

2 MW PLATFORM

Are you looking for the maximum return on **your investment** in wind energy?

Wind energy means the world to us. And we want it to mean the world to our customers, too, by maximising your profits and strengthening the certainty of your investment in wind power.

That's why, together with our partners, we always strive to deliver cost-effective wind technologies, high quality products and first class services throughout the entire value chain. And it's why we put so much emphasis on the reliability, consistency and predictability of our technology.

These aren't idle words. We have over 30 years' experience in wind energy. During that time, we've delivered more than 55 GW of installed capacity and we currently monitor over 23,000 wind turbines across the globe. Tangible proof that Vestas is the right partner to help you realise the full potential of your wind site.

What is the 2 MW platform?

Our 2 MW platform provides industry-leading reliability, serviceability and availability. Durable and dependable, the platform is built on technology that has been proven in the field over more than a decade. The 2 MW platform reduces your costs, minimises the risk of turbine downtime and helps to safeguard your investment.

You can choose from four turbines on the 2 MW platform:

- V110-2.0 MW™ IEC IIIA
- V100-1.8/2.0 MW™ IEC IIIA/IEC IIB
- V90-1.8/2.0 MW* IEC IIA/IEC IIIA
- V80-2.0 MW* IEC IA

Each 2 MW turbine incorporates enhancements that improve performance and reliability, reducing your cost of energy. The platform's predictability allows you to forecast confidently, strengthening the business case for investment, while the tried-and-tested design ensures you can produce energy on low, medium and high-wind onshore sites at the lowest possible cost, even in extreme weather conditions. In addition, remote monitoring and easy servicing keep operational costs at a minimum, while its highly-tested components and power and control systems enhance reliability.



+11,600

The performance and reliability of the 2 MW platform have seen over 11,600 turbines installed world-wide since 2002.

How does the 2MW platform increase **reliability** and **performance**?

Created with future generations of turbines in mind, the 2 MW platform's single-piece bed frame and stronger main bearing housing provide a better foundation for loads. The toughened frame and housing – each made from single-piece castings – work in conjunction to absorb higher loads from the rotor.

Additionally, the housing ensures correct alignment during bearing assembly, making the process more accurate and efficient and distributing loads evenly. These improvements combine to increase production capabilities and reduce downtime.

A reliable performer

The 2 MW platform is an extremely reliable turbine, which is documented through its strong availability performance. With the newest addition of rotor size, the 2 MW platform offers a competitive selection of turbines for all wind segments.

Thoroughly tested

The current 2 MW platform is built on unique knowledge from more than a decade of operational experience. We constantly monitor the majority of the installed 2 MW turbines, providing us with very detailed and invaluable information about how the turbine operates under all kinds of site conditions.

Our quality-control system ensures that each component is produced to design specifications and performs to peak potential at site. We also employ a Six Sigma philosophy and have identified critical manufacturing processes (both in-house and for suppliers). We systematically monitor measurement trends that are critical to quality, locating defects before they occur.

Innovative CoolerTop®

Our exclusive CoolerTop® technology uses the wind's own energy to generate the cooling required, rather than consuming energy from the wind turbine generator. CoolerTop® has no moving parts and requires little maintenance. Furthermore, the absence of cooling fans contributes to turbine efficiency and makes no noise.

Load and Power Modes increase energy output

The 2 MW platform supports Load and Power Modes, used to maximise energy production under specific wind and site conditions. Based on a site analysis, turbines can be configured to run derated when wind conditions require it. Conversely, under mild wind conditions, the turbine can be uprated - maximising annual energy production.

The 2 MW platform covers all wind segments enabling you to find the best turbine for your specific site.

WINDCLASSES - IEC

TURBINE TYPE	IEC III (6.0 – 7.5 m/s)	IEC II (7.5 – 8.5 m/s)	IEC I (8.5 – 10.0 m/s)
2 MW TURBINES			
V110-2.0 MW™ IEC IIIA			
V100-1.8/2.0 MW™ IEC IIIA/IEC IIB			
V90-1.8/2.0 MW® IEC IIA/ IEC IIIA			
V80-2.0 MW® IEC IA			

■ Turbulence level A ■ Turbulence level B

Low Balance of Plant, installation and transportation costs

At Vestas, we use technology tailored to control loads on specific tower heights. We have applied this principle to the 2 MW platform by reducing both the weight of the turbine and the loads on the tower and foundation. This reduces foundation costs, saving you unnecessary expense.

