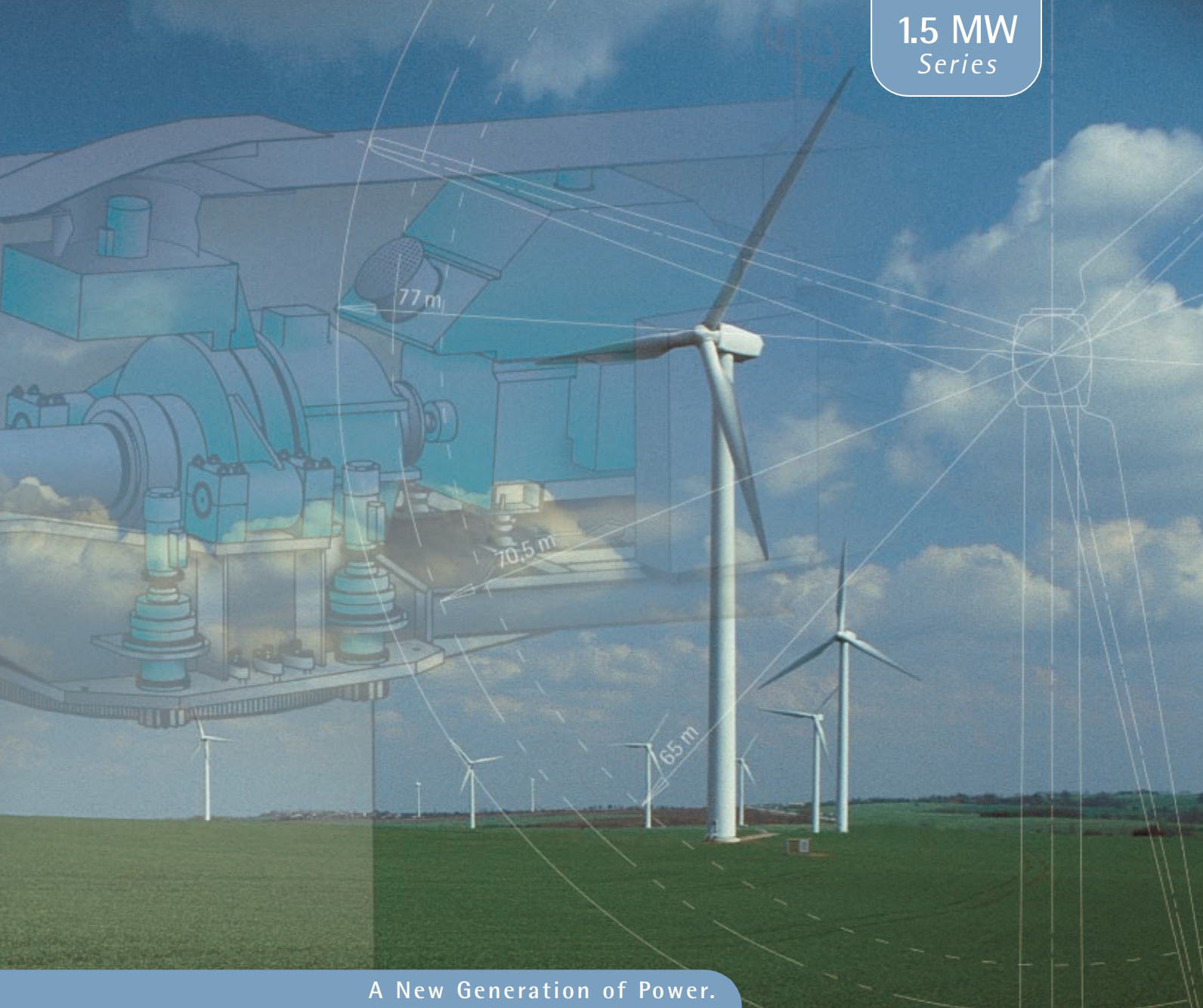


1.5 MW
Series



A New Generation of Power.

Enron Wind 1.5 MW Series

Enron Wind

Enron Wind Technology.

Superior power quality. Maximum energy capture.

Reactive power control and voltage support. Reduced loads.

With advanced wind turbines ranging from 750 kW to 2.0 MW, Enron Wind provides customized solutions for today's challenging on and offshore requirements. Enron Wind technology features PowerMax™ variable speed control for reliable, cost effective operation, and offers its patented Dynamic VAR Control for local grid support and improved transmission efficiencies. Enron Wind's ISO Quality Systems certified manufacturing facilities are located in California, Germany and Spain.



