Appendix K

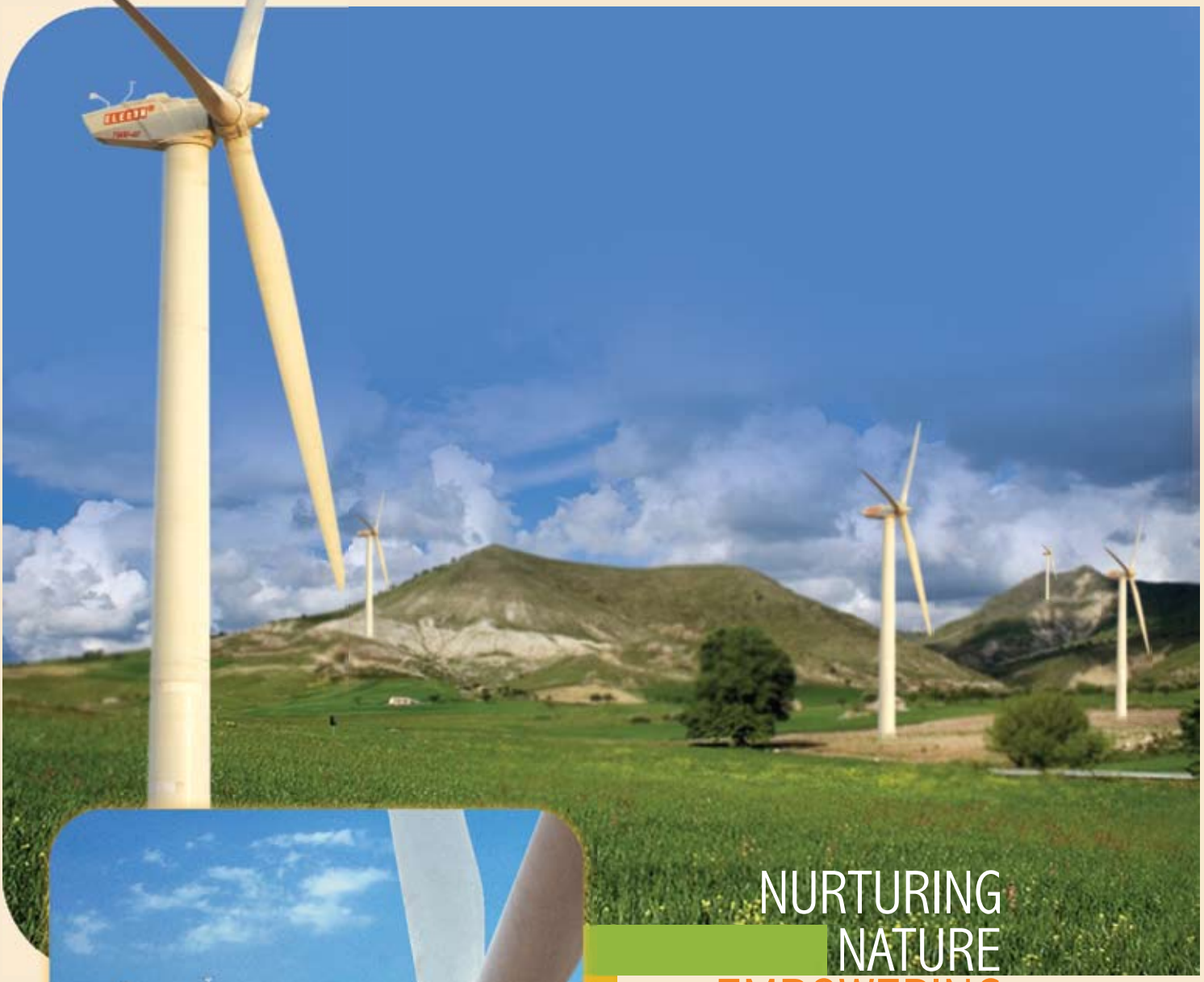
Turbine Candidate Specifications

ELECON

TURBOWINDS

600 KW WIND TURBINE GENERATOR

60 Hz Application



NURTURING NATURE
EMPOWERING FUTURE

Catalogue No.: 186/AE/03/09/INT

ELECON
TURBOWINDS

INTRODUCTION

Elecon Engineering Company Ltd., a publically traded company, has been a pioneer in the design and manufacturing of Material Handling and Power Transmission (Gearbox) Equipment since 1951. Over a decade ago, Elecon successfully diversified into the quality manufacturing of Wind Turbine Generators.

Elecon Alternate Energy Division Offices

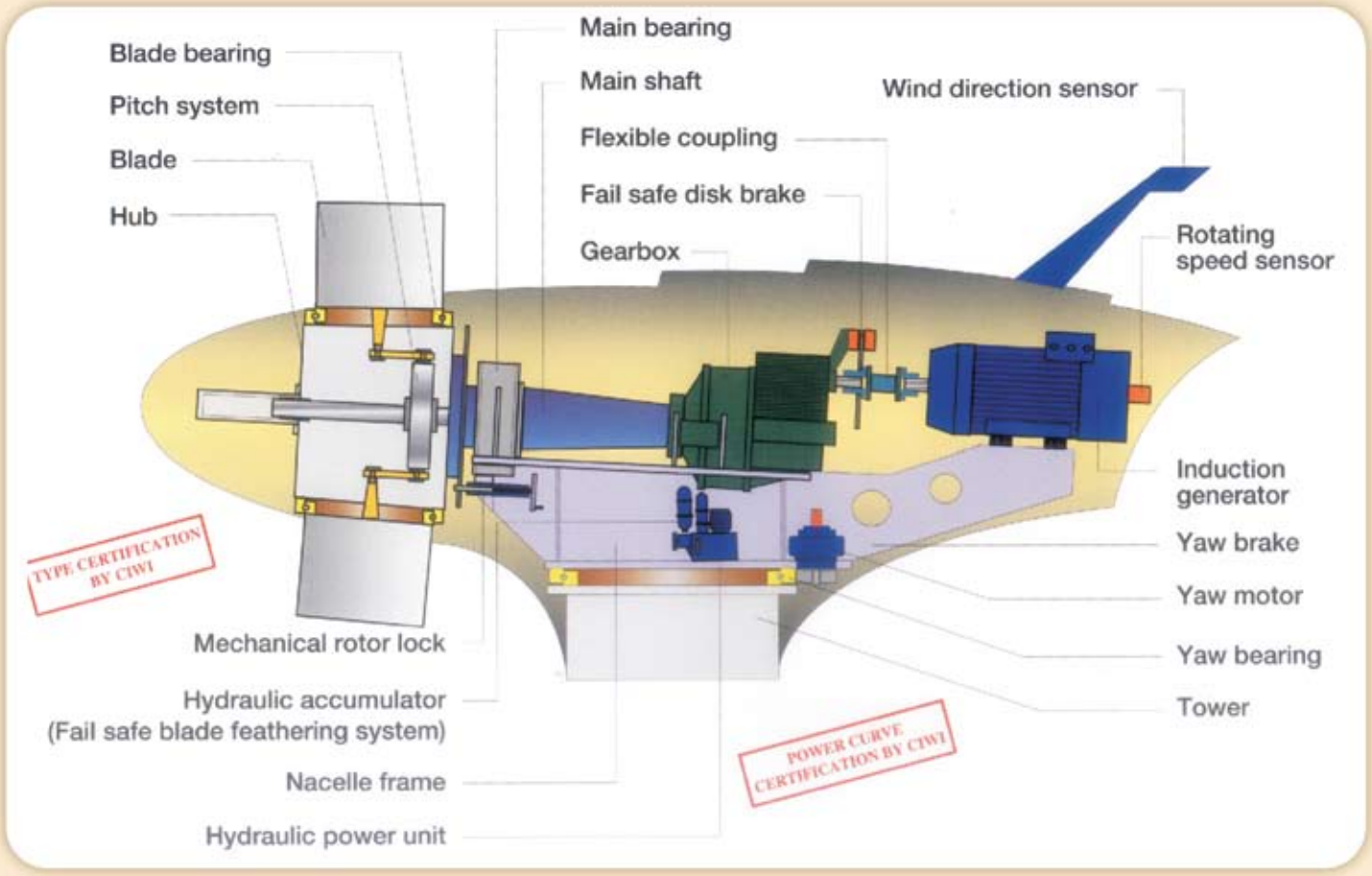
Elecon-Turbowinds T600-48DS

Elecon Wind Turbine in USA

Elecon, a MNRE/C-WET approved manufacturer, now offers dual speed and active stall hydraulically pitch controlled Wind Turbine Generators of 600 kw rating, manufactured under the technical collaboration of M/s TURBOWINDS n.v. Belgium.

