

**3 MW**

**V112-3.0 MW®**

**V126-3.0 MW™**

**ONSHORE**

# 3 MW Turbines

## Higher profits across all wind classes

### **V112-3.0 MW®**

The V112-3.0 MW® is an industry game-changer, with over 3 GW already sold in less than two years. Designed for onshore low-wind and medium-wind sites, anywhere in the world, it delivers industry-leading reliability, serviceability and exceptional energy capture.

The 54.65 m blades on the V112-3.0 MW®, together with its 3 MW generator, provide remarkable energy yield, boosting your economic returns and strengthening your investment for years to come.

Several innovative features, including a Vestas-designed permanent magnet generator and a full-scale converter for higher efficiency, better grid support and reduced drive train loads, make the V112-3.0 MW® capable of exceptional production in all wind and weather conditions, setting a new standard in turbine performance.

### **V112-3.0 MW® IEC S**

Configured to the same specifications as our V112-3.0 MW® offshore model, the new IEC S simply extends the operation of V112-3.0 MW® onshore to high-wind sites. It is built to provide superior energy capture and profitability in high winds, year after year, ultimately ensuring that your return on investment is maximised.

An improved rotor-to-generator ratio for optimum energy capture, blades profiled for aerodynamic efficiency, as well as other innovative features, ensure prime performance.

The launch of the V112-3.0 MW® IEC S opens up many exciting new opportunities for reliable, high energy production in extreme wind and weather conditions. Combined with our 30 years of industry experience, it provides you with one of the most competitive investment opportunities in wind energy.

### **V126-3.0 MW™**

Our best performer on low-wind sites, the V126-3.0 MW™ is built on the same proven technology as the V112-3.0 MW® models – with one crucial difference. The extended blades provide an immense 126 m rotor, enabling greater wind capture, which in turn produces more energy at a reduced cost. The result is exceptional profitability in areas with low wind, and new frontiers for wind energy investment.

With the launch of the V126-3.0 MW™, we now offer a range of 3 MW turbines covering all wind classes, increasing the range of opportunities available to wind energy investors. Vestas' unbeatable history of proven technology is combined with the most cutting-edge innovation, making the V126-3.0 MW™ the obvious choice for those looking to combine reliability with revolutionary performance.

# 3 GW

The combination of high returns and low risk have already made V112-3.0 MW® an industry favourite, with more than 3 GW already sold.



# Powering new opportunities

## DESIGNED FOR ALL IEC SEGMENTS

The V112-3.0MW<sup>®</sup> covers all onshore and offshore IEC wind class segments

The V126-3.0 MW<sup>™</sup> covers onshore IEC III wind class segments

TURBINE TYPE	WINDCLASSES		
	IEC III (6.0-7.5 m/s)	IEC II (7.5-8.5 m/s)	IEC I (8.5-10.0 m/s)
V164-7.0 MW <sup>™</sup> offshore			
<b>3 MW TURBINES</b>			
V90-3.0 MW <sup>®</sup> onshore/offshore			
V100-2.6 MW <sup>™</sup>			
V112-3.0 MW <sup>®</sup> onshore/offshore			
V126-3.0 MW <sup>™</sup>			
<b>2 MW TURBINES</b>			
V80-2.0 MW <sup>®</sup>			
V80-2.0 MW <sup>®</sup> GridStreamer <sup>™</sup>			
V90-1.8/2.0 MW <sup>®</sup>			
V90-1.8/2.0 MW <sup>®</sup> GridStreamer <sup>™</sup>			
V100-1.8 MW <sup>®</sup> /V100-2.0 MW <sup>™</sup>			

## **Optimise energy production**

- Designed for high productivity
- Reduced noise modes with minimal impact on power production
- Excellent grid support

## **Reduce energy costs**

- Optimised Balance of Plant installation and transportation costs
- Designed for serviceability
- Innovative CoolerTop® uses the wind's own energy to cool the turbine

## **Secure your investment**

- Proven technology
- Reliable and robust product
- Minimal downtime
- More than 30 years' track record

Above are some of the features and benefits that optimise your energy production, lower your operating costs and strengthen the business case for choosing the V112-3.0 MW® and the V126-3.0 MW™.

