

GE
Energy

2.5MW

Wind Turbine

ecomaginationSM
a GE commitment



imagination at work

Product evolution. It's one of the things GE does best. Especially when it comes to the next generation of wind turbines. With the expertise of GE's engineering and global research team, a wealth of customer feedback, and extensive knowledge gained from manufacturing over 5,000 1.5 MW wind turbines, our new onshore 2.5xl machine raises the bar when it comes to reliability and customer value.



Wieringermeer, Netherlands
1 x 2.5

Improving on our 2.x MW Class design, GE's new 2.5xl units are designed with an increased rotor size, offering higher energy capture. At the heart of the design is an optimized, force-flow bedplate where all nacelle components are joined on a common structure, providing exceptional durability. Advanced control features, including a sophisticated pitch regulation system with power/torque control capability, and improved use of the drive train damper, mitigate the increased loads of the larger rotor.

The 2.5xl also employs an efficient permanent magnet generator, enabling higher efficiency at low wind speeds. A new bearing design substantially increases the life and reliability of the gearbox by preventing bending and thrust loading produced in the rotor from impacting the gearbox — welcome benefits considering the gearbox challenges faced throughout the industry over the last decade. GE utilizes a 20-year accelerated lifetime test to validate the reliability of each gearbox type. In addition, a sophisticated lubrication system, designed to increase reliability, automatically lubricates pitch bearings, yaw bearings, main bearings and generator bearings.

GE's unique integrated suite of controls and electronics provides a sophisticated set of grid-friendly benefits similar to conventional power plants. A modular, full power converter allows for simplified, more effective control functions, including reactive power management for voltage regulation and mitigation of flicker. It also assures high power quality, including low harmonics, and enables secure operation, even on weak grids. Acting as a buffer, the converter protects both the generator and gearbox from the harmful effects of grid disturbances. It also enables the machine to be easily outfitted with GE's WindRIDE-THRU™ functions that allow wind turbines to meet grid codes and stay on-line supporting the grid, even during severe grid disturbances.

Designed for advanced logistics, the nacelle and tower dimensions of the 2.5xl allow for transportation and installation procedures comparable to standard 1.5 MW turbines. Our on-board crane, with a one ton lifting capacity, also improves and accelerates maintenance work.

Features and Benefits

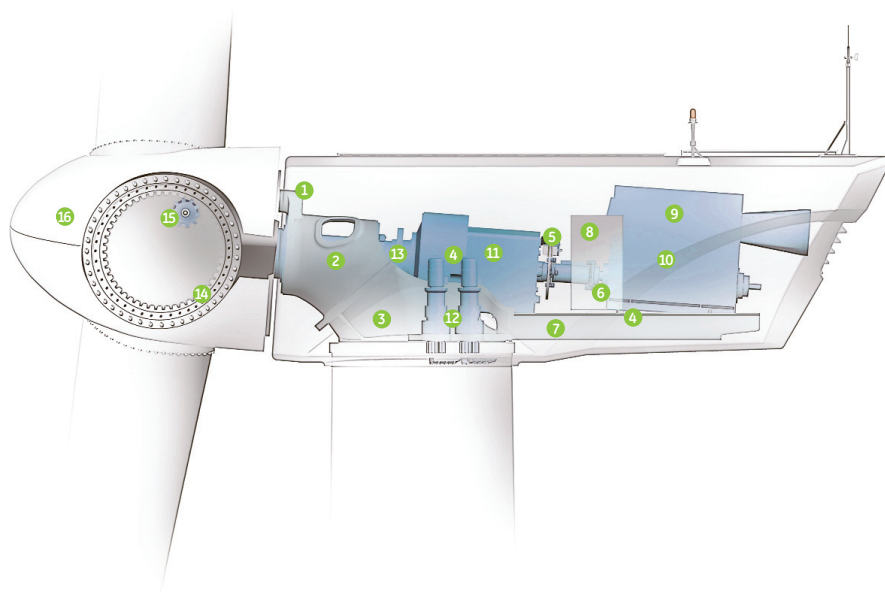
Feature	Benefit
Permanent Magnet Generator	Provides high efficiency at low wind speeds, resulting in increased Annual Energy Yield
Variable Hub Heights	Provides versatility/adaptability to a wide variety of project sites
Variable Speed Control and Advanced Blade Pitch	Enables aerodynamic efficiency and reduces loads to the drive train, thereby lowering lifetime costs and providing longer turbine life
WindCONTROL (optional)	Optimizes voltage and power regulation like a conventional power plant
WindRIDE-THRU™ (optional)	Low- and Zero Voltage Ride-Through options allow for uninterrupted turbine operation through grid disturbances
WindFREE Reactive Power (optional)	Provides reactive power to the grid even with no wind