Elecon's Alternate Energy Division is currently focusing on the manufacturing of a dual speed 600 kw Wind Turbine Generator, T600-48DS. The hydraulically controlled active stall T600 is manufactured with the technical collaboration of Turbowinds N.V. Belgium.

For nearly two decades, Turbowinds has designed and manufactured high output wind turbines for installations around the world. This experience has allowed Turbowinds to positively contribute to the reduction of Co_2 emissions and environmental preservation worldwide.



T600 - 48DS FEATURES:

- The Elecon - Turbowinds T600-48DS has been optimized for Class II and lower wind conditions as well as a wide range of climatic environments.
- The T600-48DS is provided with dual speed generator, allowing the wind turbine to effectively produce higher energy output even in low wind conditions.
- A heavy duty 3-stage Elecon gearbox, specifically designed and manufactured for the T600, contributes to the high level of operational dependability.
- The blades supplied with the T600-48DS are manufactured by the world's foremost supplier of wind turbine blades and have been robustly designed for both reliability and superior aerodynamic characteristics.
- The T600 Active Pitch Controls are hydraulically operated to harness optimum wind at all times.
- A unique safety feature of the T600 is the failsafe blade feathering in the event of grid loss or elevated wind conditions to prevent damage to the drive train.
- The T600 also features independent over-speed trips, which activate a disc braking safety system to prevent damage to the turbine.

TECHNICAL SPECIFICATION

Turbine type : **T600-48 Dual speed**

General :

Rated power	600 kw
Rotor diameter	48m
Hub height	50m/55m/60m

Rotor :

Number of blades	3
Rotor speed	15 / 23 pm
Blade construction	FRP
Aerofoil	DU97-W-300, DU91-W2-250 FFA-W3-211, NACA63418
Control	Active stall
Pitch actuation	Hydraulic
Hub type	Rigid
Cone angle	-2 Degree
Tilt angle	-4 Degree

Transmission : (Gearbox)

Type	1-stage planetary 2-stage parallel
Rating -	600 kw
Gear Ratio	1:78.26

Brake :

Type	Fail-Safe disk brake
Position	High speed shaft

Generator :

Type	Dual speed Induction generator
Rating	120 kw/600 kw
Rotation speed	1200 / 1800 rpm
Voltage/Frequency	690 Volt/60Hz*

Nacelle :

Frame	Welded high strength steel structure
Housing	FRP

Tower :

Material	Welded steel
Type	Tapered cylinder
	Paint / Hot Dip Galvanized

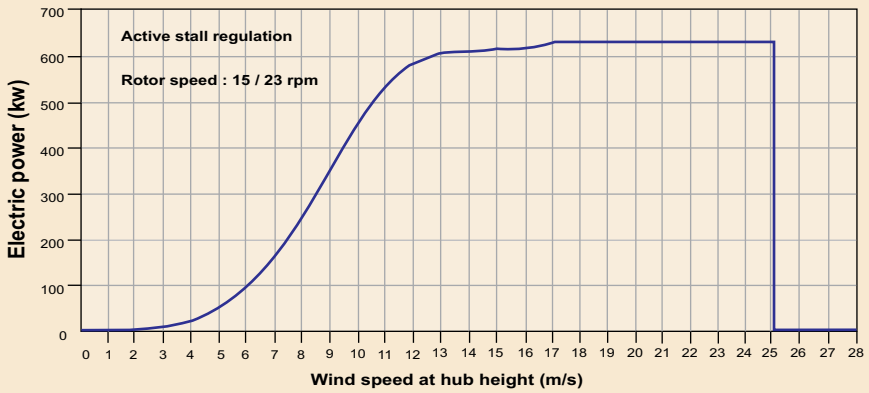
Performance :

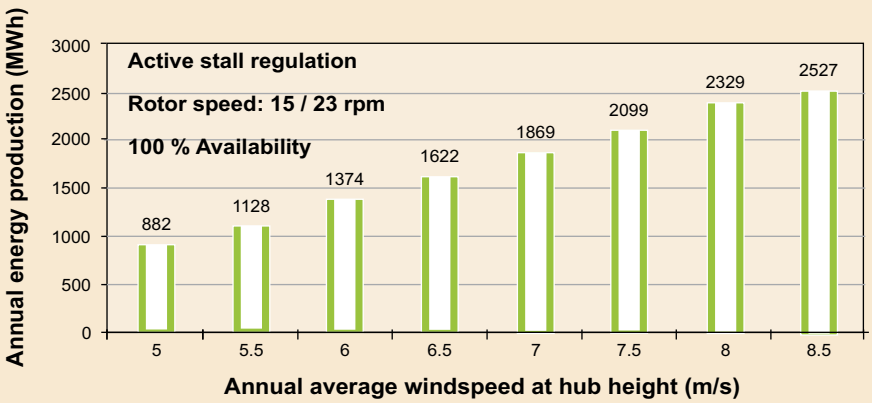
Rated power	600 kw
Rated wind speed	12.5 m/s
Cut in	3.5 m/s
Cut out	25 m/s
Survival	60 m/s

Weights :

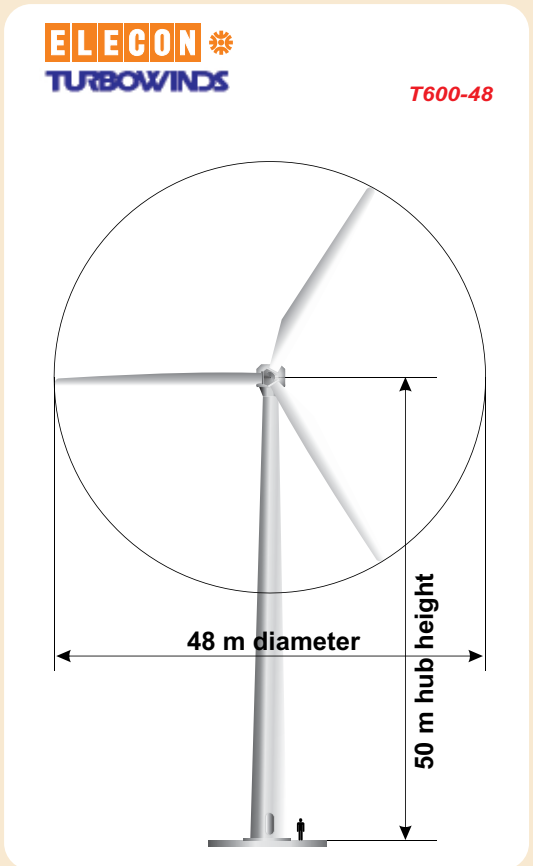
Nacelle including rotor	35,000 Kgs
Rotor (Hub & 3 Blades)	14,500 kgs
Tower (50 Mt)	56,000 Kgs
Tower (55 Mt)	65,000 Kgs
Tower (60 Mt)	68,000 Kgs

* T600 Options available include cold weather package and 50 Hz compatibility





* Estimate based on Weibull Distribution



ELECON Wind Turbine GEAR BOX

The T600 Gearbox is
a combination of Planetary
and Helical with
shaft mount and torque arm
support.

