Gaia-Wind

YOUR OWN WIND TURBINE

Product Presentation

September 09

Corporate History

- 1993: founded by a local engineering cooperative in Århus, DK
- 1994: first commercial turbine deployed; participates in RISØ testing program for small wind turbines
- 1996: concludes RISØ testing and receives Danish HB certification
- 2000: acquired by Mita-Teknik AS, a leading control system supplier to the global wind energy industry
- 2001: dispatches first international order outside of Denmark
- 2006: sold by M-T to a private group of wind industry professionals
- 2007: relocates administrative HQ to Glasgow, Scotland
- 2008: selected by NREL to participate in test program for SWTs
- 2009: receives approval for state funding in NY, WI, NJ; signs first US commercial client

Current Facts

- Commercial HQ: Glasgow, Scotland. Manufacturing: Randers, DK.
- 14 full-time employees (incl 5 sales; 3 engineering; 2 customer service)
- Over 200 worldwide turbine installations
- Only non-US manufacturer to have been selected by NREL for their independent testing program for SWTs
- 3 of 5 NREL tests completed: safety & function; duration; power performance
- NREL test data to be submitted to the Small Wind Certification Corporation (SWCC) for US SWT certification (expected by early 2010)

GW-133 Overview

- Horizontal-axis downwind machine
- 3-phase asynchronous induction generator (direct grid connection); 1-phase version available on request
- Twin-bladed rotor, mounted on teetering hub
- 42’ rotor diameter, 1428 SQFT swept area
- Passive stall control
- 2-stage gearbox, low constant rotor speed (61RPM)
- Advanced turbine control system
- Towers: SSV (60’ - 140’) and tubular (60’/90’)


CONTAINEX

Operational Parameters

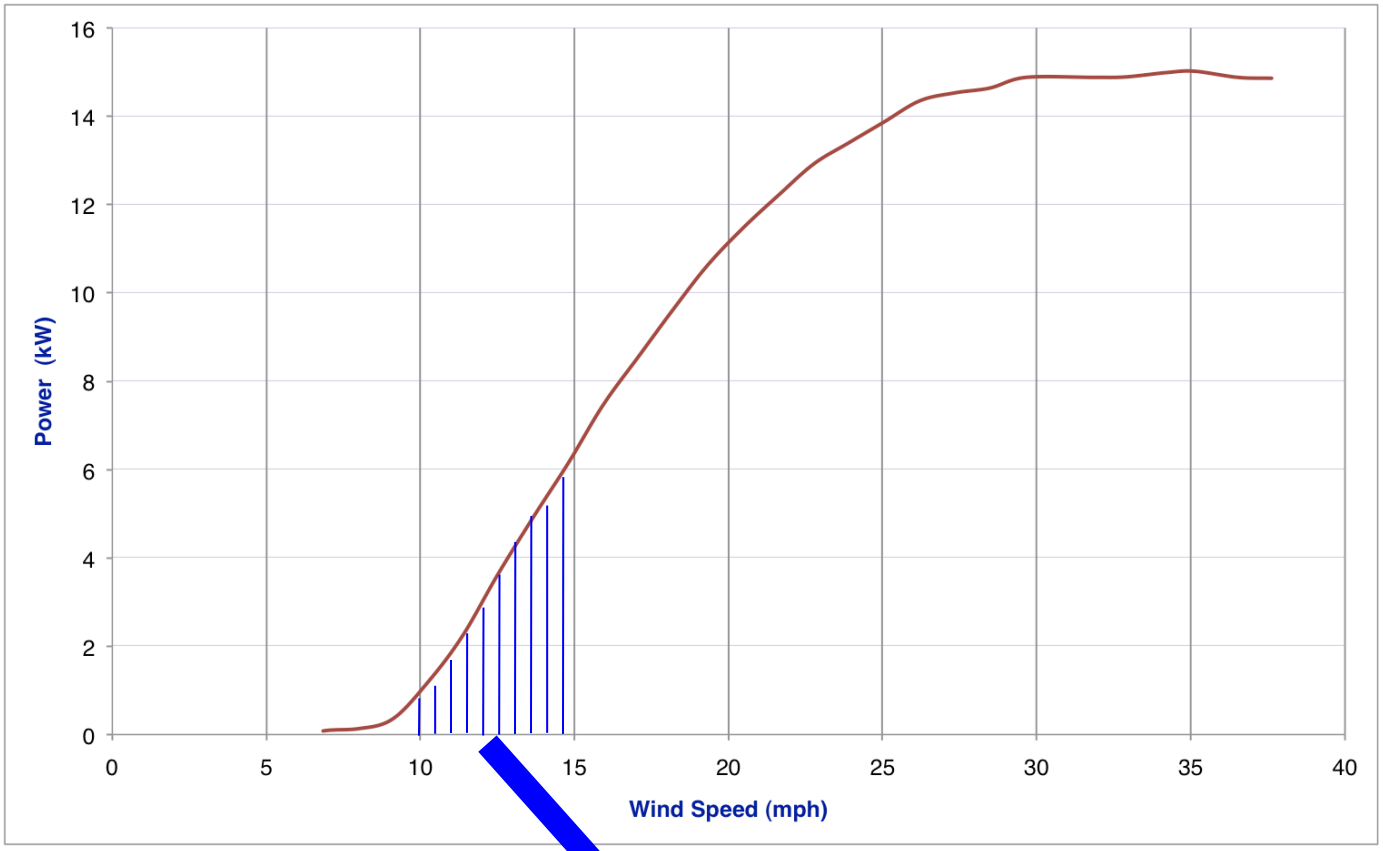
- Wind Speeds m/s *(mph)*

Starting speed	2.5 *(5.6)*
Cut-in speed	3.9 *(8.7)*
Rated output	8.9 *(19.9)*
Cut-out speed	25 *(56)*