# Industry-leading technology that generates more energy

## High productivity in all conditions

With the operating range now expanded to all wind classes, the V112-3.0 MW<sup>®</sup> and the V126-3.0 MW<sup>™</sup> deliver unrivaled energy production. The turbine blades for the turbines incorporate robust structural design. Their geometric profile increases aerodynamic efficiency while reducing sensitivity to dirt and other airborne particles. This gives the turbine better in-service energy production.

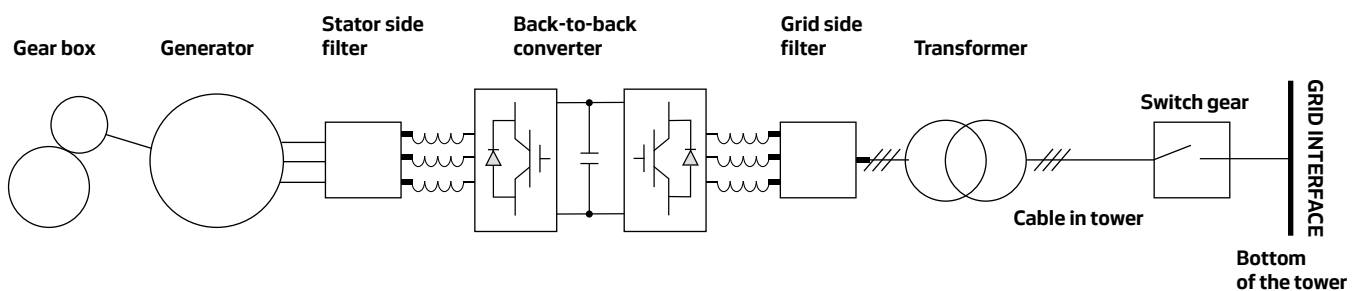
## Keeping noise down and power up

The V112-3.0 MW<sup>®</sup> and the V126-3.0 MW<sup>™</sup> have several noise modes to meet most site-specific sound level restrictions - all without a significant reduction in productivity.

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## Excellent grid support

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The new power system for the V112-3.0 MW<sup>®</sup> and the V126-3.0 MW<sup>™</sup> enables superior grid support. The permanent magnet generator, coupled with a full-scale converter, meets most challenging grid requirements – in almost any corner of the world.

The new power system has the capability to maintain production across severe drops in grid voltage, while simultaneously minimising drive train loads. It also allows rapid down-rating of production to 20 per cent.

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**Wind.** It means the world to us.™  
Wind is all we do. We are  
relentlessly committed to the  
success of wind as a source of  
energy for the world, providing  
everything you need to succeed  
in your wind power ambitions.

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# Designed to **reduce** wind energy costs

## **Optimised Balance of Plant installation and transportation costs**

Just like other Vestas turbines, the V112-3.0 MW<sup>®</sup> and the V126-3.0 MW<sup>™</sup> are designed to be transported easily to virtually any site around the world. In terms of weight, height and width, all of its components comply with most local and international limits for standard transportation.

