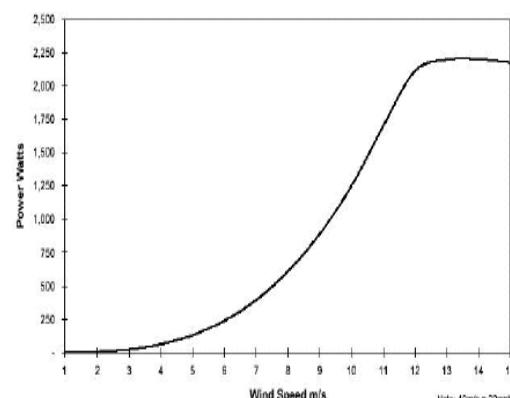
## AWT(1)2000/ 2 kW



### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	35
4	75
5	110
6	250
7	400
8	600
9	850
10	1250
11	1750
12	2100
13	2200
14	2200
15	2150

### Power curve:



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# Winddam

## VAWT – 4 kW

Contact name: Julie Trevithick  
 Address: 1 Riverside House, Heron Way,  
 Truro, TR1 2 XN  
 Telephone: +44 (0) 180 387 39 56  
 Country: United Kingdom

### Winddam 2 kW references

Site	Use	Country
DK		

## AWT(2)2x2000/ 4 kW



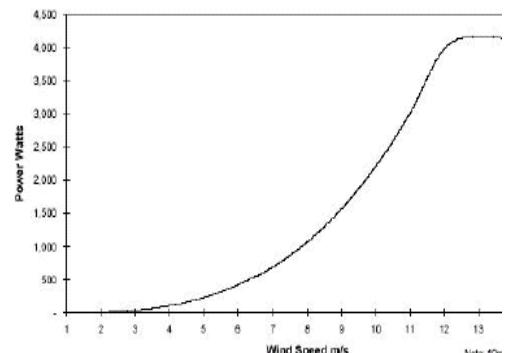
### Technical information

POWER			Unit
1) Rated power	4	kW	
2) Rated wind speed	12	m/s	
3) Cut-in wind speed	2.5	m/s	
4) Cut-out wind speed	None	m/s	
5) Maximum wind speed the turbine can withstand	234	Km/h	
DIMENSIONS			
6) Nacelle and Rotor weight	DK	Kg	
7) Rotor diameter	2.56	m	
8) Rotor height (for VAWT only)	2 x 2	m	
9) Swept area	2 x 5.12	m <sup>2</sup>	
10) Height of the mast	DK	m	
OTHER INFORMATION			
11) Maximum rpm	200	At rated wind speed	
12) Gear box type		None	
13) Brake system		Mechanical	
14) Number of blades		2 x 3	
15) Blades material	Resin Composite		
16) Output voltage	12/24/48/120/240	V	
17) Minimum operation temperature	DK	°C	
18) Maximum operation temperature	DK	°C	
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	Whisper	DB	
20) Lifetime	25+	Years	
21) Is the machine self-starting		DK	
22) Use of an asynchronous generator		No	
23) Yaw control system		N/A	
24) Upwind or downwind		N/A	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	0
2	0
3	Tiny
4	100
5	205
6	400
7	665
8	1000
9	1540
10	2205
11	3000
12	4000
13	4150
14	4110
15	4000

### Power curve:



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# Windsave

## HAWT – 1 kW

Contact name: Graham Reed  
 Address: 27 Woodside place, Glasgow G3 7QL  
 Telephone: +44 (0) 141 353 68 41  
 Country : United Kingdom

### WS 1000 1 kW references

Site	Use	Country
Burbank		England
Livingston		England
Teesside		England
Glasgow		Scotland

