

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 40 years' experience in wind energy. During that time, we've delivered more than 196 GW of installed capacity and we currently monitor over 50,000 wind turbines across the globe. Tangible proof that Vestas is the right partner to help you realise the full potential of your wind site.



Performance and reliability

Due to the strong performance and reliability of the 2 MW platform, over 29,000 turbines have been installed since 2000 across 48 countries with a capacity of more than 58 GW.

Turbines installed:

+ 29,000

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 the following turbines within the 2 MW platform:

- V110-2.0 MW® IEC IIIA
- V120-2.2 MW™ IEC IIB/IEC S

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 ultra-low, 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.

How does the 2 MW platform increase reliability and performance?

Created with future generations of turbines in mind, the 2 MW platform’s single-piece bed frame and strong main bearing housing provide a better foundation for loads. The 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 accurate and efficient and distributing loads evenly.

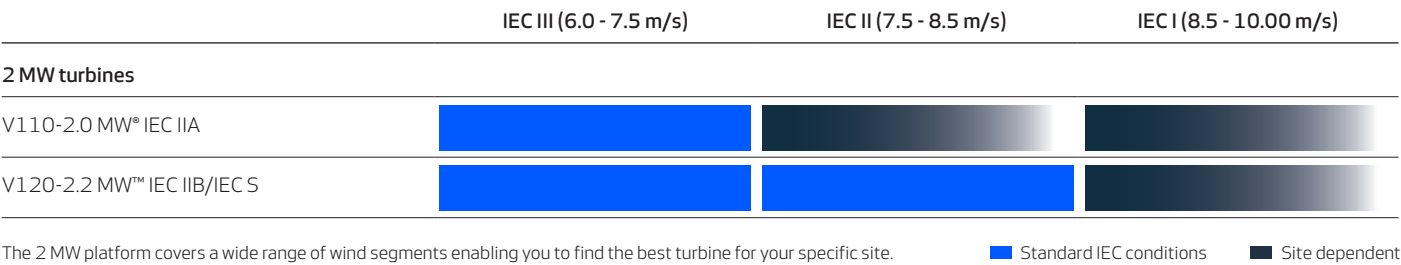
A reliable performer
The 2 MW platform is an extremely reliable technology, which is documented through its strong availability performance. It offers a competitive selection of turbines across the wind segments.

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.

Power Optimised Modes increase energy output
The 2 MW platform supports Power Optimised Modes, used to maximise energy production under specific wind and site conditions. Based on a site analysis



and under mild wind conditions, the V110-2.0 MW™ can be uprated up to 2.2 MW, maximising Annual Energy Production.

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.

2 MW platform variants 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, 2 MW 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.

The knowledge to control

The wind project planning is key. When planning a wind power plant, there are a broad range of factors over its entire lifecycle that will impact its success in the long-term. These range from financing and siting, to grid requirements and the regulatory framework.



One of the first and most important steps is to identify the most suitable location for your wind power plant. Vestas' siting capabilities cover all the steps from finding a site, until delivering a fully optimised power plant set up.

Using the largest weather library in the industry, site-specific met mast campaigns and advanced analytical tools, Vestas 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, Vestas can optimise the layout of your wind power plant and the technology selection with high accuracy by implementing detailed 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, Vestas' 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.

Designed for high park performance
Supported by Vestas' vast operational experience, site specific design capabilities and sophisticated load models, the 2 MW platform technology allows customers to choose the optimal turbine configuration for each unique site. The 2 MW platform has been strengthened through selected component upgrades. The control system of the 2 MW platform turbines has been

proven since 2000 and optimised for a range of rotor diameters from 80m to 120m. The result is a confident control and a robust aerodynamic performance.

The Vestas 2 MW platform wind turbines can benefit from Vestas SCADA system, which includes an extensive range of monitoring and management functions to control your wind power plant, optimise production levels, monitor performance and obtain reports from anywhere in the world. The Vestas SCADA system ensures efficient operation of the power plant, including integration of balance of plant and additional equipment needed to meet specific grid requirements.