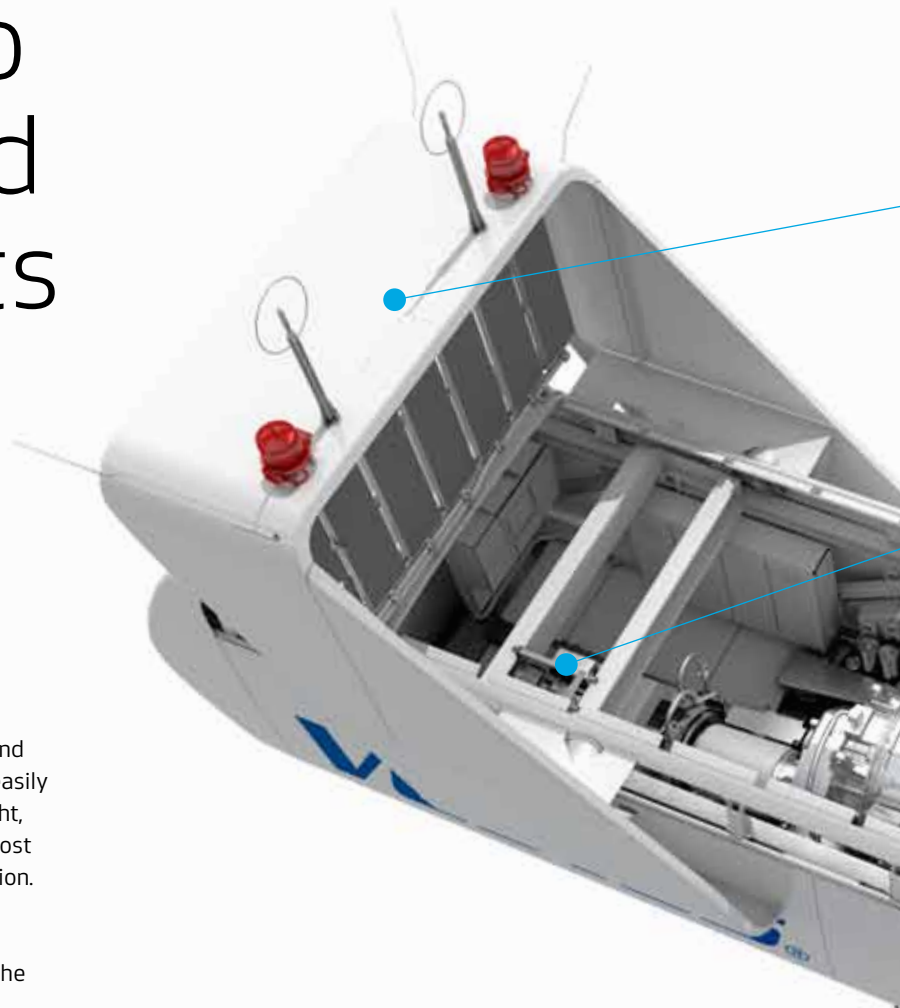
Each transportable component weighs less than 70 tonnes. Your foundation costs are also lowered with the V112-3.0 MW<sup>®</sup> and the V126-3.0 MW<sup>™</sup> due to its improved load control. Additionally, the grid support capabilities of the new power system help minimise substation cost and provide greater flexibility to meet future requirements.

## **Easy serviceability**

The nacelle of the V112-3.0 MW<sup>®</sup> and the V126-3.0 MW<sup>™</sup> is ergonomically designed. It maximises the available internal space by integrating the power converter into the nacelle floor. This extra space makes it easier for maintenance crews to gain access – reducing the time spent on service and, therefore, maximising uptime. The automatic lubrication of the yaw system, main bearing and generator bearings delivers the triple benefit of increased reliability, reduced maintenance time and less frequent servicing. Combined, these factors save you money and maximise your returns on the wind energy produced on all onshore sites. The turbines can be put into place and maintained using standard installation and servicing tools and equipment – minimising ongoing maintenance costs.

## **Innovative CoolerTop<sup>®</sup>**

The CoolerTop<sup>®</sup> installed on the the V112-3.0 MW<sup>®</sup> and the V126-3.0 MW<sup>™</sup> uses the wind's own energy to generate the cooling required, rather than consuming energy generated elsewhere. The fact that the CoolerTop<sup>®</sup> has no moving parts means it requires little maintenance, reducing costs once more. In addition, the absence of any fans ensures that the cooling system makes minimal noise while simultaneously reducing the turbine's own energy consumption. Finally, the CoolerTop<sup>®</sup> provides sufficient cooling at altitudes of up to 2,000 m. This makes the turbines an ideal choice for locations high above sea level that were once deemed unsuitable.





### CoolerTop®

- Operation up to 2,000 m with de-rating under specific conditions
- No power consumption for fans
- Minimal noise emission from cooling system

### Permanent magnet generator and full scale converter

- Simple and effective power system with high efficiency and excellent fault ride-through capabilities
- Permanent magnet generator designed by Vestas
- Reduced maintenance cost
- Highly adaptable for future requirements
- HCCBA bearings (High Capacity Bearing)

### Drive train

- Based on proven geared technology
- Integrated rotor lock system to improve maintenance

### Pitch system

- Design based on V90-3.0 MW®
- Double feeding pump system ensuring redundancy and reliability
- Solutions for safe work in hub integrated in design

### Blade

- Large root diameter ( $\Phi 2.6$  m) ensures blade bearing longevity
- Lightning receptors and internal grounding cable integrated
- Robust aerodynamic profile less sensitive to airborne contamination

### Yaw system

- Design based on V90-3.0 MW® and V90-2.0 MW®
- Robust plain bearing with built-in friction (grease lubricated)



The passion and  
experience to  
secure your wind  
energy **investment**

**47,000+**

The V112-3.0® MW and the V126-3.0 MW™ advance the already proven technology powering over 47,000+ installed Vestas turbines worldwide – more than any other supplier.

