For distributed energy projects

Windflow's 33 metre turbines offer wind farm developers superior land utilisation, ease of transport and installation, low environmental impact, exceptional grid integration capabilities and cost-effective installation, operation and maintenance.

Being a mid-size wind turbine it is:

- Small enough that its size is not a major planning and logistic issue
- Big enough that it produces commercial quantities of electricity

Te Rere Hau wind farm

Services offered

Windflow UK and our Dealers offer complete wind farm project management.

Services include:

- wind monitoring
- planning permissions
- line surveys
- siting
- construction
- maintenance
- operations
- general wind energy consultancy

About Windflow Technology

Windflow Technology Limited was incorporated in New Zealand in 2001 and is a publicly listed company with international shareholders (NZX:WTL).

Windflow Technology is committed to achieving and maintaining the highest standards in quality management. The company gained IEC 61400-1 (edition 3), Class 1A for the Windflow 500 turbine in September 2010. In June 2008 it achieved ISO 9001 for its design, development, production, installation and servicing activities.

Windflow UK
Website: www.windflow.co.uk

Photo: Richard Moreham

WINDFLOW

Windflow 250
Windflow 330
Windflow 500

- Full IEC Type Certification (Class 1A, Edition 3)
- Proven performance on high wind sites
- Low visual impact for ease of planning
- Quality assured manufacturing and assembly

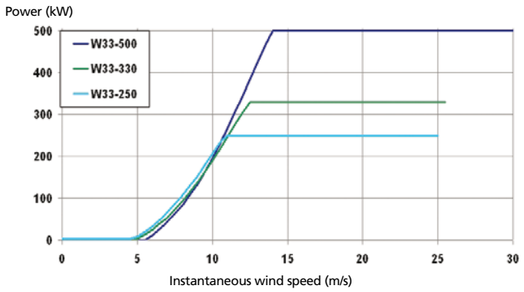
The Windflow Advantage

Why Windflow Turbines?

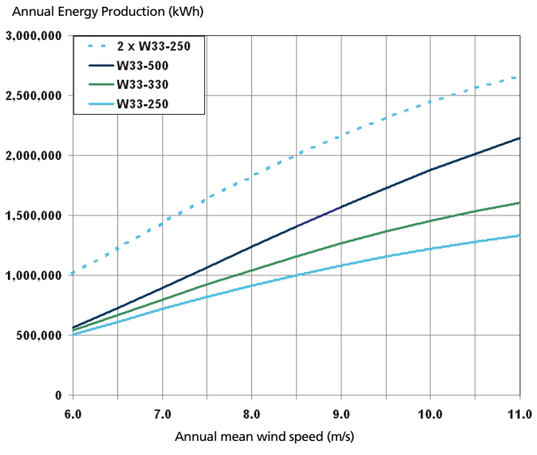
The Windflow turbine is a fully IEC certified turbine made with high quality manufacturing exclusively in New Zealand, Australia, UK and Europe. The company's flagship turbine, the Windflow 500, has a proven track record with almost 100 turbines operating on some of the toughest, windiest wind farm locations in the world. The Windflow 330 and the Windflow 250 variants of this original design offer the same outstanding performance but are optimised for medium wind sites.

With low visual and environmental impact, the Windflow turbines easily obtain planning consent, and are easy to transport and install. Comprehensive warranty options and local approved O&M providers help ensure continued operation to maximise the return on investment.

Calculated Power Curve



Annual Energy Production



Independent certification

The Windflow 500 is fully certified to the highest standard IEC 61400-1 (edition 3) Class 1A. The certifying body is Lloyd's Register in Aberdeen. The IEC certification is a third party verification of the turbine design, manufacturing quality and turbine performance, and it attests that the Windflow 500 will operate for more than 20 years in the strongest, most turbulent wind regime in the IEC classification.

It is one of very few turbines in the world within the 100-500 kW size range that is IEC certified; and the only turbine in the world that has achieved IEC type certification to Edition 3 of Class 1A.

Windflow has also implemented quality assurance procedures and is certified to ISO 9001:2008.