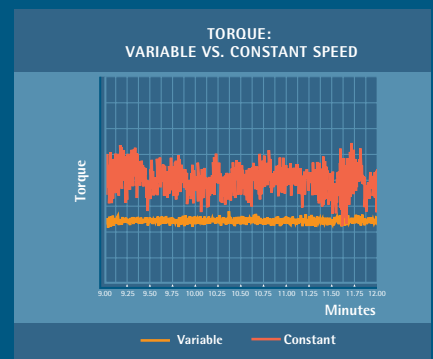
The Enron Wind 1.5 MW Series Wind Turbine.

When it comes to "mega" technology, our proven 1.5 MW wind turbine was the first of its size class to become commercially available. Today, our customers find that the Enron Wind 1.5 MW Series wind turbines combine proven technology and an extremely low cost of energy (COE), with quiet, reliable operation. The Enron Wind 1.5 MW Series wind turbines are also versatile. Their universally operable nacelle accepts rotor diameters of 65 meters, 70.5 meters, and 77 meters. And their variable hub heights range from 61.4 meters to 100 meters.

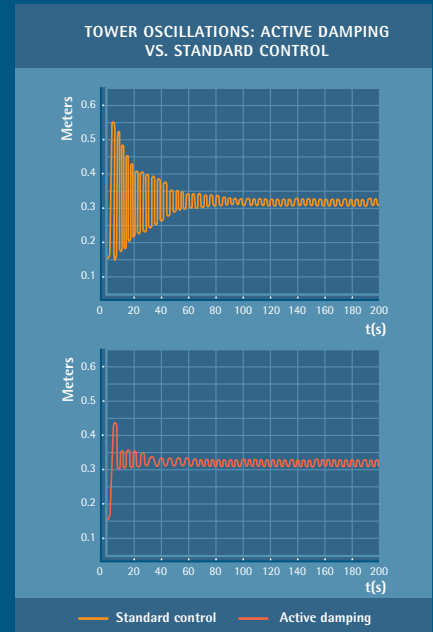
The Enron Wind 1.5 MW Series wind turbines are active yaw and pitch regulated machines with power/torque control capability. The rotor utilizes blade pitch regulation and variable speed operation to achieve optimum power output. The 1.5 MW Series wind turbines also feature a bedplate drivetrain design where all nacelle components are attached to the bedplate. The nacelle is lined with sound insulating foam and the generator and gearbox are supported by elastomeric elements to assure that they are among the quietest machines available on the market today. The Enron Wind 1.5 MW Series technology is designed in accordance with the International Electrotechnical Committee 1400-1 Standard and Germanischer Lloyd's Rules and Regulations for wind turbine design.

Superior Technology for Maximum Energy Capture.

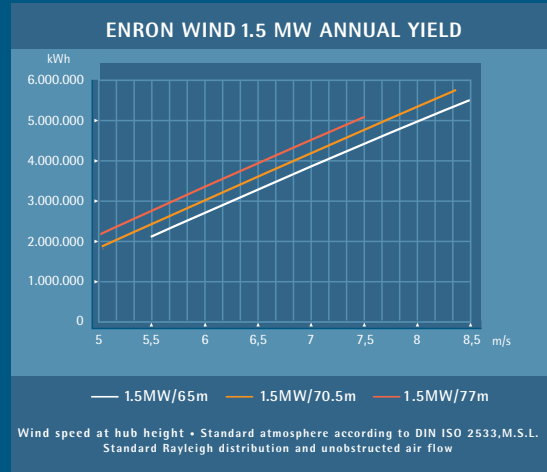
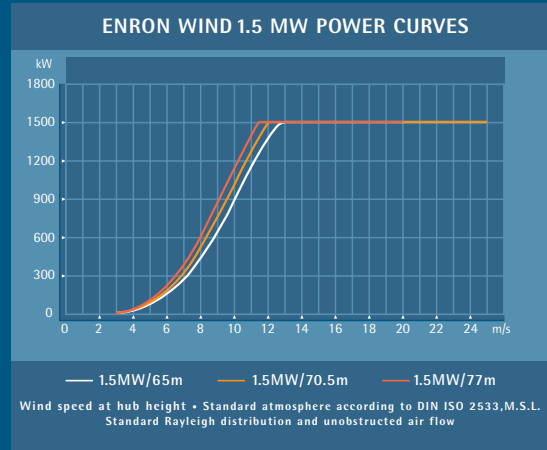
At the heart of the Enron Wind technology is a patented power electronic converter which converts the wind turbine's variable speed operation into constant frequency power required by the utility. The results are remarkable – higher energy yield and high quality power that is fully compliant with IEEE-519 power quality requirements.

