

GE Energy  
Renewable Energy



# Introducing GE's 1.6-100

Best-in-class  
capacity factor

a product of  
**ecomagination**



imagination at work

## Introducing GE's **1.6-100**

Product evolution. It's one of the things GE does best. Especially when it comes to the next generation of wind turbines. Building on a strong power generation heritage spanning more than a century, our onshore wind turbines deliver proven performance, availability and reliability—creating more value for our customers.

As one of the world's leading wind turbine suppliers, GE Energy's current product portfolio includes wind turbines with rated capacities ranging from 1.5 MW–4.1 MW and support services extending from development assistance to operation and maintenance.

## GE's 1.6-100 Wind Turbine

GE's 1.6-100 wind turbine offers a 47% increase in swept area when compared to the 1.6-82.5 turbine, resulting in 19% increase in Annual Energy Production (AEP) at 7.5 m/s. This increase in blade swept area allows greater energy capture and improved project economics for wind developers. GE's 1.6-100 turbine has a 53% gross capacity factor, at 7.5 m/s; a class leading performance. GE's proprietary 48.7 meter blade uses the same proven aerodynamic shape as the blades found on the 2.5-100 turbine.

GE's stringent design procedures result in a turbine designed for high performance, reliability and availability. The use of the rotor from the proven GE 2.5-100 turbine and selected component modifications provide increased annual production with the same reliable performance as the 1.5 MW series turbine.

Available in 80 meter and 96 meter hub heights, these sizes provide flexible options for Class III wind sites, allowing for higher energy capture in lower wind speed environments.

## Building Upon the Proven 1.5 MW and 2.5 MW Platforms

The evolution of GE's 1.5 MW turbine design began with the 1.5i turbine introduced in 1996. The 65 meter rotor was increased to 70.5 meters in the 1.5s then to 77 meters in the 1.5sle turbine which was introduced in 2004. Building on the exceptional performance and reliability of the 1.5sle, GE introduced the 1.5xle with its 82.5 meter diameter in 2005. Subsequent improvements in design led to the 1.6-82.5 turbine, introduced in 2008. Ongoing investment in the industry workhorse resulted in the introduction of GE's 1.6-100 wind turbine with a 100 meter rotor. This product evolution ensures increased capacity factor while increasing AEP by 19%.

Incremental changes to the 1.6-100 resulted in a significant performance increase. These enhancements include greater blade length and controls improvements resulting in an increase in AEP, high capacity factor, and controlled sound performance. Designed with high reliability to ensure continued operation in the field, GE's 1.6-100 can provide excellent availability comparable with the 1.5 MW series units operating in the field today.

# Technical Description

GE's 1.6-100 wind turbine is a three-blade, upwind, horizontal axis wind turbine with a rotor diameter of 100 meters. The turbine rotor and nacelle are mounted on top of a tubular steel tower providing hub heights of 80 meters and 96 meters. The machine uses active yaw control to keep the rotor pointed into the wind. The turbine is designed to operate at a variable speed and uses a doubly fed asynchronous generator with a partial power converter system.

### Specifications:

1.6-100 Wind Turbine:

- Designed to IEC 61400-1
- Standard and cold weather extreme options
- Standard tower corrosion protection; C2 internal and C3 external with optional C4 internal and C5 external available
- Rotational direction: Clockwise viewed from an upwind location
- Speed regulation: Electric drive pitch control with battery backup
- Aerodynamic brake: Full feathering of blade pitch

# Features and Benefits

- Higher AEP than its 1.6 predecessors
- Highest capacity factor in its class
- Designed to meet or exceed the 1.5 MW platform's historic high availability
- Grid friendly options are available
  - Enhanced Reactive Power, Voltage Ride Thru, Power Factor Control
- Wind Farm Control System; WindSCADA\*
- GE proprietary 48.7 meter blade
- Available in both 50 Hz and 60 Hz versions for global suitability

## Construction

**Towers:** tubular steel sections provide hub heights of 80 meters or 96 meters

**Blades:** GE 48.7 meter blades

**Drivetrain components:** GE's 1.6-100 uses proven design gearboxes, mainshaft and generators with appropriate improvements to enable the larger rotor diameter on the 1.6 MW machine

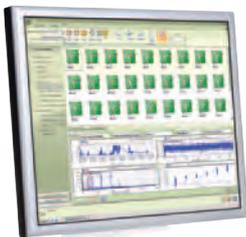
## Enhanced Controls Technology

The 1.6-100 wind turbine employs two enhanced control features:

- GE's patented Advanced Loads Control reduces loads on turbine components by measuring stresses and individually adjusting blade pitch
- Controls developed by GE Global Research minimize loads including at near rated wind speeds to improve Annual Energy Production (AEP)

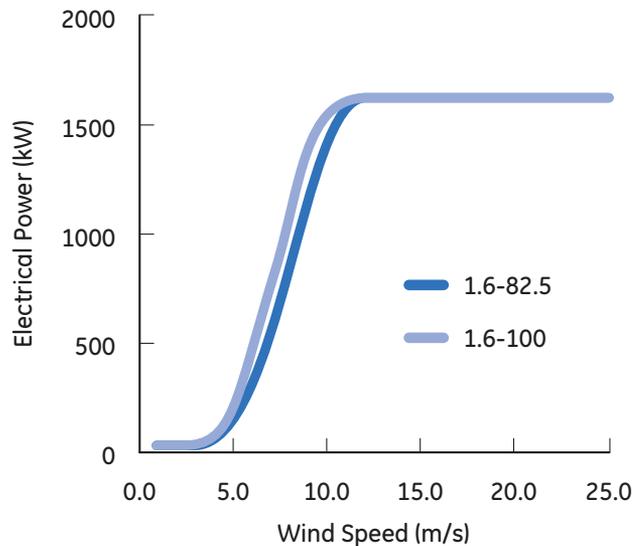
## Condition Monitoring System (option)

GE's Condition Monitoring System (CMS) and SCADA Anomaly Detection Services, a complementary suite of advanced condition monitoring solutions, proactively detect impending drive train and whole-turbine issues enabling increased availability and decreased maintenance expenses. Built upon half a century of power generation drivetrain and data anomaly monitoring experience, this service solution is available as an option on new GE Units and as an upgrade.



# 1.6-100 Specifications

## Power Curve Improvement



## Highest capacity factor in its class

- **Value.** Best in Class Capacity Factor, 53% @ 7.5 m/s
- **Reliability.** GE fleet at 98%+ availability
- **Experience.** 17,000+ wind turbines installed globally
- **Finance-ability.** Evolutionary design using “proven technology” from GE 1.5 MW and 2.5 MW platforms



Best-in-class capacity factor



1.6 MW wind turbine, Tehachapi, California, U.S.A.

# Powering the world...responsibly.

For more information please visit [www.ge-energy.com/wind](http://www.ge-energy.com/wind).



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