Low environmental and visual impact

The mid-size, light weight Windflow turbines offer advantages with low environmental and visual impact which improves the likelihood of gaining planning permission sooner. On a 30 m tower, the Windflow turbines have a tip height under the important 50 metre threshold that councils and air traffic authorities look at when considering planning applications.

The Windflow turbines fit on standard trucks which need only 3-4 m wide roads, and the fully assembled nacelle with rotor can be installed in one easy lift, even on windy days. This enables local equipment and contractors to be used and helps reduce project costs.

The 250 and 330 kW versions have a lower rotor speed relative to the 500 kW turbine's 48 rpm and are optimised for medium wind sites and feature lower sound levels.

Technological innovations

The Windflow turbine takes advantage of a number of technologies and innovations, providing a turbine that will perform even in the most challenging of conditions.

- ***Two-bladed technology***

The two-bladed rotor is mounted on a hinge, allowing it to teeter back and forth slightly as it rotates. The proven advantage of teetering is that it greatly reduces the fatigue loads ensuring the turbine can cope with the most challenging conditions.

- ***Robust torque limiting gearbox design***

The patented Torque Limiting Gearbox (TLG) is a hydraulic variable speed system which has proven to significantly reduce the otherwise damaging fatigue loads and enhance gearbox reliability. The TLG's hydraulic system effectively enables the generator speed to be constant while the rotor varies which allows the use of a synchronous generator.

- ***Synchronous generator***

Windflow turbines feature a grid-friendly synchronous generator, as is used in the vast majority of traditional power plants. They have in-built characteristics and advantages for Network operators that make grid connections easier to obtain especially in areas with a weak grid.

Turbine model	W33-250	W33-330	W33-500
Turbine rating	250 kW	330 kW	500 kW
1 *BLADE*			
Make	Wind Blades Ltd		
Material	Laminated wood/epoxy		
Air brake	Full-span pitch		
Weight	900 kg		
2 *ROTOR*			
Number of blades	2		
Rotor diameter	33.2 m		
Rotor speed	40–42rpm	40–42rpm	48–51rpm
Swept area	866 m^2		
Hub height	30 m or 50 m		
Orientation	Upwind		
Regulation	Full-span pitch		
Hub	Teetering (pitch-coupled)		
Weight (hub and blades)	4,000 kg		
3 *HYDRAULIC SYSTEM*			
3a. Power unit	7.5 kW axial piston pump		
3b. Yawing	1.3*/ 2°/sec geared motor		
3c. Pitch actuation	Linear actuator		
3d. Braking	Fail-safe calliper		
3e. Torque limiting	Radial piston pump		
4 *GEARBOX*			
Type	Hicks planetary/parallel TLG		
No of stages	4		
Overall ratio	37.5:1	37.5:1	30.9:1
Rated torque	114 kN.m		
5 *GENERATOR*			
Type	Synchronous		
Nominal power	250 kW	330 kW	500 kW
Speed	1,500 rpm		
Voltage	415 V		
Frequency	50 Hz		
6 *TOWER*			
Type	Tubular		
Height	29 m or 49 m		
CONTROLLER			
Make	Bremca Industries Ltd		
Cut in system	Auto-synch		
Logic system	PLC		
WEIGHT			
Nacelle & rotor	13,700 kg		
PERFORMANCE			
Maximum power	250 kW	330 kW	500 kW
Low wind cut-in (steady wind)	4.6 m/s	4.6 m/s	5.4 m/s
Low wind cut-in (IEC Class A turbulence)	3.9 m/s	3.9 m/s	4.7 m/s
Rated power at (steady wind)	11 m/s	12.5 m/s	13.9 m/s
Rated power at (IEC Class A turbulence)	12.6 m/s	14.8 m/s	15.5 m/s
High wind cut-out	25 m/s	26 m/s	30 m/s
CERTIFICATION:			
Type approval	Lloyd's Register		
Turbine design	IEC 61400-1 (edition 3) Class 1A		
Quality accreditation	ISO 9001: 2008		