Wind Turbine Gearboxes
up to 2MW can be manufactured in
Elecon Facilities

For further details contact :
GEAR DIVN. : Tel. : +91 (2692) 236469,236513,236516,
Fax : +91 (2692) 236527
Email : infogear@gear.elecon.com

GE Energy

1.5MW
Wind Turbine

imagination at work

a product of
ecomagination

The industry workhorse

The world needs a reliable, affordable and clean supply of electric power with zero greenhouse gas emissions, which is why GE continues to drive investment in cutting-edge wind turbine technology.

Building on a strong power generation heritage spanning more than a century, our 1.5 MW wind turbine—also known as the industry workhorse—delivers proven performance and reliability, creating more value for our customers.

Our product strategy is focused on results that contribute to our customers' success and wind farm return on investment. Every initiative we pursue bears our uncompromising commitment to quality and product innovation. Our reputation for excellence can be seen in everything we do. GE's commitment to customer value and technology evolution is demonstrated in our ongoing investment in product development. Since entering the wind business in 2002, GE has invested over $850 million in driving reliable and efficient wind technology.

GE 1.5 MW...the most widely used wind turbine in its class

- **12,000+** turbines are in operation worldwide
- **19** countries
- **170+** million operating hours
- **100,000+** GWh produced

Data as of March, 2009

Global footprint

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 Energy Infrastructure—which also includes the Water, Energy Services and Oil & Gas businesses—we have the worldwide resources and experience to help customers meet their needs for cleaner, more reliable and efficient energy.

GE has six wind manufacturing and assembly facilities in Germany, Spain, China and the United States. Our facilities are registered to both ISO 9001:2000 and our Quality Management System, providing our customers with quality assurance backed by the strength of GE. Our wind energy technology centers of excellence in Europe, Asia, and North America, as well as our teams of engineers and scientists, use Six Sigma methodology coupled with the latest computational modeling and power electronic analysis tools to manufacture wind turbines with the performance and reliability necessary to meet our customers' challenges.

As the cornerstone of GE technology for more than 100 years, our four Global Research Centers are focused on developing breakthrough innovations in the energy industry. We believe 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.

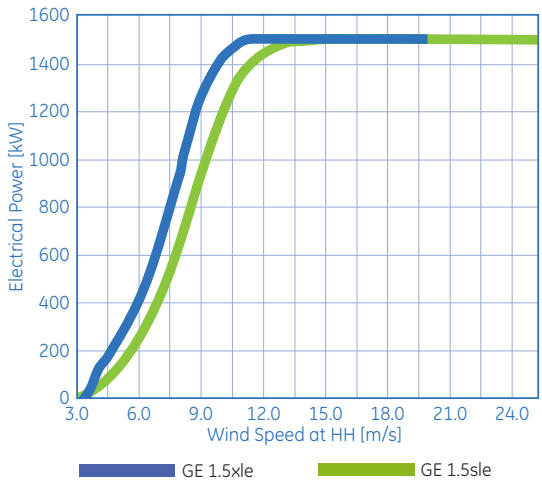
Advancing wind capture performance

As a leading global provider of energy products and services, GE continues to invest in advancing its 1.5 MW wind turbine product platform. With a core focus on enhancing efficiency, reliability, site flexibility and delivering multi-generational product advancements, GE's 1.5 MW wind turbine is the most widely used turbine in its class. Our commitment is to fully understand our customer's needs and respond with new technology enhancements aimed at capturing maximum wind energy to deliver additional return on investment.

Technical data

	1.5sle	1.5xle
Operating Data		
Rated Capacity:	1,500 kW	1,500 kW
Temperature Range: (with Cold Weather Extreme Package) Operation:	-30°C – +40°C	-30°C – +40°C
Survival:	-40°C – +50°C	-40°C – +50°C
Cut-in Wind Speed:	3.5 m/s	3.5 m/s
Cut-out Wind Speed (10 min avg.):	25 m/s	20 m/s
Rated Wind Speed:	14 m/s	11.5 m/s
Wind Class — IEC:	IIa (V_{e50} = 55 m/s V_{ave} = 8.5 m/s)	IIIb (V_{e50} = 52.5 m/s V_{ave} = 8.0 m/s)
Electrical Interface		
Frequency	50/60 Hz	50/60 Hz
Voltage	690V	690V
Rotor		
Rotor Diameter:	77 m	82.5 m
Swept Area:	4657 m^2	5346 m^2
Tower		
Hub Heights:	65/80 m	80 m
Power Control	Active Blade Pitch Control	Active Blade Pitch Control

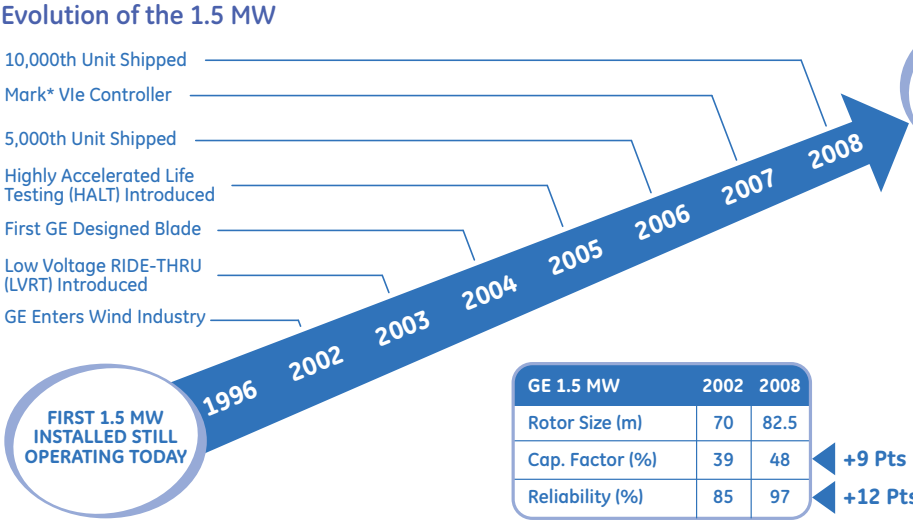
Power curve



1.5sle — *Classic workhorse, an efficient and reliable machine with proven technology*
1.5xle — *Built on the success of the 1.5sle platform, captures more wind energy with 15% greater swept area*

GE's 1.5 MW wind turbine is designed to maximize customer value by providing proven performance and reliability. GE's commitment to customer satisfaction drives our continuous investment in the evolution of the 1.5 MW wind turbine through technological enhancements.

Evolution of the 1.5 MW



GE 1.5 MW	2002	2008	
Rotor Size (m)	70	82.5	
Cap. Factor (%)	39	48	+9 Pts
Reliability (%)	85	97	+12 Pts

Commitment to continued investment

GE's commitment to investing in technology and increasing customer value is demonstrated with our exciting new customer options for increasing turbine performance, flexibility and reliability.