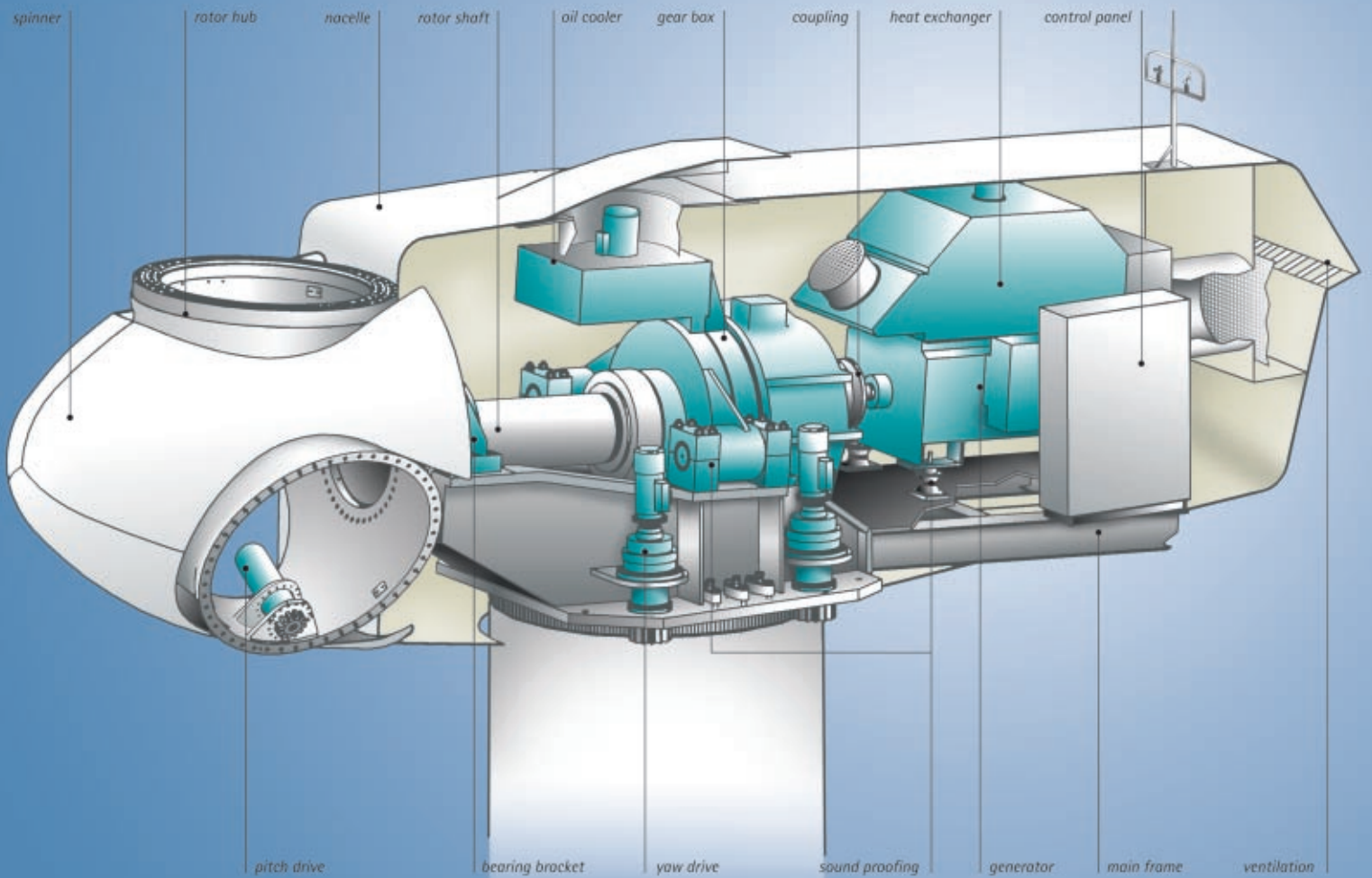


Enron Wind's variable speed operation provides reduced mean torque loads and smaller torque excursions for a given power output compared to constant speed wind turbines.



Enron Wind's PowerMax system provides active damping of the entire wind turbine system. Results include considerably less tower oscillation as compared to constant speed wind turbines, greater drivetrain reliability, reduced maintenance cost, and longer turbine life.





Higher Energy Capture and Reduced Loads.