All 2MW turbines are easy to transport (by rail, truck or ship) to virtually any site around the world. In terms of weight, height and width, all components comply with local and international standard transportation limits, ensuring you incur no unforeseen costs. In addition, 2MW turbines are built and maintained using tools and equipment that are standard in the installation and servicing industries – minimising maintenance costs.

Vestas Online® Business

All Vestas wind turbines benefit from Vestas Online® Business, the latest Supervisory Control and Data Acquisition (SCADA) system for modern wind power plants. This flexible system includes an extensive range of monitoring and management functions to control your wind power plant in the same way as a conventional power plant. Vestas Online® Business enables you to optimise production levels, monitor performance, and produce detailed, tailored reports from anywhere in the world. The system's power plant controller provides active and reactive power regulation, power ramping and voltage control.

24/7 remote surveillance with VMP Global® and Vestas Online® Business

To reduce the cost of energy, the 2 MW platform is equipped with VMP Global®, our latest turbine control and operation software. Developed to run this latest generation of turbines, VMP Global®, combined with Vestas Online® Business, automatically manages the turbine 24/7 and ensures maximum power generation. The application also monitors and troubleshoots the turbines – both onsite and remotely – saving further expense on servicing.

Designed for serviceability

Service is facilitated by the overall design of the 2 MW platform and components are specifically positioned for easy access.

Options available for the 2 MW platform

- Yaw power backup
- Increased cut-in
- Shadow detection
- Obstacle Collision Avoidance System (OCAS™)
- Smoke and heat detection
- Aviation marking
- Load and power modes

Would you **benefit** from uninterrupted control of wind energy production?

Knowledge about wind project planning is key

Getting your wind energy project up and operating as quickly as possible is fundamental to its long-term success. One of the first and most important steps is to identify the most suitable location for your wind power plant. Vestas' SiteHunt® is an advanced analytical tool that examines a broad spectrum of wind and weather data to evaluate potential sites and establish which of them can provide optimum conditions for your project.

In addition, SiteDesign® optimises the layout of your wind power plant. SiteDesign® runs Computational Fluid Dynamics (CFD) software on our powerful in-house supercomputer Firestorm to perform simulations of the conditions on site and analyse their effects over the whole operating life of the plant. Put simply, it finds the optimal balance between the estimated ratio of annual revenue to operating costs over the lifetime of your plant, to determine your project's true potential and provide a firm basis for your investment decision.

The complexity and specific requirements of grid connections vary considerably across the globe, making the optimal design of electrical components for your wind power plant essential. By identifying grid codes early in the project phase and simulating extreme operating conditions, Electrical PreDesign provides you with an ideal way to build a grid compliant, productive and highly profitable wind power plant. It allows customised collector network cabling, substation protection and reactive power compensation, which boost the cost efficiency of your business.

Advanced monitoring and real-time plant control

All our wind turbines can benefit from VestasOnline® Business, the latest Supervisory Control and Data Acquisition (SCADA) system for modern wind power plants.

This flexible system includes an extensive range of monitoring and management functions to control your wind power plant. VestasOnline® Business enables you to optimise production levels,



+24,000

The Vestas Performance and Diagnostics Centre monitors more than 24,000 turbines worldwide. We use this information to continually develop and improve our products and services.

monitor performance and produce detailed, tailored reports from anywhere in the world. The VestasOnline® Power Plant Controller offers scalability and fast, reliable real-time control and features customisable configuration, allowing you to implement any control concept needed to meet local grid requirements.

Surveillance, maintenance and service

Operating a large wind power plant calls for efficient management strategies to ensure uninterrupted power production and to control operational expenses. We offer 24/7 monitoring, performance reporting and predictive maintenance systems to improve turbine performance and availability. Predicting faults in advance is essential, helping to avoid costly emergency repairs and unscheduled interruptions to energy production.

Our Condition Monitoring System (CMS) assesses the status of the turbines by analysing vibration signals. For example, by measuring the vibration of the drive train, it can detect faults at

an early stage and monitor any damage. This information allows pre-emptive maintenance to be carried out before the component fails, reducing repair costs and production loss.

Additionally, our Active Output Management® (AOM) concept provides detailed plans and long term agreements for service and maintenance, online monitoring, optimisation and troubleshooting. It is possible to get a full scope contract, combining your turbines' state-of-the-art technology with guaranteed time or energy-based availability performance targets, thereby creating a solid base for your power plant investment. The Active Output Management® agreement provides you with long term and financial operational peace of mind for your business case.