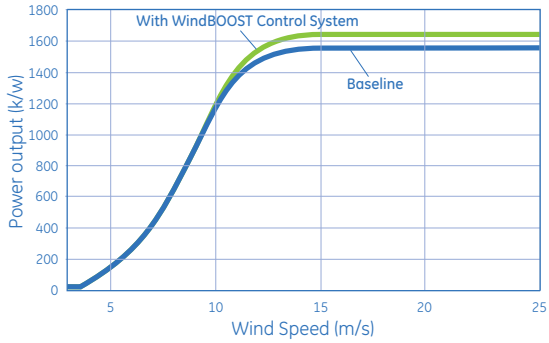
Enhanced performance

WindBOOST* Control System

This exciting new customer option for increasing performance, WindBOOST* control system, is a unique offering in the wind industry and the latest addition to the 1.5 MW product platform. This software upgrade provides:

- Up to 4% increased annual energy production (AEP), resulting in higher return on investment.
- Patent-pending control technology for optimum rotational speed, resulting in increased energy production.
- Remote capability to turn feature on and off at the turbine level.
- Increased power output while maintaining grid stability.

WindBOOST* Control System
Power Curve Density 1.2 (kg/m^3)



Improved flexibility

Reinforced Tower

GE's investment in a reinforced tower design opens up new potential wind sites for our customers, enabling us to deliver reliable and safe products that meet product and regulatory compliance expectations. GE's reinforced tower sections have the same length and external diameter as the standard GE North American modular system, but are specially built to handle seismic loads.

- Allows wind farms to be located in designated seismic prone areas with good wind resources.
- GE provides an evaluation to determine if the site requires reinforced tower due to seismic activity.

Increased reliability

Condition Based Maintenance (CBM)

GE Energy's integrated Condition Based Maintenance (CBM) system proactively detects impending drive train issues, enabling increased availability and decreased maintenance expenses. Factory or field installed and tested, the CBM solution can improve reliability on a single wind farm or multiple wind farms. GE's CBM allows operators to understand an issue weeks—or even months—in advance. This permits operators to:

- Continue to produce power while parts, crane, and labor are resourced.
- Plan multiple maintenance events with the same resources.
- Reduce or limit the extent of damage to the drivetrain and reduce repair costs.

Leading reliability and availability perform

GE's 1.5 MW wind turbine and services are designed to set the industry standard for product reliability and availability performance. GE's continual investments in technology, established infrastructure, research capabilities and globally recognized business processes allow GE to create and deliver customer value by maximizing energy capture and return on investment. This is evident through our model year performance trend where availability performance significantly improves each year.

GEARBOX

- HALT testing on every design
- Cylindrical roller bearings
- Improved oil filtration, heating and cooling