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## Life testing

The Vestas Test Centre has the unique ability to test complete nacelles using technologies like Highly Accelerated Life Testing (HALT). This rigorous testing of new components ensures the reliability of the V112-3.0 MW® and the V126-3.0 MW™.



## Proven technologies - from the company that invented them

Since 1999, Vestas has installed over 2,600 V90-3.0 MW® turbines and more than 9,700 2 MW turbines globally. These workhorses form the basis of the mighty V112-3.0 MW® and V126-3.0 MW™, which incorporates their thoroughly tested technologies – including the pitch, yaw and control systems, and the drive train concepts. This heritage makes the turbines your low-risk choice.

The V112-3.0 MW® and V126-3.0 MW™ are based upon the proven technologies that underpin the 47,000+ Vestas turbines installed around the world. Using the best features from across the range, as well as some of the industry's most stringently tested components and systems, the turbines' reliable design minimises downtime – helping to give you the best possible return on your investment.

In Vestas Performance and Diagnostics Centre, we monitor more than 22,000 turbines worldwide. The information we obtain is then used in developing new turbines, including the V112-3.0 MW® and V126-3.0 MW™.

## Reliable and robust product

The Vestas Test Centre is unrivalled in the wind industry. We test most of the nacelle components using Highly Accelerated Life Testing (HALT) to ensure reliability. For critical components, HALT identifies potential failure modes and mechanisms. Specialised test rigs ensure strength and robustness for the gearbox, generator, yaw and pitch system, lubrication system and accumulators. Our quality-control system ensures that each component is produced to design specifications and performs 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.



# 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.

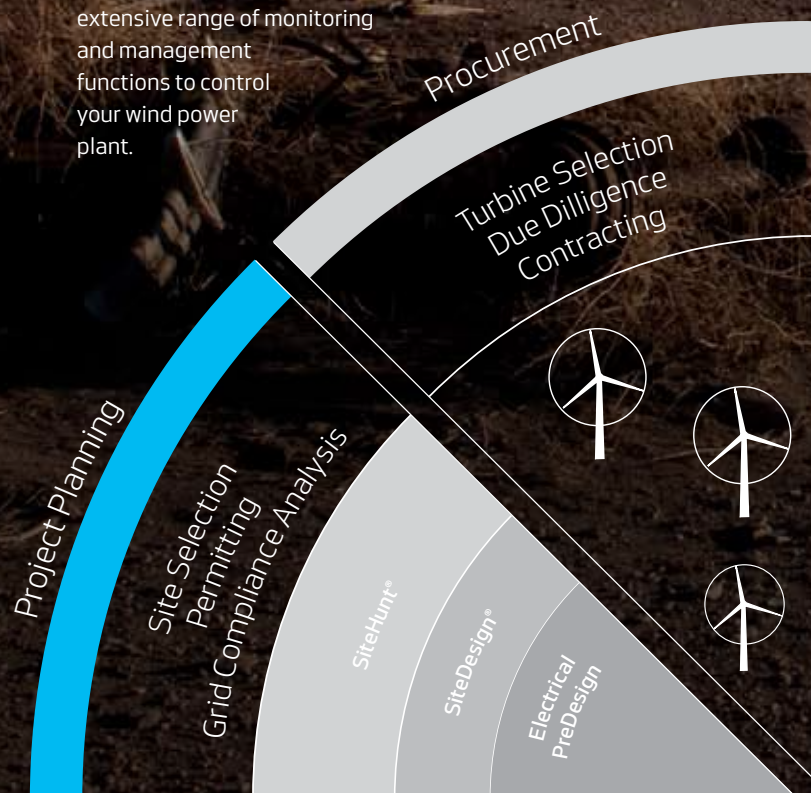
In addition, SiteDesign® optimises the layout of your wind power plant, through a sophisticated analysis of lifetime energy costs for each turbine. Put simply, it finds the optimal balance between the estimated ratio of annual revenue to operating costs over the lifetime of your plant, to determine your 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 you customized 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.



