

# WWD-3 Wind Turbine

**Reliable**  
**Effective**  
**Excellent power quality**

*WinWinD supplies three megawatt WWD-3 wind turbines based on the Multibrid® technology. The most significant benefits of WinWinD's technology are: high operating reliability, good energy efficiency and excellent power quality.*

***Reliable Wind Turbine.** An advanced planetary gear solution and slow speed synchronous generator form the heart of the Multibrid® concept, which combines the reliability of a direct drive and the compactness of a traditional high speed gear system. Low rotational speed together with optimal mechanical load management ensures low maintenance cost, high reliability and high availability.*

www.WinWinD.fi



## Principles of the WinWinD technology

The rotor hub is connected to the gearbox casing using a double-row tapered roller bearing. The bearing transfers the rotor loads directly to the load carrying support structure, keeping the whole drive train free from deformation.

The planetary gear increases the rotating speed modestly and transfers the torque to the low speed permanent magnet generator. The integrated power unit design philosophy eases assembly and results in a well-defined load distribution.

The frequency converter transfers the full generator power. As a result the machine can produce power efficiently at lower wind speeds and there is no need for slip rings as with a double-fed generator solution. This also ensures high power quality and maximum grid compatibility; WinWinD turbines fulfil the strictest grid code requirements in Europe.

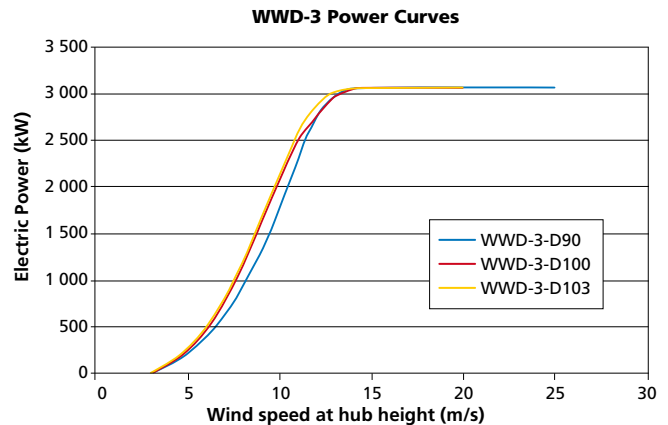
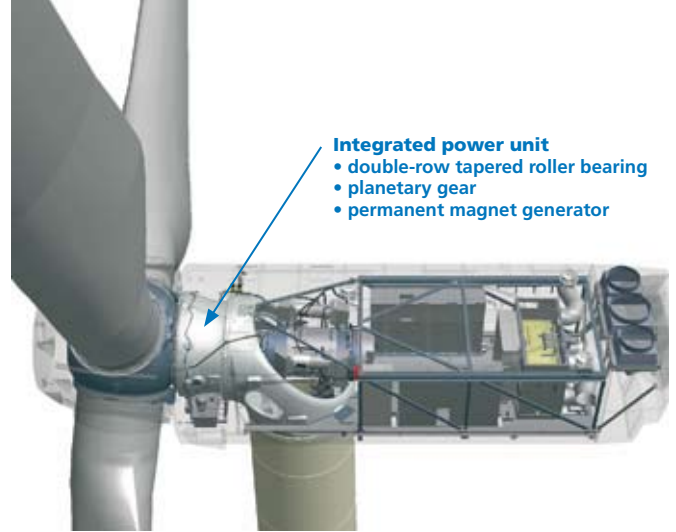
## Reliable design proven in practice

WinWinD's main motivation in developing this innovative type of wind turbine was to offer the market a clearly more reliable solution. Experience from installed turbines shows this target has been proven in practice. Close co-operation with experienced world-class component manufacturers and partners resulted in a product at the cutting edge of technology.

WinWinD wind turbines are designed to operate in the most demanding weather conditions, from freezing arctic to tropical desert conditions, with different turbine versions capable of operating in different temperature ranges and climates. All WinWinD turbines are designed for a minimum of 20 years operation.

## Product quality and certification

WWD-3 turbines are IEC type certified by GL, and are manufactured according to ISO 9001 standards.



General	
Rated power	3 000 kW
Cut-in	4 m/s
Rated wind speed	12.5 m/s
Cut-out	20–25 m/s
Wind class	IEC IIA, IIIA (rotor dependent)
Design lifetime	20 years
Power control	Variable speed, variable pitch control
Turbine concept	Planetary gear with slow speed permanent magnet synchronous generator and full scale converters
Rotor	
Type	Upwind 3 bladed turbine
Diameter	90 m / 100 m / 103 m
Swept area	6 475 / 7 917 / 8 332 m <sup>2</sup>
Rotational speed	5–18 rpm
Power unit / Drive train	
Main bearing	Two-row tapered roller bearing
Gear box	Planetary
Generator	Synchronous, permanent magnet
Converter	Full scale IGBT converter
Grid frequency	50 Hz
Tower	
Type	Steel, tubular and Concrete / steel hybrid
Hub height	80–100 m
Brake system	
Aerodynamic	Individual electric pitch with emergency power supply
Mechanical	Hydraulic disc brake



• **Helsinki:**  
Keilaranta 13, 02150 Espoo, Finland  
Tel. +358 207 410 160  
Fax +358 207 410 162  
info@winwind.fi, www.winwind.fi

• **Chennai:** Sterling Towers, 327 Anna Salai,  
Teynampet, Chennai 600 006, India  
Tel. +91 44-2431 3001-15  
Fax +91 44-2431 3035  
info@winwind.in, www.winwind.in

• WinWinD Eesti OÜ, Estonia  
• WinWinD Ibérica Ltd, Portugal  
• WinWinD Sweden AB, Sweden