By design, through its advanced electronics and aerodynamics, the Enron Wind technology captures significantly more energy than constant speed wind turbines at lower cost. While constant speed rotors must be designed to resist high loads when subjected to wind gusts, Enron Wind's variable speed PowerMax system enables the loads from the gust to be absorbed and converted to electric power. By adjusting blade pitch through the turbines' variable pitch operation, rotor speed is controlled. Generator torque is controlled through the frequency converter. This combined control strategy allows higher rotor rpm in strong, gusty winds, thereby reducing torque loads in the drivetrain. PowerMax also provides active damping of the entire wind turbine system, resulting in considerably less tower oscillation as compared to constant speed wind turbines. Active damping of the machine also limits



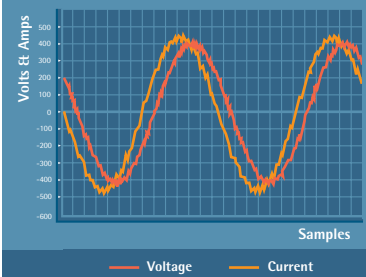
peak torque, providing greater drivetrain reliability, reduced maintenance cost, and longer turbine life.

Dynamic Reactive Power (VAR) and Voltage Support.



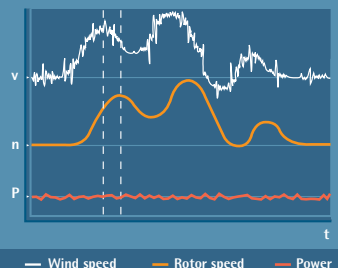
Enron Wind's Dynamic VAR Control option provides support to local grid voltage, improving transmission efficiencies and providing the utility grid with reactive power (VARs) to further strengthen the grid. The Enron Wind technology, outfitted with its patented Dynamic VAR Control option, can automatically maintain defined grid voltage levels and/or deliver reactive power (VARs) to the utility. This feature is particularly beneficial to weaker grids.

DYNAMIC REACTIVE POWER (VAR): LEADING POWER FACTOR



Enron Wind's Dynamic Reactive VAR Control enables the wind turbine to generate reactive power (current leading voltage), providing transmission efficiencies and enhanced voltage stability, which is particularly beneficial in weak grid applications.

ENERGY STORAGE IN THE ROTOR



The energy of a gust is stored by accelerating the rotor. This leads to reduced loads, improved transmission efficiencies and performance.

Specifications – Enron Wind 1.5 MW Series

Performance

Cut-in wind speed
Cut-out wind speed
Rated wind speed

65m

4.0 m/s
25 m/s
13 m/s

70.5m

3.0 m/s
25 m/s
12 m/s

77m

3.0 m/s
20 m/s
11.8 m/s

Rotor

Number of blades
Diameter
Swept area
Rotor speed (variable)
Maximum tip speed
Blade length

3
65 m
3318 m²
11-20 rpm
68 m/s
31.2 m

3
70.5 m
3902 m²
11-20 rpm
73.8 m/s
34.0 m

3
77 m
4657 m²
10-18 rpm
72.6 m/s
37.2 m

Gearbox

Type: Three step planetary spur gear system
i=72, for 77 meter rotor: i=80

Generator

Type: Rotary current asynchronous with slip rings
Rated power: 1500 kW

Inverter

Type: IGBT-frequency inverter

Braking Systems

Individual pitch regulation
Brake control system: fail-safe

Yaw System

Motor driven with wind direction sensor and automatic cable unwind

Control System

Microprocessor-based programmable logic controller (PLC)
Remote control operating system

Tower

Multi layer coated, conical tubular steel tower with interior safety ladder to the nacelle
Load lifting system, 250 kg carrying force
Hub height:
65 meter rotor: 67.1 , 80 or 85 meter
70.5 meter rotor: 64.7, 80 , 85 or 100 meter
77 meter rotor: 80 or 85 meter

Lightning Protection System

Lightning receptor installed on blade tips
Discharge inside the rotor blades along nacelle and tower

Sound Proofing

Structure borne noise insulation of the drive train
Sound reduced gearbox
Reduced blade tip speed
Noise reduced nacelle



Specifications subject to possible modification.



Global Manufacturing Capabilities

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Enron Wind offers ISO 9001 Quality Systems Certified manufacturing, experienced power plant design and engineering, development expertise, creative financing options, experienced operations and maintenance, and responsive and reliable customer service. Its wind technology has been utilized in world-class projects around the globe, including the world's three largest wind power projects. As a part of Enron Corp., with \$46 billion in assets, Enron Wind shares the diverse resources of the world's leading energy and communications company.

Europe

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Enron is a leader in providing cleaner energy sources worldwide. We know that renewable energy will be an integral part of the world energy mix in the next century, and we are committed to helping our partners and customers design and implement energy solutions for their unique energy needs. Every relationship we pursue bears our uncompromising commitment to quality and innovation.

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Endless possibilities.™