V110-2.0 MW™

Facts & figures

POWER REGULATION

Pitch regulated with variable speed

OPERATING DATA

Rated power	2,000 kW (50/60 Hz)
Cut-in wind speed	3 m/s
Rated wind speed	11.5 m/s
Cut-out wind speed	20 m/s
Wind class	IEC IIIA
Operating temperature range:	standard turbine: -20 °C to 40 °C. low temperature turbine: -30 °C to 40 °C

SOUND POWER

Max 107.5 dB*

(Mode 0, 10 m above ground, hub height 80 m, air density 1.225 kg/m³)

* for further information on noise limits please contact Vestas

ROTOR

Rotor diameter	110 m
Swept area	9,503 m²
Air brake	full blade feathering with 3 pitch cylinders

ELECTRICAL

Frequency	50/60 Hz
Generator type	4-pole (50 Hz)/6-pole (60 Hz) doubly fed generator, slip rings

GEARBOX

Type	two helical stages and one planetary stage
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BLADE DIMENSIONS

Length	54 m
Max. chord	3.9 m

TOWER

Type	tubular steel tower
Hub heights*	95 m and 125 m (50 Hz) 80 m and 95 m (60 Hz)

* Tower heights are preliminary and subject to change

NACELLE DIMENSIONS

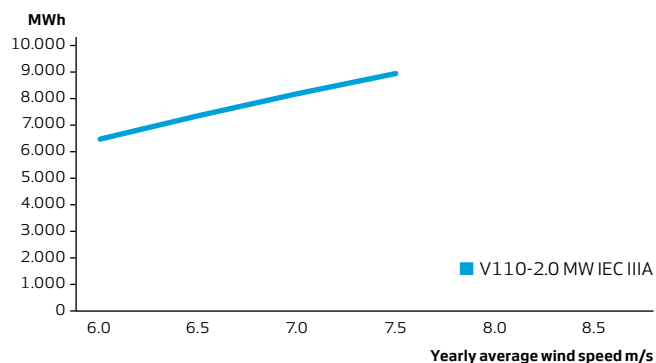
Height for transport	4 m
Height installed (incl. CoolerTop®)	5.4 m
Length	10.4 m
Width	3.5 m

HUB DIMENSIONS

Max. transport height	3.4 m
Max. transport width	4 m
Max. transport length	4.2 m

Max. weight per unit for transportation	70 metric tonnes
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ANNUAL ENERGY PRODUCTION