- Estimated Annual Energy Output

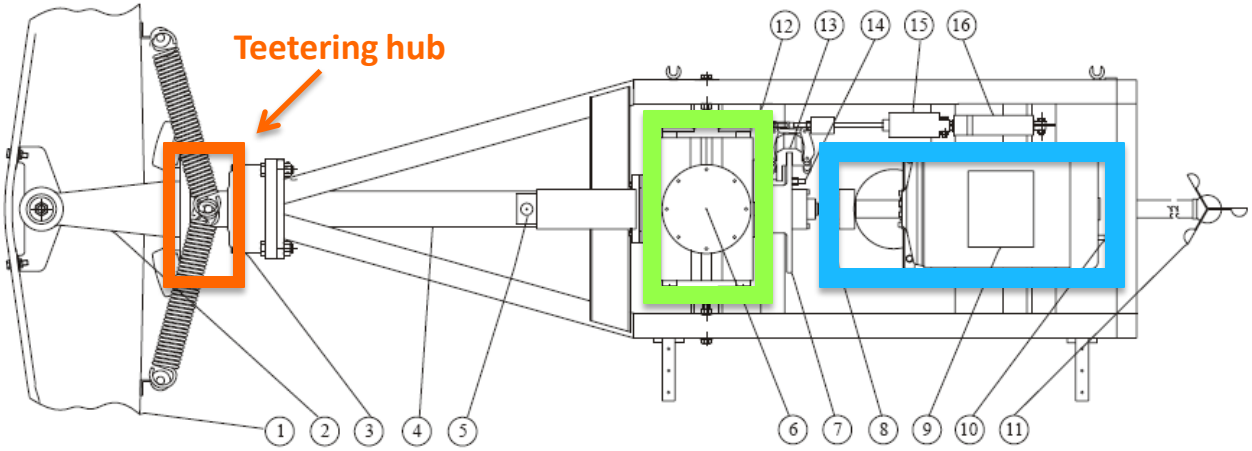
Avg annual wind speeds	Production (kWh)
4 *(9)*	17,700
5 *(11.2)*	32,000
6 *(13.4)*	46,300

Power Curve



Large rotor optimizes performance in low to moderate wind speeds!

Nacelle Assembly



1. Blades
2. Hub yoke
3. Main bearing
4. Main shaft
5. Vibration sensor
6. Gear
7. Brake disc
8. Cardan joint
9. Generator
10. Revolution sensor, generator
11. Anemometer
12. Control of pad wear
13. Brake calibre
14. Revolution sensor, rotor
15. Braking magnet
16. Spindle motor

Rotor Design

- At 13m / 42ft our rotor is one of the largest in this turbine class, creating a much larger swept area and corresponding energy output:

	Gaia-Wind 11kW	Jacobs 31-20 20kW	Proven 15kW	ARE442 10kW	Bergey Excel 10kW
Rotor diameter (m)	**13**	9.45	9	7.2	7
Rotor diameter (ft)	***42***	*31*	*30*	*24*	*23*
AEO (kWh) *	**24,000**	19,727	15,000	14,280	13,800

** in average annual wind speeds of 4.5 m/s*

- The larger rotor enables high performance in low to moderate wind speeds (4.5 – 6 m/s; IEC Class IV)

Rotor Design II

- **2-bladed** rotor design uses fewer materials than traditional 3-blade assembly
- **Teetering hub** ensures rotational stability and reduces fatigue loads
- **Passive stall** design ➔ fewer moving parts
- Centrifugally activated **tip brakes** ensure turbine stoppage in the event of normal brake system failure
- **Constant rotor speed** (61RPM nominal) leads to lower noise footprint:

Wind Speed *m/s*	**Turbine Noise** *dB*	**Total Sound Power** ***dB***
4	48.1	**81.7**
5	49.2	**82.7**
6	50.3	**83.8**

* taken at a distance of 30m from tower base

Turbine Controller

- Manufactured by Mita-Teknik
- Monitors parameters like wind speed, vibration and temperature and performs emergency shut-downs when necessary
- Protects grid against voltage and frequency fluctuations
- Multiple connectivity: Dial-up, GSM, TCP/IP
- Remote monitoring and control via optional M-T Gateway software

Target Customers

- Agricultural
- Light commercial/industrial
- Municipal
- Educational institutions
- Large residential

Image Gallery


GAIA WIND


SANTONI
Berger
Berger
Spedition

Gaia-Wind

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Thank you for your time!