MAIN SHAFT

- Material upgrade
- Expanded operating range

MAIN BEARING

- Increased bearing robustness

SOFT BRAKE SYSTEM

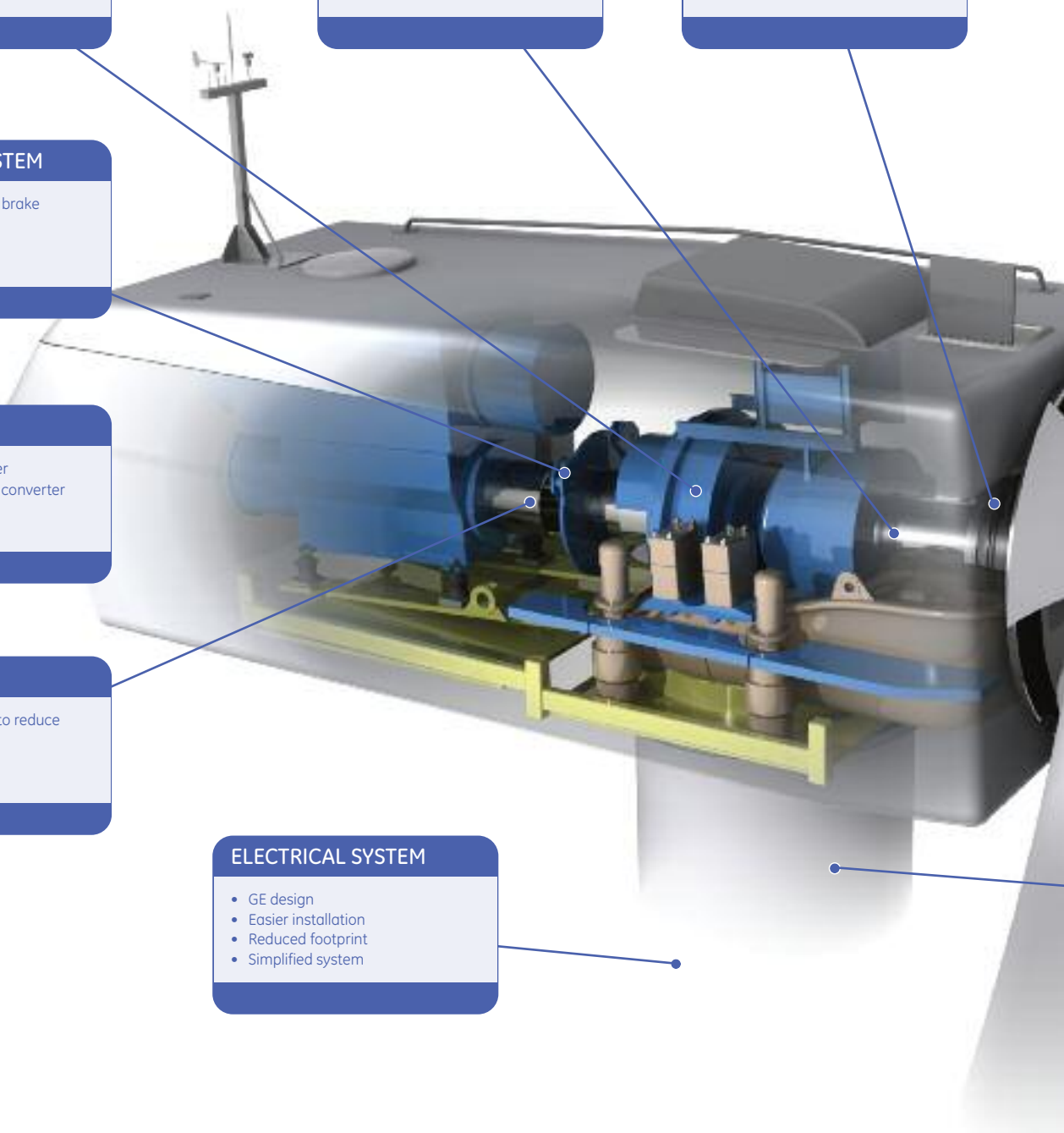
- Hydraulic secondary brake

CONTROL

- GE Mark VIe controller
- Integrated pitch and converter diagnostics

COUPLING

- Slip coupling design to reduce gearbox loads



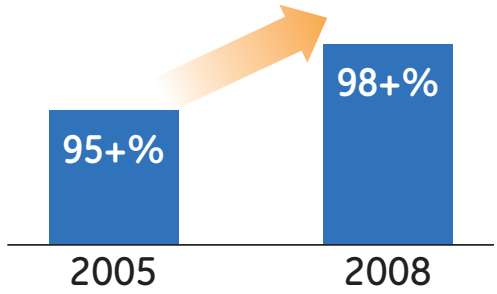
ELECTRICAL SYSTEM

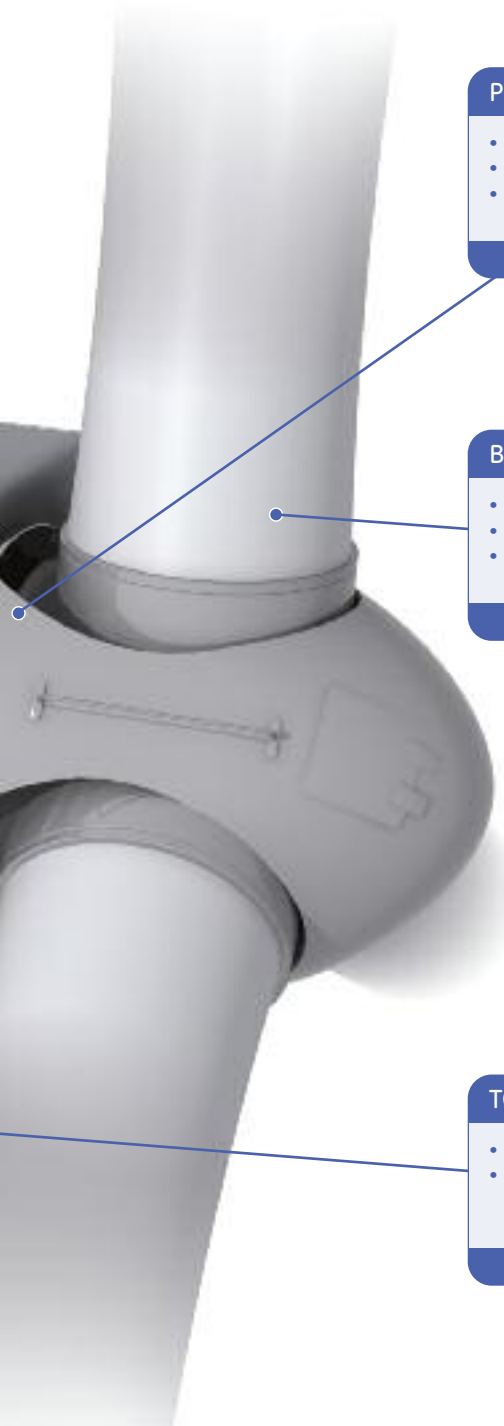
- GE design
- Easier installation
- Reduced footprint
- Simplified system

ance

Delivering reliability through advanced technology
To optimize turbine reliability and availability, GE focuses on reducing the number of downtime faults, and providing faster Return-to-Service (RTS). Our rigorous design and testing process—including specialized 20-year fatigue testing and Highly Accelerated Life Testing (HALT)—reflects our ongoing investment in key turbine components.

1.5 model year availability





PITCH
- GE designed pitch electronics
- Increased pitch drive robustness
- Greater torque

BLADES
- Includes GE designs
- Improved capacity factor
- HALT testing

TOWER
- Modular tower system
- Hub height flexibility

Technological expertise

GE Infrastructure

Energy
- Controls, materials, power electronics
- Fulfillment and logistics capability
- Efficient supply chain management

Aviation

Aerodynamic and aero-acoustic modeling expertise

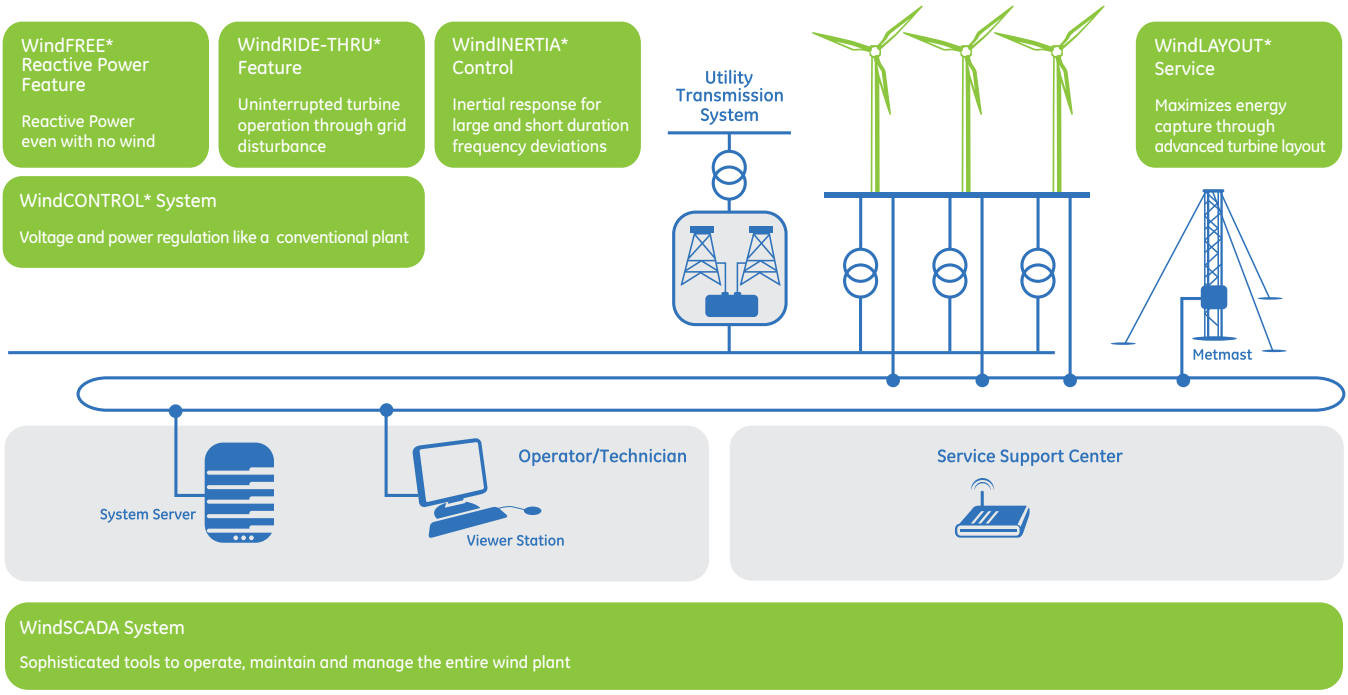
Rail

Gearbox and drive train technologies

GE Global Research
- Energy conversion
- Material sciences
- Smart grids

Optimized wind power plant performance

Wind turbine performance is a critical issue in light of increasingly stringent grid requirements. GE's unrivaled experience in power generation makes us the industry leader in grid connection. By providing a sophisticated set of grid-friendly benefits similar to conventional power plants, GE's patented integrated suite of controls and electronics take your wind power plant to the frontline of performance and seamless grid integration.



FEATURE	DESCRIPTION	BENEFITS
WindCONTROL* System	Voltage and power regulation like a conventional power plant	Ability to supply and regulate reactive and active power to the grid Additional features include power frequency droop, power ramp rate limiters and integrated capacitor/reactor bank control
WindFREE* Reactive Power Feature	Provides reactive power even with no wind	Provides smooth fast voltage regulation by delivering controlled reactive power through all operating conditions Eliminates the need for grid reinforcements specifically designed for no-wind conditions
WindRIDE-THRU* Feature	Low voltage, zero voltage and high voltage ride-through of grid disturbances	Uninterrupted turbine operation through grid disturbances Meets present and emerging transmission reliability standards
WindINERTIA* Control	Provides temporary boost in power for under-frequency grid events	Provides inertial response capability to wind turbines that is similar to conventional synchronous generators without additional hardware
WindLAYOUT* Service	Service to optimize turbine layout for a site	Opportunity to increase annual energy production for a site
WindSCADA System	Tools to operate, maintain and manage wind power plant	Real-time data visualization, reporting on historical data, alarm management and secure user access

Project execution

GE understands that grid compatibility, site flexibility, and on-time delivery are critical to the economics of a wind project. That's why the 1.5 MW wind turbine has been engineered for ease of integration and delivery to a wide range of locations, including those with challenging site conditions.

Our global project management and fulfillment expertise offer customers on-time delivery and schedule certainty. Regardless of where wind turbine components are delivered, GE's integrated logistics team retains ownership and responsibility for this critical step. Utilizing the GE Energy Power Answer Center, our engineering and supply chain teams are ready to respond to any technical, mechanical or electrical questions that may arise.

As one of the world's largest power plant system providers, GE is uniquely positioned to provide customers with full-service project management solutions. With offices in North America, Europe, and Asia, our world class Global Projects Organization utilizes decades of fulfillment expertise in project management, logistics, plant start-up and integration from Gas Turbine, Combined Cycle, Hydro, and Aero plants.