**Vestas works with you across the full project life cycle**





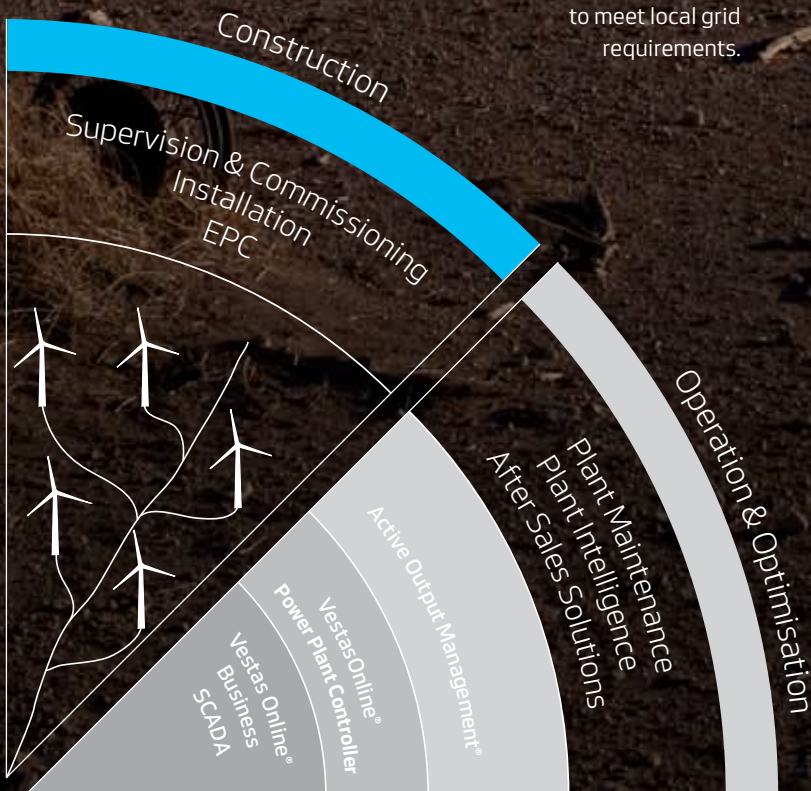
VestasOnline® Business enables you to optimise production levels, monitor performance, and produce detailed, tailored reports from anywhere in the world. The VestasOnline® Power Plant Controller offers scalability and fast, reliable real-time control and features customisable configuration, allowing 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 the V126-3.0 MW™'s state-of-the-art technology and 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.



# V112-3.0 MW<sup>®</sup>

## Facts & figures

WIND CLASS	IEC IIA/IIIA	IEC S
POWER REGULATION	pitch regulated with variable speed	
OPERATING DATA		
Rated power	3,075 kW	3,000 kW
Cut-in wind speed	3 m/s	3 m/s
Rated wind speed	13 m/s	13 m/s
Cut-out wind speed	25 m/s	25 m/s
Re cut-in wind speed	23 m/s	23 m/s
Operating temperature range:	-30° up to +40°*	
*subject to different temperature options		
SOUND POWER*		
(Mode 0, 10 m above ground, hub height 84 m, air density 1,225 kg/m³)		
3 m/s	94.5 dB	96.0 dB
4 m/s	97.3 dB	97.5 dB
5 m/s	100.9 dB	100.9 dB
6 m/s	104.3 dB	104.4 dB
7 m/s	106.5 dB	107.5 dB
8 m/s	106.5 dB	107.5 dB
*other sound reduced modes available		
ROTOR		
Rotor diameter	112 m	112 m
Swept area	9,852 m²	9,852 m²
Air brake	full blade feathering with 3 pitch cylinders	
ELECTRICAL		
Frequency	50/60 Hz	50/60 Hz
Generator type	permanent magnet	permanent magnet
Converter	full scale	full scale