GE Energy has wind manufacturing and assembly facilities in Germany, Spain, China, Canada and the United States. Our current product portfolio includes wind turbines with rated capacities ranging from 1.5 to 3.6 megawatts and support services ranging from development assistance to operation and maintenance.

Our facilities are registered to ISO 9001:2000. Our Quality Management System, which incorporates our rigorous Six Sigma methodologies, provides our customers with quality assurance backed by the strength of GE. We know that wind power will be an integral part of the world energy mix throughout the 21st century and we are committed to helping our customers design and implement energy solutions for their unique energy needs. Every relationship we pursue bears our uncompromising commitment to quality and innovation.

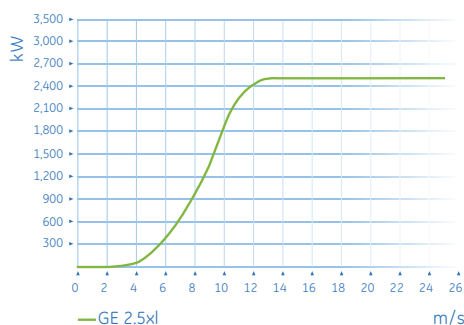
GE Energy is one of the world's leading suppliers of power generation and energy delivery technologies — providing comprehensive solutions for coal, oil, natural gas and nuclear energy; renewable resources such as wind, solar and biogas; and other alternative fuels. As a part of GE Infrastructure — which also includes the Water, Rail, Aviation and Oil & Gas businesses — we have the worldwide resources and experience to help customers meet their needs for cleaner, more reliable and efficient energy.





- | | |
|---------------------------|------------------|
| 1 Rotor lock | 9 Heat exchanger |
| 2 Pillow block | 10 Generator |
| 3 Main frame | 11 Gearbox |
| 4 Impact noise insulation | 12 Yaw drive |
| 5 Hydraulic parking brake | 13 Rotor shaft |
| 6 Coupling | 14 Rotor hub |
| 7 Generator frame | 15 Pitch drive |
| 8 Control panel | 16 Nose cone |

Power Curve



Technical Data

2.5xl

Operating data

- | | |
|-----------------------|-----------|
| • Rated capacity: | 2,500 kW |
| • Cut-in wind speed: | 3,5 m/s |
| • Cut-out wind speed: | 25 m/s |
| • Rated wind speed: | 12,5 m/s |
| • Wind Class - IEC: | IIIa, IIb |

Rotor

- | | |
|---------------------------|---------------------|
| • Number of rotor blades: | 3 |
| • Rotor diameter: | 100 m |
| • Swept area: | 7854 m ² |

Tower

- | | |
|----------------|-------------------|
| • Hub heights: | 75 m, 85 m, 100 m |
|----------------|-------------------|

Power control

Active blade pitch control

Gearbox

- Multi-stage planetary gear

Generator and Converter

- Permanent magnet generator and full power converter

Braking system (fail-safe)

- Electromechanical pitch control for each blade (3 self-contained systems)
- Hydraulic parking brake

Yaw system

- Electromechanical driven with wind direction sensor and automatic cable unwind

Control system

- PLC (programmable logic controller) with remote control and monitoring system

Noise reduction

- Vibration insulation of the gearbox and generator
- Noise insulated nacelle

Lightning protection system

- Lightning receptors on the blades and nacelle
- Surge protection in electrical components
- Carbon brushes on the main shaft

Hoisting system

- Nacelle crane with 1000 kg (1 ton) lifting capacity



Subject to technical alterations, errors and omissions.

www.ge-energy.com/wind