Condition monitoring and maintenance
Operating a large wind power plant calls for efficient management strategies to minimise downtime and operational expenses. Vestas offers 24/7 monitoring, performance reporting and predictive maintenance solutions to improve turbine performance and availability.

Vestas Condition Monitoring Solution (CMS) enables to predict the failure of components by analysing vibration signals, preventing major equipment damages and enabling to optimise the service planning according to the energy production and weather conditions.

Additionally, Vestas' Active Output Management® (AOM) provides detailed plans and long-term agreements for maintenance, online monitoring, optimisation and troubleshooting. It is possible to get a full scope contract, combining turbine technology with guaranteed time or energy-based availability performance targets, thereby creating a solid base for your power plant investment.

Performance and diagnostics

The Vestas Performance and Diagnostics Centre monitors more than 50,000 turbines worldwide.

We use this information to continually develop and improve our products and services.

Turbines monitored:

+50,000

Vestas' transparency towards Sustainability

Vestas Sustainability

In 2020 we introduced our sustainability strategy, Sustainability in Everything We Do. At Vestas we are working to improve our own environmental performance, create value for local communities, promote a safe, diverse, and inclusive workplace, while leading the transition to a world powered by sustainable energy. We believe these efforts will help to elevate the standards of our industry as a whole. Read more about Vestas sustainability strategy at www.vestas.com/en/sustainability/sustainability-strategy.

Life Cycle Assessments (LCA)

Since 1999, we have been developing wind turbine LCAs to give 'cradle-to-grave' evaluations of the environmental impact of our products and solutions. These evaluations concentrate on two key actions: documenting the environmental performance of Vestas wind turbines and analysing the results to reduce the environmental impact of our turbines. The LCAs provide environmental impact transparency to help customers achieve their own sustainability ambitions. To view our current portfolio of Life Cycle Assessments visit the following page: www.vestas.com/en/sustainability/reports-and-ratings

As part of our commitment to customers, we also offer customised wind power plant LCAs, called Vestas® SiteLCA™. These assessments determine key indicators of environmental performance, taking the wind turbine type, site specific conditions and production supply chain into consideration. SiteLCA™ provides customers or project developers with transparent environmental facts for a specific wind power plant.