WIND CLASS	IEC IIA/IIIA	IEC S
<b>GEARBOX</b>		
Type	Multi stage (planetary + helical)	
<b>TOWER</b>		
Type	tubular steel tower	
Hub heights		
50hz:	84 m/94 m IEC IIA & 119 m/140 m IEC IIIA	84 m
	94 m/119/140 m DIBt II & 94 m/119 m DIBt III	
60 hz:	84 m/96 m IEC IIA & IIIA	84 m
<b>BLADE DIMENSIONS</b>		
Length	54.65 m	54.65 m
Max. chord	4 m	4 m
<b>NACELLE DIMENSIONS</b>		
Height for transport	3.4 m	3.4 m
Height installed (incl. CoolerTop®)	6.8 m	6.8 m
Length	12.8 m	12.8 m
Width	4.0 m	4.0 m
<b>TOWER DIMENSIONS</b>		
Max. section length	30 m	30 m
Max. diameter	4.5 m	4.2 m
<b>HUB DIMENSIONS</b>		
Max. transport height	3.74 m	3.74 m
Max. transport width	3.75 m	3.75 m
Max. transport length	5.42 m	5.42 m
Max. weight per unit for transportation	70 metric tonnes	70 metric tonnes
<b>TURBINE OPTIONS</b>		
OCAS®, smoke & heat detection, shadow detection, increased cut-in wind speed & aviation light.		

# V126-3.0 MW™

## Facts & figures

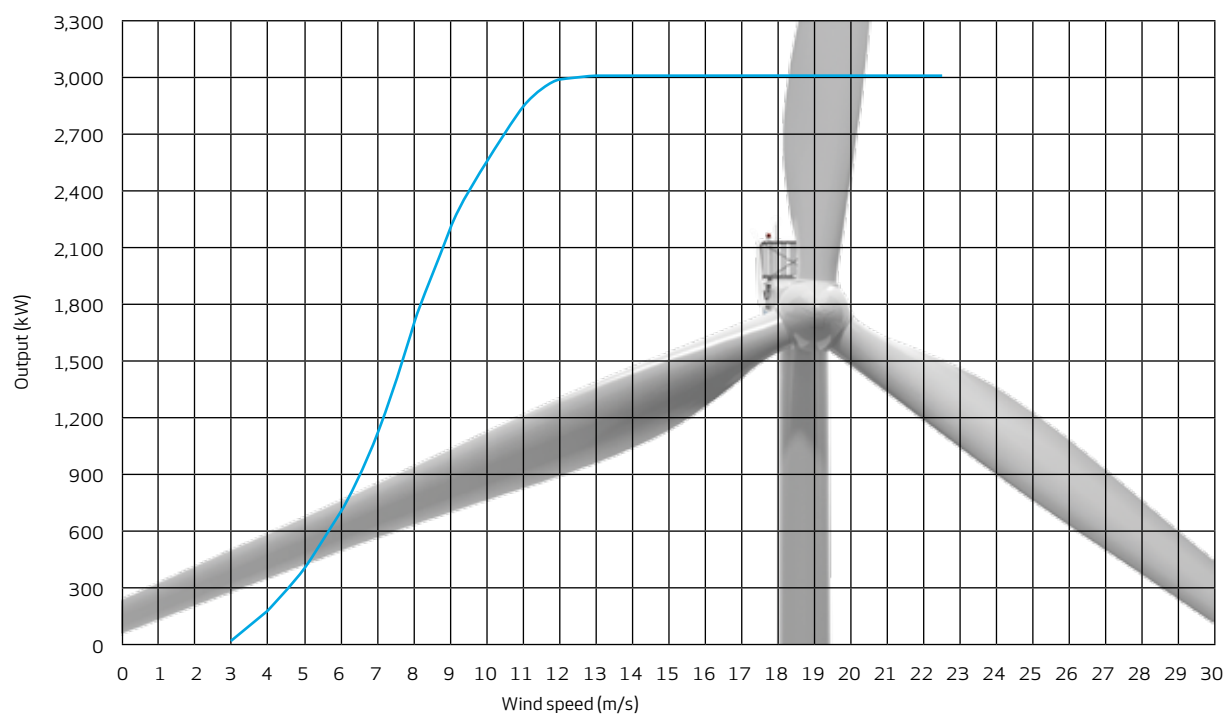
WIND CLASS		IEC IIIB
<hr/>		
POWER REGULATION	pitch regulated with variable speed	
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OPERATING DATA		
Rated power	3,000 kW	
Cut-in wind speed	3 m/s	
Rated wind speed	12 m/s	
Cut-out wind speed	22.5 m/s	
Re cut-in wind speed	20 m/s	
Operating temperature range:	-30° up to +40°*	
*subject to different temperature options		
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SOUND POWER*		
(Mode 0, 10 m above ground, hub height 119 m, air density 1,225 kg/m³)		
Max sound power	107.5 dB	
*other sound reduced modes available		
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ROTOR		
Rotor diameter	126 m	
Swept area	12,469 m²	
Air brake	full blade feathering with 3 pitch cylinders	
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ELECTRICAL		
Frequency	50 Hz	
Generator type	permanent magnet generator	
Converter	full scale	
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WIND CLASS		IEC IIIB
<hr/>		
GEARBOX		
Type	Multi stage (planetary + helical)	
<hr/>		
TOWER		
Type	tubular steel tower	
Hub heights		
50hz:	119 m*	
*or site specific		
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BLADE DIMENSIONS		
Length	62 m	
Max. chord	4 m	
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NACELLE DIMENSIONS		
Height for transport	3.4 m	
Height installed (incl. CoolerTop®)	6.8 m	
Length	12.8 m	
Width	4.0 m	
<hr/>		
HUB DIMENSIONS		
Max. transport height	3.74 m	
Max. transport width	3.75 m	
Max. transport length	5.42 m	
<hr/>		
Max. weight per unit for transportation	70 metric tonnes	
<hr/>		
TURBINE OPTIONS		
OCAS®, smoke & heat detection, shadow detection, increased cut-in wind speed & aviation light.		