Here are some examples of how GE has worked with customers to solve project challenges and maximize their value through on-time delivery and advanced logistic capabilities:

Challenge:
Site with late grid availability due to project location change

GE's solution:
Pre-commissioning service: GE can bring portable generators on site and pre-commission turbines even without back feed power

Customer benefit:
Faster commissioning once grid became available

Challenge:
Project site with difficult geographic access

GE's solution:
Well-choreographed team with challenging terrain transportation expertise

Customer benefit:
More site flexibility; schedule target met

World-class customer service

GE's wind turbine fleet is one of the fastest growing and best-run fleets in the world. Utilizing our decades of experience in product services in the power generation industry, GE provides state-of-the-art solutions to ensure optimal performance for your wind plant.

24x7 Customer Support

GE's customer support centers in Europe and the Americas provide remote monitoring and troubleshooting for our installed fleet of wind turbines around the world, 24 hours a day, 365 days a year. The customer support centers are able to quickly perform remote resets for over 250 turbine faults. It is one of the most effective ways to ensure continuous monitoring and fault resets of your wind assets by qualified technology experts.

Technical Skills and In-depth Product Knowledge

GE's wind customer support centers have dedicated teams to dispatch for troubleshooting, repair and maintenance, available 24 hours a day, 365 days a year. This model ensures wide coverage of large wind turbine fleets without compromising technical skills or quality.

GE taps into our extensive product knowledge for timely resolution of many issues. All turbine faults are investigated using a structured technical process, which is then escalated as necessary. We also use feedback from this process in product development.

Operations and Maintenance Support

Driven by a highly skilled work force and the operating knowledge of over 12,000 1.5 MW wind turbines, GE offers a wide range of services tailored to the operation and maintenance needs of your wind assets. Our offerings range from technical advisory services, transactional services and remote operations to full on-site operations support including availability guarantees.

Parts Offerings

GE has utilized the extensive Parts and Refurbishment experience of its Energy Services business to establish a global center of excellence for wind parts operations. The wind parts resources are aligned to provide a full range of offerings for all types of parts and refurbishment needs, including routine maintenance kits, consumables and flow parts, and key capital parts such as gearboxes and blades.

With the launch of our 24/7 parts call center (877-956-3778), and the development of online ordering tools, we are increasing the channels that our wind plant operators can utilize to order required wind turbine parts, including emergency requests for down-turbine needs.

For wind plant operators looking for additional benefits that a contractual parts relationship with GE can offer, the wind parts team has developed tailored offerings that can provide ongoing inventory-level support and parts lead-time guarantees. One of the exciting advantages of a GE wind parts and refurbishment program is membership in the capital parts pool, with a priority access to often hard-to-source capital parts.

Conversions, Modifications and Uprates (CM&U)

Continuous technological improvements are key for GE to be a world leader in the wind industry. Our CM&U offerings utilize the new technology developments in the 1.5 MW platforms to improve the performance of existing assets. These offerings are designed to improve reliability and availability, and increase turbine output and improve grid integration.

Long-Term Asset Management Support

GE is your reliable partner as we strive to build long-term relationships with asset managers. Utilizing our strengths, we can provide parts solutions, field technician and customer training, and a wide range of specialized services to complement local on-site capabilities.

Environmental Health and Safety, a GE commitment

Maintaining high Environmental Health and Safety (EHS) standards is more than simply a good business practice; it is a fundamental responsibility to our employees, customers, contractors, and the environment we all share.

GE is committed to maintaining a safe work environment. We incorporate these values into every product, service and process, driving EHS processes to the highest standards.

Powering the world...responsibly.

For more information, please visit
www.ge-energy.com/wind

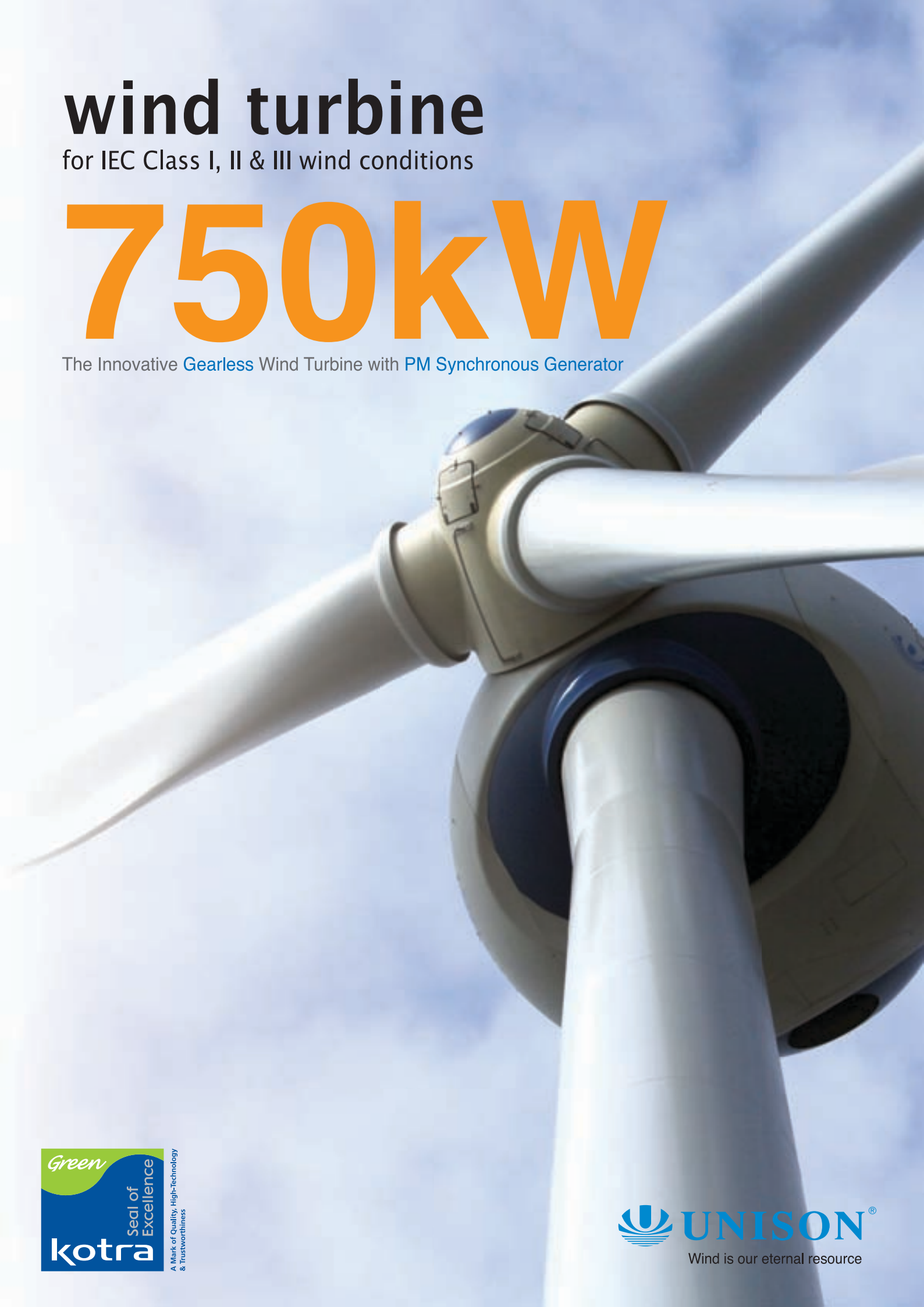
Printed on recycled paper. GEA-14954C (06/09)

wind turbine

for IEC Class I, II & III wind conditions

750kW

The Innovative Gearless Wind Turbine with PM Synchronous Generator



Green Seal of Excellence kotra
A Mark of Quality, High-Technology & Trustworthiness

UNISON®
Wind is our eternal resource

>>> UNISON is the specialized manufacturer

750kW.