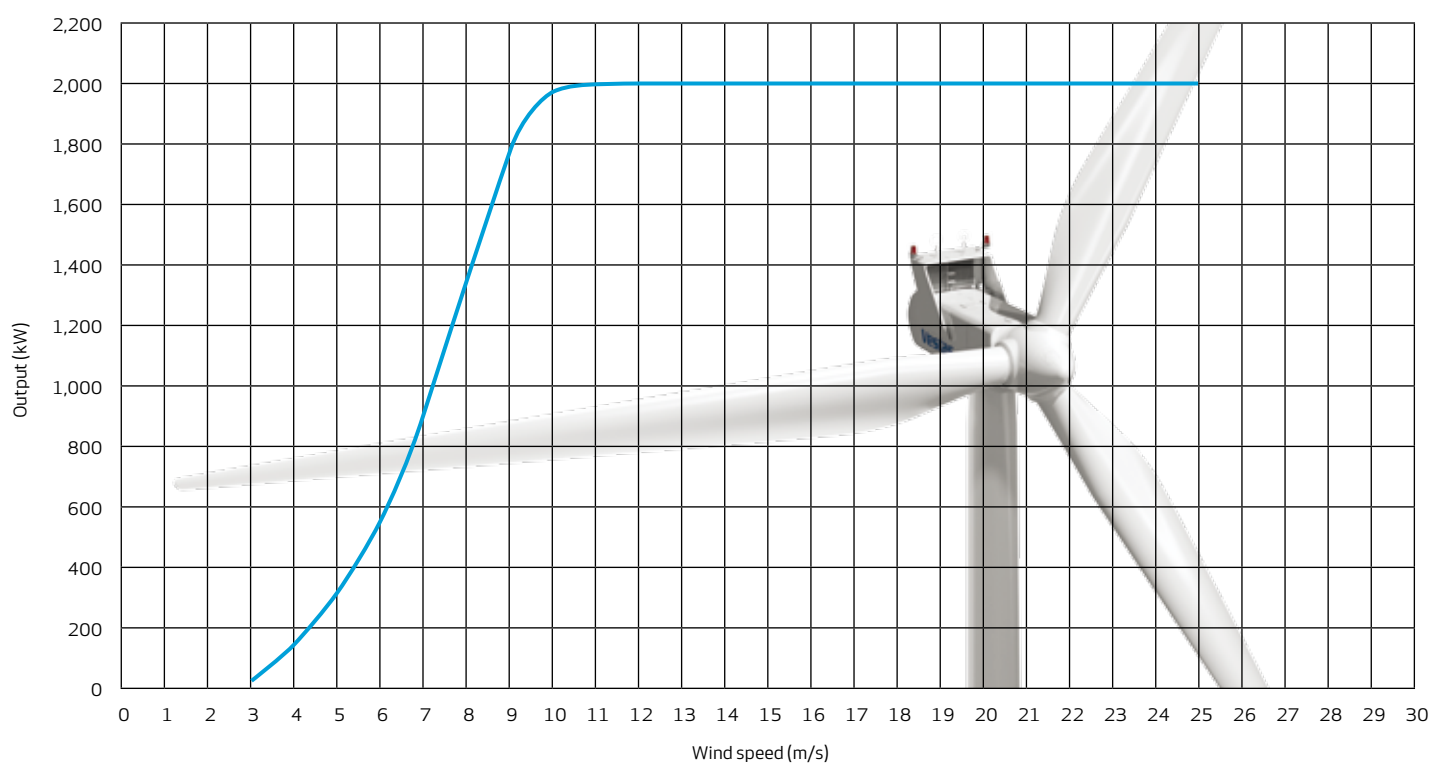


Assumptions

One wind turbine, 100% availability, 0% losses, k factor =2, Standard air density = 1.225, wind speed at hub height

POWER CURVE FOR V110-2.0 MW®

Noise reduced sound power modes are available



V110-2.0 MW OPTIONS

- Yaw Power Backup
- Increased Cut-In
- Shadow detection
- OCAS™
- Smoke and heat detection
- Aviation marking
- Load mode

V100-1.8/2.0 MW™

Facts & figures

POWER REGULATION

Pitch regulated with variable speed

OPERATING DATA

Rated power	1,800/2,000 kW (50/60 Hz*)
Cut-in wind speed	3 m/s
Rated wind speed	12 m/s
Cut-out wind speed	20 m/s
Wind class	IEC S (IEC IIIA average wind/ IEC IIA extreme wind) IEC IIB (50/60 Hz)
Operating temperature range:	standard turbine: -20 °C to 40 °C. low temperature turbine: -30 °C to 40 °C

* The rated power for V100 IEC IIIA 60 Hz is limited to 1950 kW in North America

SOUND POWER

Max 105 dB*

(Mode 0, 10 m above ground,
hub height 80 m, air density 1.225 kg/m³)

*for further information on noise limits please contact Vestas

ROTOR

Rotor diameter	100 m
Swept area	7,854 m²
Air brake	full blade feathering with 3 pitch cylinders

ELECTRICAL

Frequency	50/60 Hz
Generator type	4-pole (50 Hz)/6-pole (60 Hz) doubly fed generator, slip rings

GEARBOX

Type	two helical stages and one planetary stage
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BLADE DIMENSIONS

Length	49 m
Max. chord	3.9 m

TOWER

Type	tubular steel tower
Hub heights	80 m, 95 m and 120 m (IEC IIIA)

NACELLE DIMENSIONS

Height for transport	4 m
Height installed (incl. CoolerTop®)	5.4 m
Length	10.4 m
Width	3.5 m