## POWER CURVE FOR V126-3.0 MW™

IEC IIIB

Noise reduced sound power modes are available

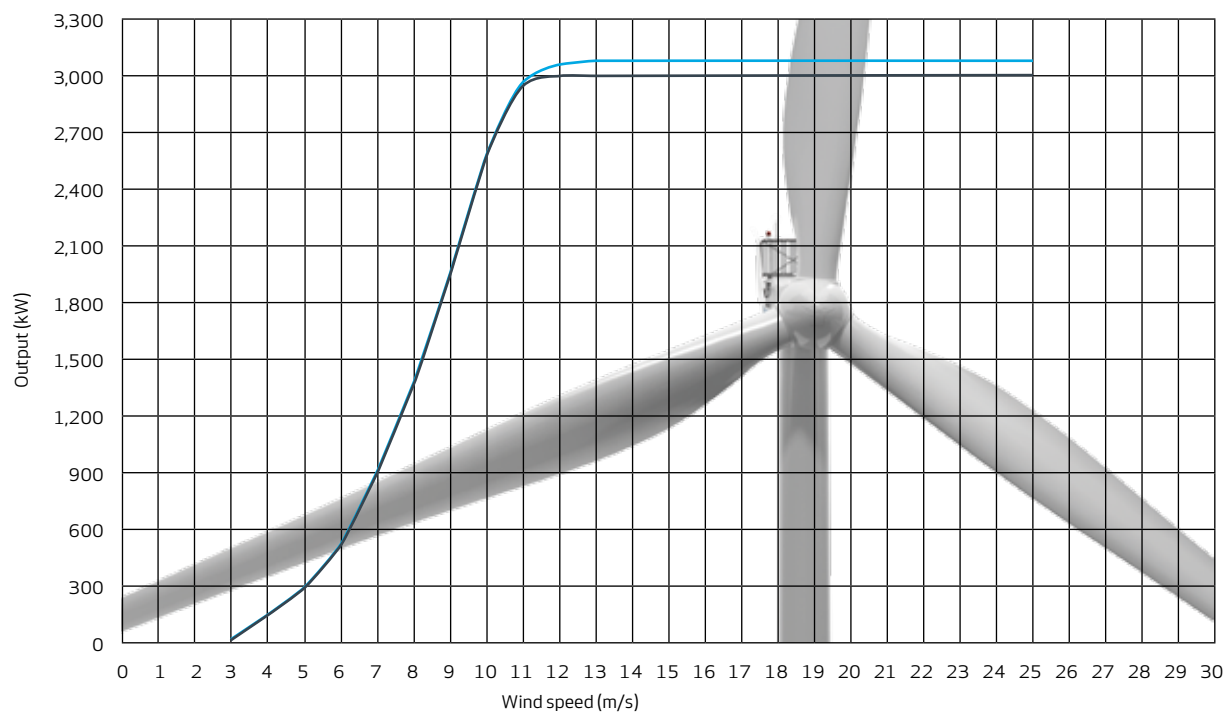


## POWER CURVE FOR V112-3.0 MW®

IEC IIA/IIIA

Noise reduced sound power modes are available

IEC S





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