g/kWh
6.8 - 7.2

1002 CO₂ comparison between the 2 MW platform and a coal power plant

Energy neutral
7 - 8
months of operation

Energy return
31 - 33
times

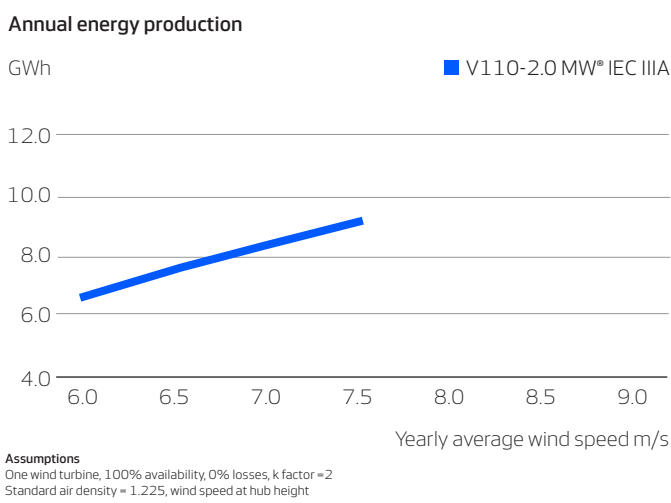
Recyclability rate
84.5% - 86%

Sustainability metrics depending on project and site specific conditions

V110-2.0 MW[®] IEC IIIA

Power regulation		Pitch regulated with variable speed
Operating data		
Rated power	2,000kW	
Cut-in wind speed	3m/s	
Cut-out wind speed	21m/s	
Re cut-in wind speed	18m/s	
Wind class	IEC IIIA	
Standard operating temperature range from -20°C to 45°C		
Sound power		
Maximum	107.6dB*	
* Sound Power Modes available		
Rotor		
Rotor diameter	110m	
Swept area	9,503m ²	
Air brake	full blade feathering with 3 pitch cylinders	
Electrical		
Frequency	50/60Hz	
Generator type	4-pole (50Hz)/6-pole (60Hz) doubly fed generator, slip rings	
Gearbox		
Type	one planetary stage and two helical stages	
Tower		
Hub heights	75m (IEC IIIA) 80m (IEC IIIA) 95m (IEC IIIA/IEC IIIB) 110m (IEC IIIB) 120m (IEC IIIB) 125m (IEC IIIB)	
Nacelle dimensions		
Height for transport	4m	
Height installed (incl. CoolerTop®)	5.4m	
Length	10.4m	
Width	3.5m	

Hub dimensions	
Max. transport height	3.4m
Max. transport width	4m
Max. transport length	4.2m
Blade dimensions	
Length	54m
Max. chord	3.9m
Max. weight per unit for transportation	70 metric tonnes
Turbine options	
- Power Optimised Modes up to 2.2 MW (site specific)	
- Condition Monitoring System	
- Smoke Detection	
- Shadow Detection	
- Low Temperature Operation to -30°C	
- Aviation Lights	
- Aviation Markings on the Blades	
- Vestas Bat Protection System	
Sustainability	
Carbon Footprint	7.2g CO ₂ e/kWh
Return on energy break-even	8 months
Lifetime return on energy	31 times
Recyclability rate	84.5%
Configuration: 80m hub height, Vavg=7.0m/s. Depending on site-specific conditions. Metrics are based on an externally reviewed Life Cycle Assessment available on vestas.com	



V120-2.2 MW[™] IEC IIB/IEC S

Power regulation		Pitch regulated with variable speed
Operating data		
Rated power	2,000kW/2,200kW	
Cut-in wind speed	3m/s	
Cut-out wind speed	18m/s	
Re cut-in wind speed	16m/s	
Wind class	IEC IIB/IEC S	
Standard operating temperature range from -20°C to 45°C		
Sound power		
Maximum	110.5dB*	
* Serrated Trailing Edge technology available to reduce sound power level		
Rotor		
Rotor diameter	120m	
Swept area	11,310m ²	
Air brake	full blade feathering with 3 pitch cylinders	
Electrical		
Frequency	50/60Hz	
Generator type	4-pole (50Hz)/6-pole (60Hz) doubly fed generator, slip rings	
Gearbox		
Type	one planetary stage and two helical stages	
Tower		
Hub heights	80m (IEC S) 92m (IEC S) 118m (IEC S) 122m (IEC S) 137m (IEC S)	
Nacelle dimensions		
Height for transport	4m	
Height installed (incl. CoolerTop®)	5.4m	
Length	10.4m	
Width	3.5m	

Hub dimensions		
Max. transport height	3.6m	
Max. transport width	4m	
Max. transport length	4.2m	
Blade dimensions		
Length	59m	
Max. chord	3.9m	
Max. weight per unit for transportation		70 metric tonnes
Turbine options		
- Power Optimised Modes up to 2.2 MW (site specific)		
- Condition Monitoring System		
- Smoke Detection		
- Shadow Detection		
- Low Temperature Operation to -30°C		
- Aviation Lights		
- Aviation Markings on the Blades		
- Vestas Bat Protection System		
Sustainability		
Carbon Footprint	6.8g CO ₂ e/kWh	
Return on energy break-even	7 months	
Lifetime return on energy	33 times	
Recyclability rate	86%	
Configuration: 122m hub height, Vavg=7.0m/s. Depending on site-specific conditions. Metrics are based on an externally reviewed Life Cycle Assessment available on vestas.com		