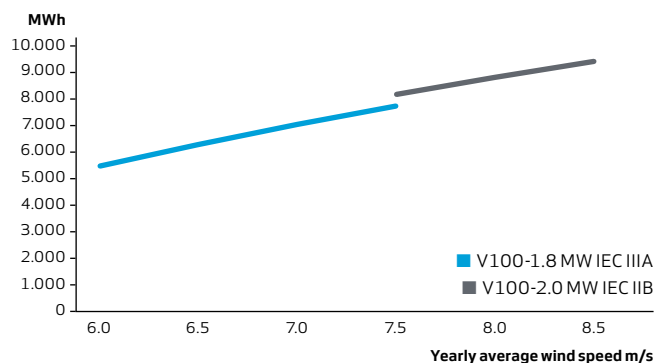
HUB DIMENSIONS

Max. transport height	3.4 m
Max. transport width	4 m
Max. transport length	4.2 m

Max. weight per unit for
transportation

70 metric tonnes

TURBINE OPTIONS

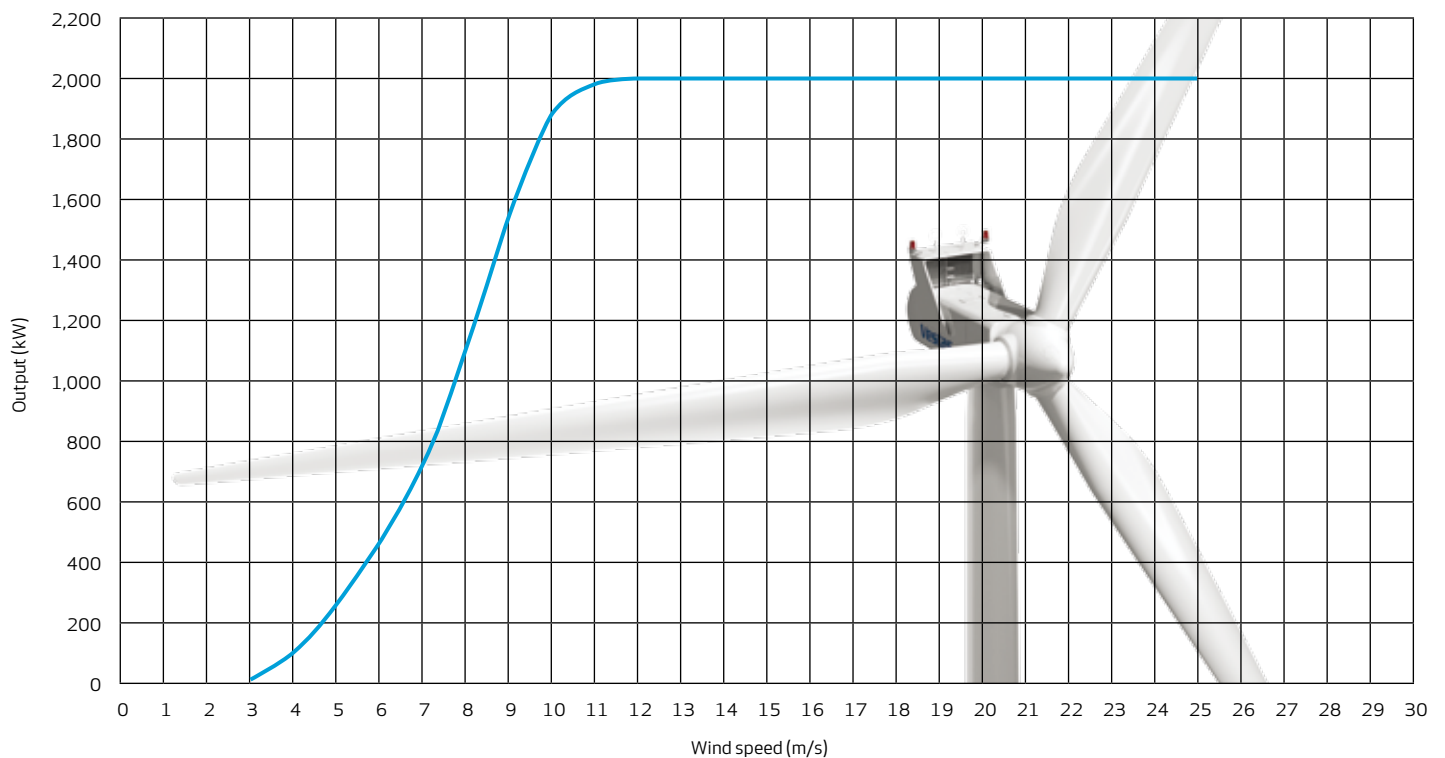


Assumptions

One wind turbine, 100% availability, 0% losses, k factor =2,
Standard air density = 1.225, wind speed at hub height

POWER CURVE FOR V100-1.8/2.0 MW* (50/60 Hz)

Noise reduced sound power modes are available



V100-1.8/2.0 MW OPTIONS

- Yaw Power Backup
- Increased Cut-In
- Shadow detection
- OCAS™
- Smoke and heat detection
- Aviation marking
- Load and power modes