## WS 1000/ 1 kW



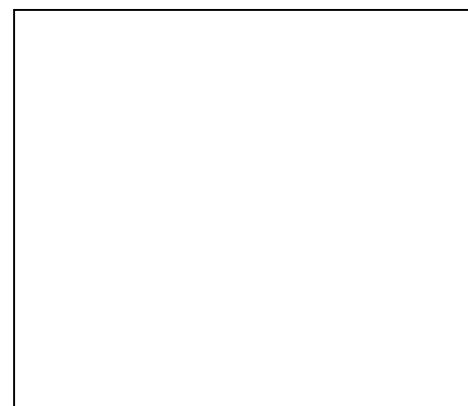
### Technical information

POWER		Unit
1) Rated power	1	KW
2) Rated wind speed	12	m/s
3) Cut-in wind speed	2,9	m/s
4) Cut-out wind speed	15	m/s
5) Maximum wind speed the turbine can withstand	216	Km/h
DIMENSIONS		
6) Rotor weight		Kg
7) Rotor diameter	1,75	m
8) Rotor height (for VAWT only)		m
9) Swept area	2,41	m <sup>2</sup>
10) Height of the mast		m
OTHER INFORMATION		
11) Maximum rpm		At rated wind speed
12) Gear box type		
13) Brake system		
14) Number of blades		3
15) Blades material	Polyamide Glass Reinforced	
16) Output voltage	240	V
17) Minimum operation temperature	Not tested	°C
18) Maximum operation temperature	Not tested	°C
19) Acoustic levels at a distance of 20 m ? at nacelle ? (wind = 5 m/s)	30 DB at 4m/s	DB
20) Lifetime	10	Years
21) Is the machine self-starting		Yes
22) Use of an asynchronous generator		No
23) Yaw control system	Wind vane	
24) Upwind or downwind	Upwind	

### Calculated power curve

Wind speed (m/s)	Power (W)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	1 000
13	
14	
15	

### Power curve:



# WindWall B.V.

VAWT from 2,9 kW to 60 kW.

Contact name: Rob Roelofs  
 Address: De Eiken 5D, 7491 HP Delden  
 Telephone: +31 – 74 2434885  
 Country : Netherlands

WW2000 / 2,9 kW



## WW2000 references

Site	Use	Country
Zwolle	Roof high school	Netherlands
Den Haag	Office building (Siemens)	Netherlands
Den Haag	Office building (government)	Netherlands
Rotterdam	Erasmus MC (University Medical Centre)	Netherlands

## Technical information

POWER	Unit	
1) Rated power	2,9	kW
2) Rated wind speed	10,5	m/s
3) Cut-in wind speed	4	m/s
4) Cut-out wind speed	20	m/s
5) Maximum wind speed the turbine can withstand	55	m/s
DIMENSIONS		
6) Rotor weight	3000	kg
7) Rotor diameter	2	m
8) Rotor height (for VAWT only)	5 (horizontal) – 15 (vertical)	m
9) Swept area	10	m <sup>2</sup>
10) Height of the mast	n.a.	m
OTHER INFORMATION		
11) Maximum rpm	500	At rated wind speed
12) Gear box type	No gears	
13) Brake system	Electrical + disc brake system	
14) Number of blades	6	
15) Blades material	Aluminium	
16) Output voltage	400	V
17) Minimum operation temperature	- 20	°C
18) Maximum operation temperature	+ 40	°C
19) Acoustic levels at nacelle ? (wind = 5 m/s)	74	DB
20) Lifetime	20	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	Yes	
23) Yaw control system	Independent	
24) Upwind or downwind	Downwind	

## Calculated power curve

Wind speed (m/s)	Power* (W)
1	0
2	0
3	0
4	1%
5	
6	
7	
8	50%
9	
10	100%
11	100%
12	100%
13	100%
14	100%
15	100%

## Power curve



# XCO2

## VAWT – 6 kW

Contact name: Richard Cochrane

Address: 1-5 Offord Street, London, N1 1DH

Telephone: +44 (0) 207 700 1000

Country : United Kingdom

## XCO2 / 6 kW



### EMAT references

Site	Use	Country
Southwark Bridge Rd, London	Pilot installation – due 12 / 2005	UK
Temple Meads Roundabout, Bristol	Pilot installation – due 1 / 2006	UK

### Technical information

POWER	Unit	
1) Rated power	6	kW
2) Rated wind speed	~ 12,5	m/s
3) Cut-in wind speed	4,5	m/s
4) Cut-out wind speed	16	m/s
5) Maximum wind speed the turbine can withstand	DK	Km/h
DIMENSIONS		
6) Nacelle and rotor weight	DK	kg
7) Rotor diameter	3,1	m
8) Rotor height (for VAWT only)	5	m
9) Swept area	15,5	m <sup>2</sup>
10) Height of the mast	5-10	m
OTHER INFORMATION		
11) Maximum rpm	DK	At rated wind speed
12) Gear box type	None	
13) Brake system	DK	
14) Number of blades	3	
15) Blades material	Carbon fibre	
16) Output voltage	48 dc or 240 ac	V
17) Minimum operation temperature	-40	°C
18) Maximum operation temperature	100	°C
19) Acoustic levels at a distance of 20 m? at nacelle ? (wind = 5 m/s)	Silent	DB
20) Lifetime	20	Years
21) Is the machine self-starting	Yes	
22) Use of an asynchronous generator	No	
23) Yaw control system	n/a	
24) Upwind or downwind	n/a	

### Calculated power curve

Not available

Wind speed (m/s)	Power (kW)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

### Power curve