Injae Wind Park

Unison is a manufacturer of the direct drive(gearless) wind turbines(750kW) and the low gear ratio wind turbines(2MW). We also specialize in the development of wind parks.

Unison, which stands on the development and operation of 140MW capacity of large-scale commercial Wind Parks : Youngduk Wind Park (Capacity : 39.6MW) and Gangwon Wind Park(Capacity : 98MW - the largest wind park in Korea), will bring great challenge into the global wind market with the 750kW Gearless Direct Drive WTGs with PM Synchronous generator.

We have managed to gain expertise in both design and production of the WTGs that are innovative and effective because we work very closely with a Proven German Engineering Company (Aerodyn). At present, we are in commercial production of the 750kW Wind Turbine Generator Systems(WTGs) suitable for IEC Class I, II, III wind conditions.

Unison promises to offer Wind Turbine technology with top quality solutions that require low maintenance during the twenty years operational lifetime to our customer through continuous research and development for advanced technology.

Ansan Wind Park

Advanced & Reliable Technology

Simple & Compact

> Direct drive concept by eliminating the Gearbox
> Low Speed PM Synchronous Generator

Optimal Energy Production

> Variable speed operation through AC-DC-AC full conversion to maintain maximum power output
> Independent pitch control combined with a PM Synchronous Generator for optimal efficiency

Reliable & High Availability

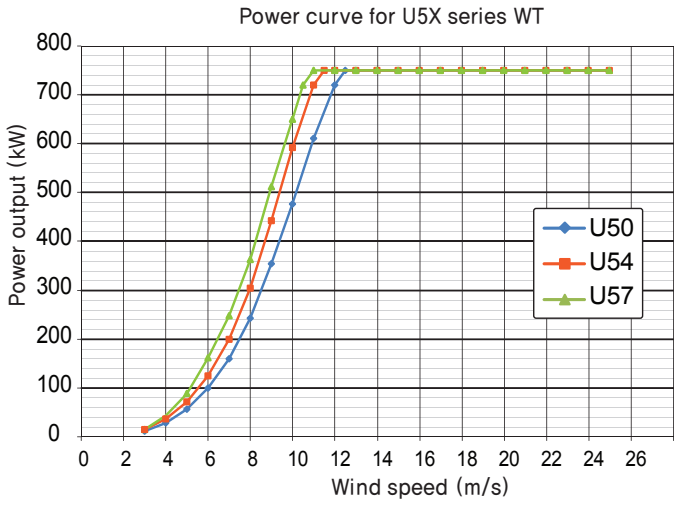
> Two separated high performance roller bearings minimize the load influence from wind changes (Suitable for sites with high turbulence)
> Fully encapsulated Generator with water cooling system to protect inner components against corrosion from high density of salt, humidity and dust
> Enhanced reliability through installation of proven components
> Aerodynamic blade tip and mechanical component design minimize noise emissions

Grid-friendly Electricity

> With our reliable PM synchronous generator that is particularly beneficial for weak grids
> Power factor correction device and Excitation are not needed
> Built in grid fault-ride-through technology is available on request

Cost effective maintenance

> Low rotational speed resulting in less wear and high durability
> Energy production down time is significantly reduced by implimenting a gearless design
> All maintenance is done in nacelle without the need for expensive equipment



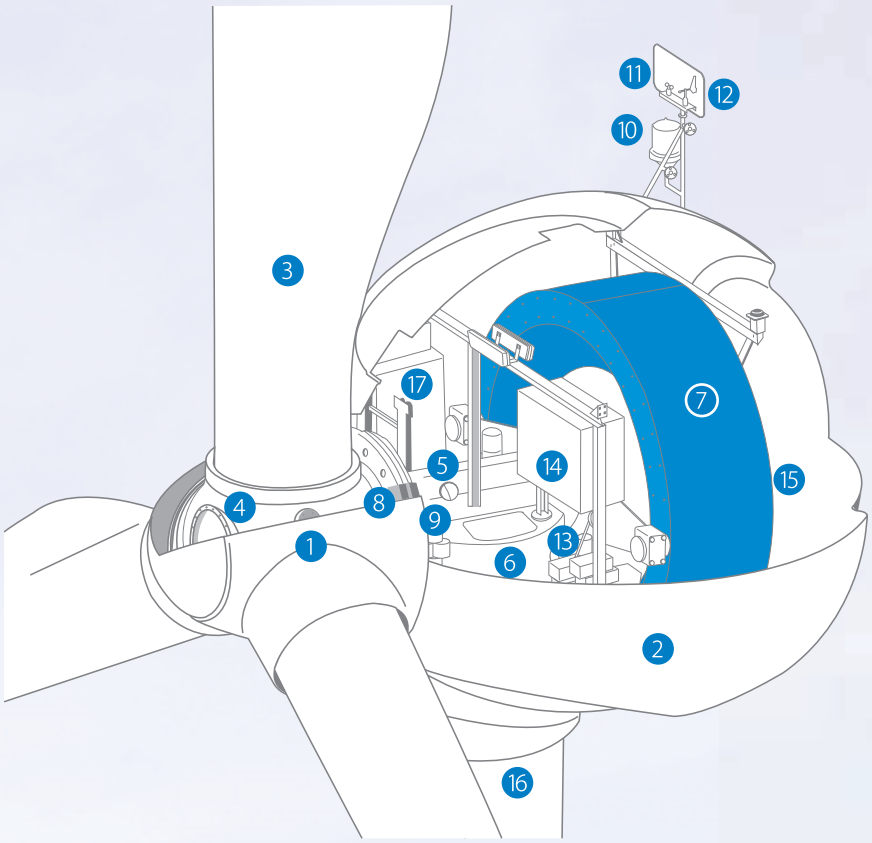
International Certificate

Design Certificate

Germanischer Lloyd
Statement of Compliance
for Design Assessment
(No. WT00-002A-2005)

Type Certificate

DEWI-OCC
(No. TC-070601, Rev.3)



750 kW

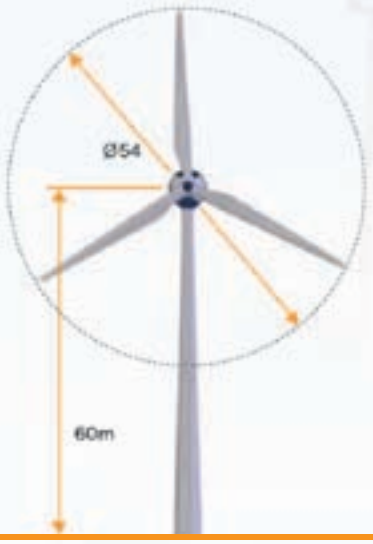
for IEC Class
Ⅰ, Ⅱ & Ⅲ Wind conditions

1. Spinner
2. Nacelle Cover
3. Blade
4. Rotor Hub
5. Main Shaft
6. Machine Frame
7. PM Generator
8. Rotor Brakes
9. Yaw Drive
10. Lightning Arrester
11. Wind Vane
12. Anemometer
13. Hydraulic Unit
14. Controller
15. Heat Exchanger
16. Tower
17. PCS