V90-1.8/2.0 MW®

Facts & figures

POWER REGULATION

Pitch regulated with variable speed

OPERATING DATA

Rated power	IEC IIA - 50 Hz: 1,800 kW IEC IIA - 60 Hz: 1,815 kW IEC IIIA - 50 Hz: 2,000 kW
Cut-in wind speed	4 m/s
Rated wind speed	12 m/s
Cut-out wind speed	25 m/s
Wind class	IEC IIA (V90-1.8 MW) IEC IIIA (V90-2.0 MW)
Operating temperature range:	standard turbine: -20 °C to 40 °C. low temperature turbine: -30 °C to 40 °C

SOUND POWER

Max 104 dB*

(Mode 0, 10 m above ground, hub height 80 m, air density 1.225 kg/m³)

* for further information on noise limits please contact Vestas

ROTOR

Rotor diameter	90 m
Swept area	6,362 m²
Air brake	full blade feathering with 3 pitch cylinders

ELECTRICAL

Frequency	50/60 Hz
Generator type	4-pole (50 Hz)/6-pole (60 Hz) doubly fed generator, slip rings
Nominal output	50 Hz: 1,800 kW/2,000 kW 60 Hz: 1,815 kW

GEARBOX

Type	two helical stages and one planetary stage
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BLADE DIMENSIONS

Length	44 m
Max. chord	3.5 m

TOWER

Type	tubular steel tower
Hub heights	
V90-1.8 MW - 50 Hz	80 m, 95 m and 105 m (IEC IIA)
V90-1.8 MW - 60 Hz	80 m and 95 m (IEC IIA)
V90-2.0 MW	80 m, 95 m, 105 m and 125 m (IEC IIIA) 95 m, 105 m, and 125 m (DIBt2)

NACELLE DIMENSIONS

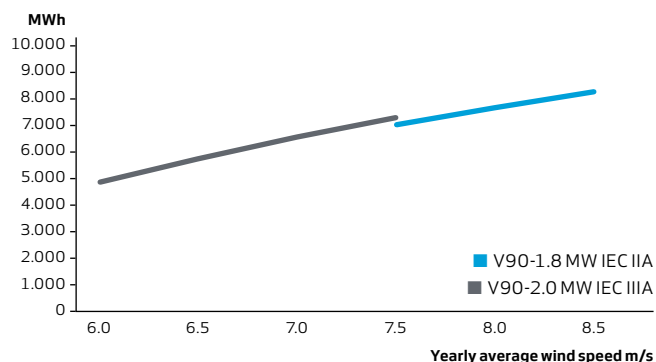
Height for transport	4 m
Height installed (incl. CoolerTop®)	5.4 m
Length	10.4 m
Width	3.5 m

HUB DIMENSIONS

Max. transport height	3.4 m
Max. transport width	4 m
Max. transport length	4.2 m

Max. weight per unit for transportation	70 metric tonnes
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ANNUAL ENERGY PRODUCTION

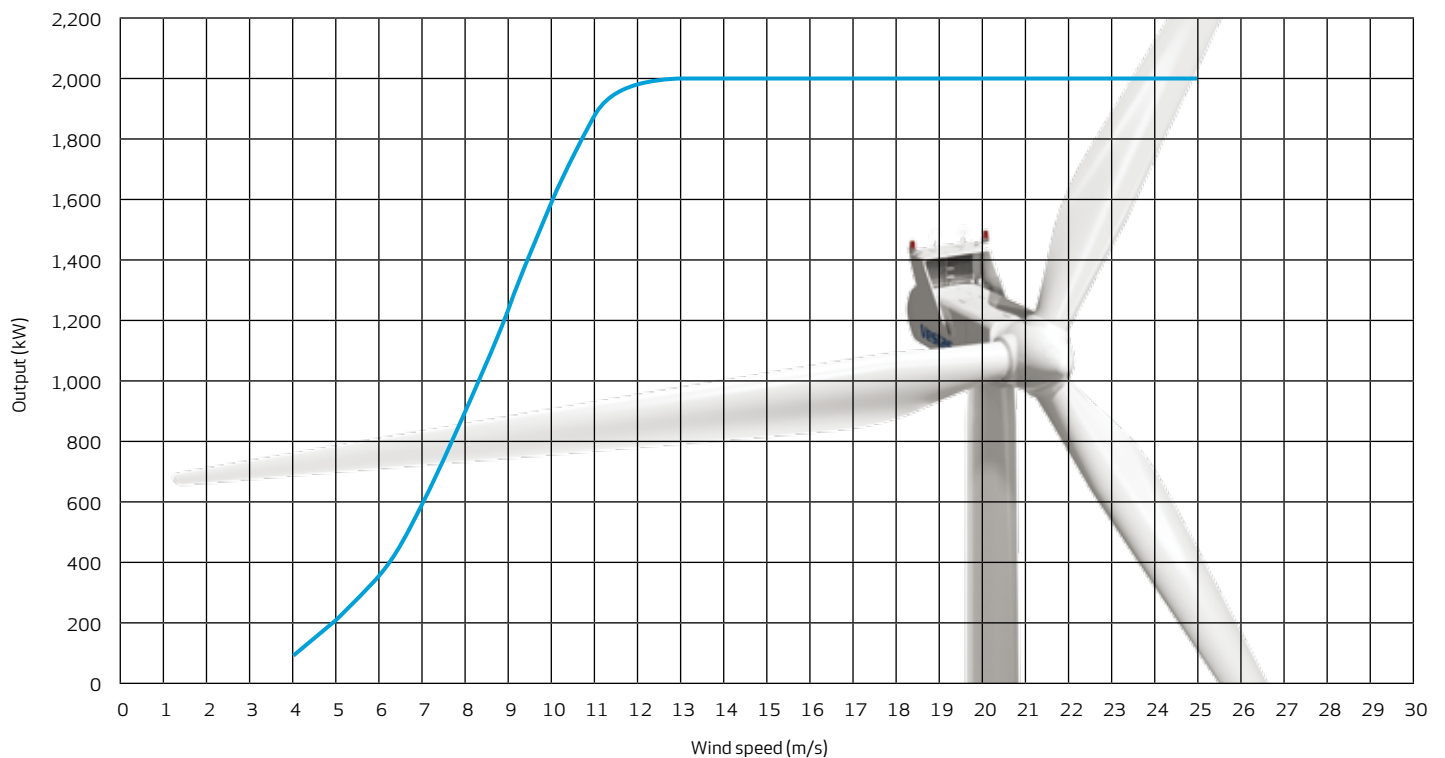


Assumptions

One wind turbine, 100% availability, 0% losses, k factor =2, Standard air density = 1.225, wind speed at hub height

POWER CURVE FOR V90-1.8/2.0 MW* (50/60 Hz)

Noise reduced sound power modes are available



V90-1.8/2.0 MW OPTIONS

- Yaw Power Backup
- Increased Cut-In
- Shadow detection
- OCAS™
- Smoke and heat detection
- Aviation marking
- Load and power modes

V80-2.0 MW®

Facts & figures

POWER REGULATION

Pitch regulated with
variable speed

OPERATING DATA

Rated power	2,000 kW (50/60 Hz)
Cut-in wind speed	4 m/s
Rated wind speed	14 m/s
Cut-out wind speed	25 m/s
Wind class	IEC IA
Operating temperature range:	standard turbine: -20 °C to 40 °C. low temperature turbine: -30 °C to 40 °C

SOUND POWER

Max 105 dB*

(Mode 0, 10 m above ground,
hub height 80 m, air density 1.225 kg/m³)

* for further information on noise limits please contact Vestas

ROTOR

Rotor diameter	80 m
Swept area	5,027 m²
Air brake	full blade feathering with 3 pitch cylinders

ELECTRICAL

Frequency	50/60 Hz
Generator type	4-pole (50 Hz)/6-pole (60 Hz) doubly fed generator, slip rings

GEARBOX

Type	two helical stages and one planetary stage
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BLADE DIMENSIONS

Length	39 m
Max. chord	3.4 m

TOWER

Type	tubular steel tower
Hub height	80 m

NACELLE DIMENSIONS

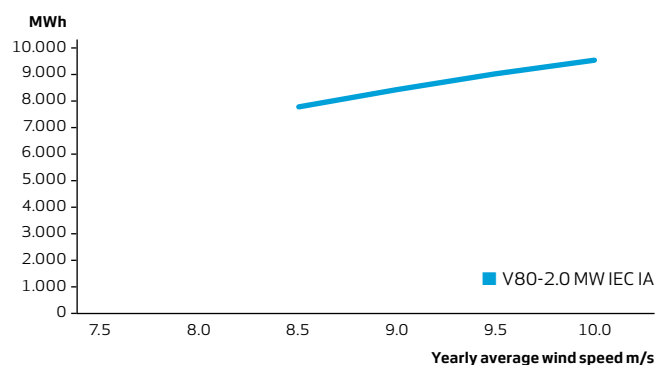
Height for transport	4 m
Height installed (incl. CoolerTop®)	5.4 m
Length	10.4 m
Width	3.5 m