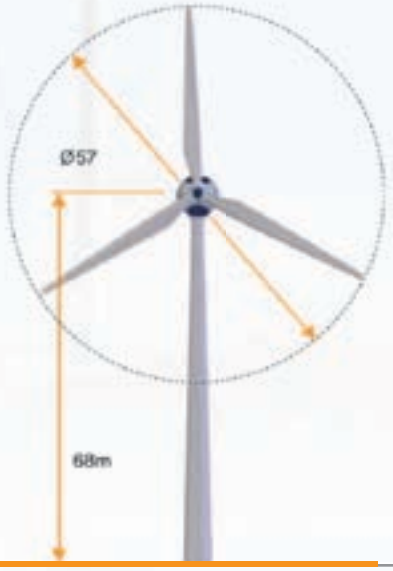
>>> Technical Specifications

Model_U50

Model_U54



Model_U57



General

Type	Horizontal axis, Upwind		
Rated power	750kW		
Model	U50	U54	U57
Design class	IEC IA	EC IIA	IEC IIIA
Hub height	50m	60m	68m
Cut-in speed	3m/s	3m/s	3m/s
Rated	12.5m/s	11.5m/s	11.5m/s
Cut-out	25m/s	25m/s	25m/s

Pitch System

Type	Independent blade pitch
Drive	DC electric servo-drive

Hub

Type	Spherical Graphite Iron Casting

Machine frame

Type	Hot rolled steel, single piece, welds

Generator

Type	Permanent Magnet, Synchronous
Rated power	805kW
Voltage	780V
Enclosure	IP 54
Cooling	Water-cooled

Noise performance

SPL @ 8m/s	100.9dB(A) (U50)

Power Converter

Type	AC/DC/AC IGBT Inverter
Voltage	690V
Frequency	50/ 60Hz

Yaw System

Type	Active
Drive	3×Asynchronous motor
Brake	Active hydraulic disc brakes
Yaw bearing	Ball bearing

Lightning protection

Blade	1 receptor, internal ground conductor
Nacelle	Lightning brush
Standard	According to IEC61400-24

Rotor

Diameter	50m	54m	57m
Swept area	1,964	2,290	2,552
Tip speed	65.4m/s	70.7m/s	74.6m/s
Material	Glass / Epoxy		
Tilt angle	5 deg		
Cone angle	2.5 deg		
Operation RPM	Variable, 9~28 rpm		
Primary brake	Blade pitch (aerodynamic)		

Drive train

Type	Direct drive
Rated power	850kW

Parking brake

Type	4 discs, Active hydraulic

Controller

Processor	Micro-Processor based PLC
Rmotecontrol	Web based (Via ethemer and modem)

Grid compatibility

Frequency	Fn ± 1Hz during 0.1sec
Over voltage	690 VAC×110% during 0.1sec
Under voltage	690 VAC×90% during 0.1sec
Phase unbalance	120±6

Service crane

On-board	250kg crane

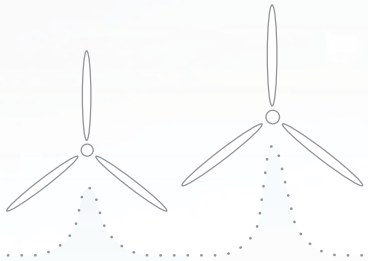
Tower

Type	Tubular		
Hub height	50m	60m	68m
Number of sections	2	2	3

※ Alternative tower height can be arranged upon request.

Temperature Conditions

Standard	Operate	-15 ~ +40°C
	Stand still	-20 ~ +55°C
Cold climate	Operate	-30 ~ +40°C
	Stand still	-40 ~ +55°C






Wind Turbine Factory

750kW

Specialized Wind Turbine Manufacturer

UNISON Co., Ltd.

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EWT

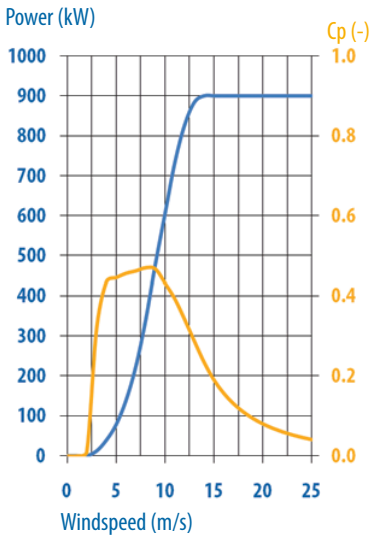
Direct Drive Wind Technology

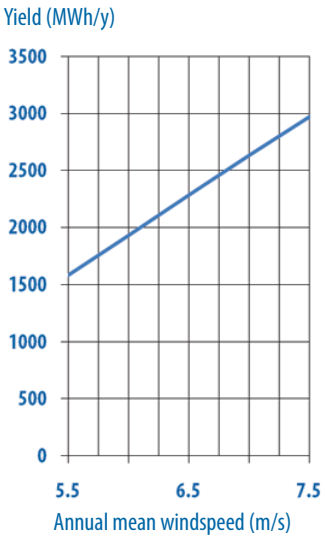
Proven robust 900kW Direct Drive wind turbine

*The DIRECT**WIND** 52/54 – 900kW is a pitch controlled variable speed wind turbine that combines continuous market driven innovation with highly advanced direct drive technology. The DIRECT**WIND** 52/54 – 900kW turbine boasts a track record over 300 operating turbines in many different wind climates.*

Specifications

Rotor diameter	52 or 54m
IEC Wind Class	IIA & IIIA
Rotor speed	Variable, 12 - 28 rpm
Nominal power output	900 kW
Hub heights	35, 40, 50 and 75 m
Cut-in wind speed	2.5 m/s
Rated wind speed	13 m/s
Cut-out wind speed	25 m/s, 10 min. avg.
Survival wind speed	59.5 m/s
Power output control	Pitch controlled variable speed
Generator	Synchronous multi-pole wound-rotor
Power converter	IGBT-controlled





Direct Drive Wind Technology

Direct Drive Wind Technology

In EWT turbines the rotor directly drives the synchronous generator, without the use of a gearbox. This is important because various studies have concluded that the dominant cause of downtime is malfunctioning of gearboxes. The generated energy is fed into the grid via a modern back-to-back full-power converter which controls the output, so grid requirements can be met. This makes the *DIRECT**WIND*** turbine suitable to operate in weak grids.

Advantages of EWT's Direct Drive Technology:

- Superior availability levels
- No need to replace gearboxes
- Higher yields / return on investment
- Lower maintenance costs
- Reduced noise levels
- Lower cost of ownership

Power quality & Site conditions

The *DIRECT**WIND*** turbine feeds generator power into the grid by means of a modern 'back-to-back' type full-converter system. This converter contains a number of programmable functions like a capability to limit output during night hours and a noise reduction measure. Built-in grid-fault-ride-through technology is available on demand.

All the advanced grid-connection features combined make the *DIRECT**WIND*** the perfect choice for solitary applications, weak grids, high-turbulence sites, and demanding locations where specific environmental demands have to be met.

The combination of advanced control features and proven wind technology makes the *DIRECT**WIND*** also a first-class choice with regard to energy yield. Fewer components, high reliability, reduced maintenance and excellent energy yield ensure an optimal return on investment. We are looking forward to showing you what our *DIRECT**WIND*** systems can offer.

DSP - DIRECTWIND Service Program

EWT stands for high-quality direct drive turbines characterized by reliability and cost efficiency. To ensure optimal performance and trouble-free operation of our *DIRECT**WIND*** turbines, we have a extensive service and maintenance program in place. The *DIRECT**WIND*** Service Program offers:

- Preventive maintenance
- Availability guarantee
- Extended product warranty
- Corrective maintenance
- Power curve guarantee
- Business Interruption compensation

The company

EWT is a global designer and manufacturer of direct drive wind turbines active in Europe, North America and Asia. EWT was established in 2004 and is based in the Netherlands. The company has an extensive product line, an engineering department covering all relevant disciplines and a dedicated service and maintenance organisation.

EWT B.V.

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