HUB DIMENSIONS

Max. transport height	3.4 m
Max. transport width	4 m
Max. transport length	4.2 m

Max. weight per unit for transportation	70 metric tonnes
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ANNUAL ENERGY PRODUCTION

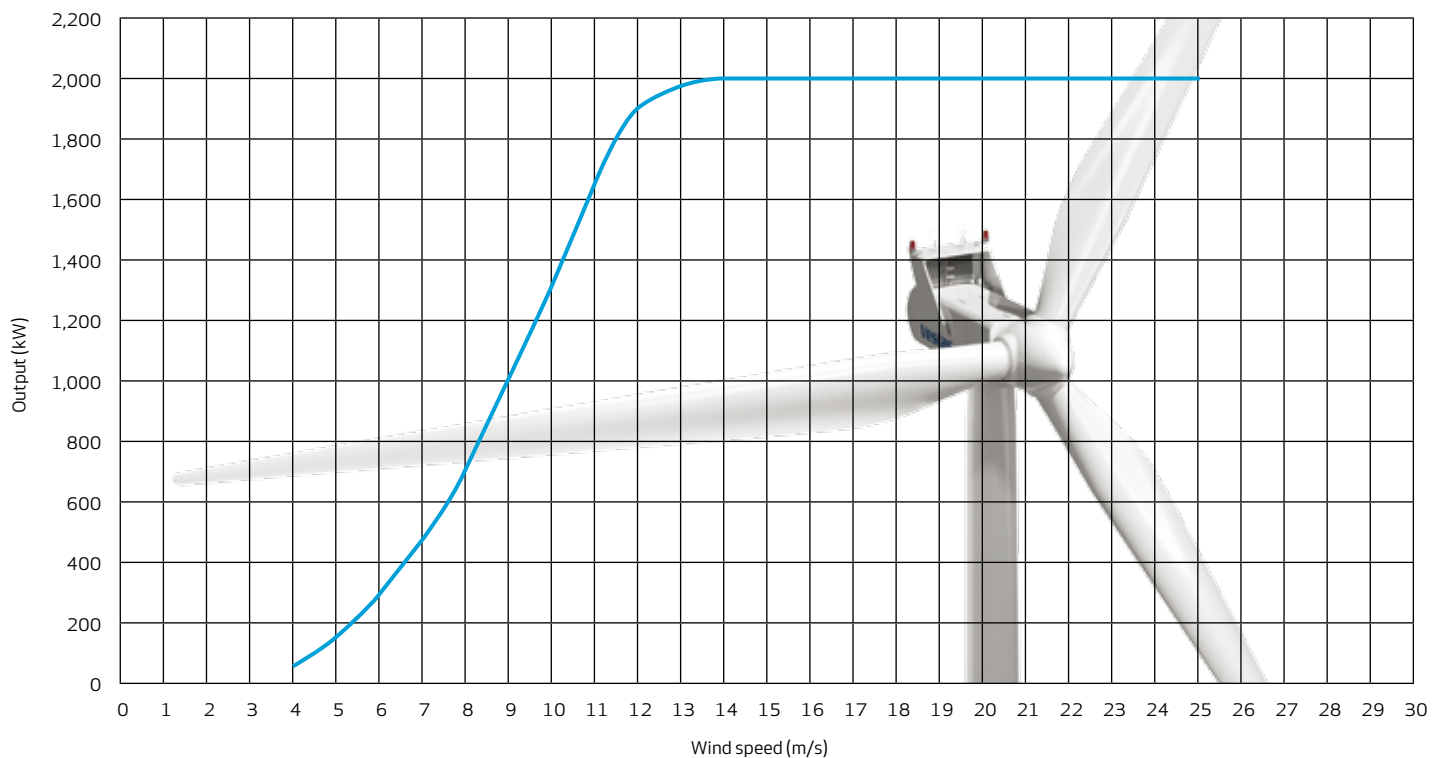


Assumptions

One wind turbine, 100% availability, 0% losses, k factor =2,
Standard air density = 1.225, wind speed at hub height

POWER CURVE FOR V80-2.0 MW* (50/60 Hz)

Noise reduced sound power modes are available



V80-2.0 MW OPTIONS

- Yaw Power Backup
- Increased Cut-In
- Shadow detection
- OCAS™
- Smoke and heat detection
- Aviation marking

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in

Case No(s). 14-1591-EL-BGA

Summary: Exhibit A to Application (Part 1/2) electronically filed by Mr. Michael J. Settineri on behalf of Black Fork Wind Energy LLC