

V112-3.0 MW Offshore

A state-of-the-art turbine
with exceptionally high output

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WE LET OUR EXPERIENCE GUIDE YOU THE WAY

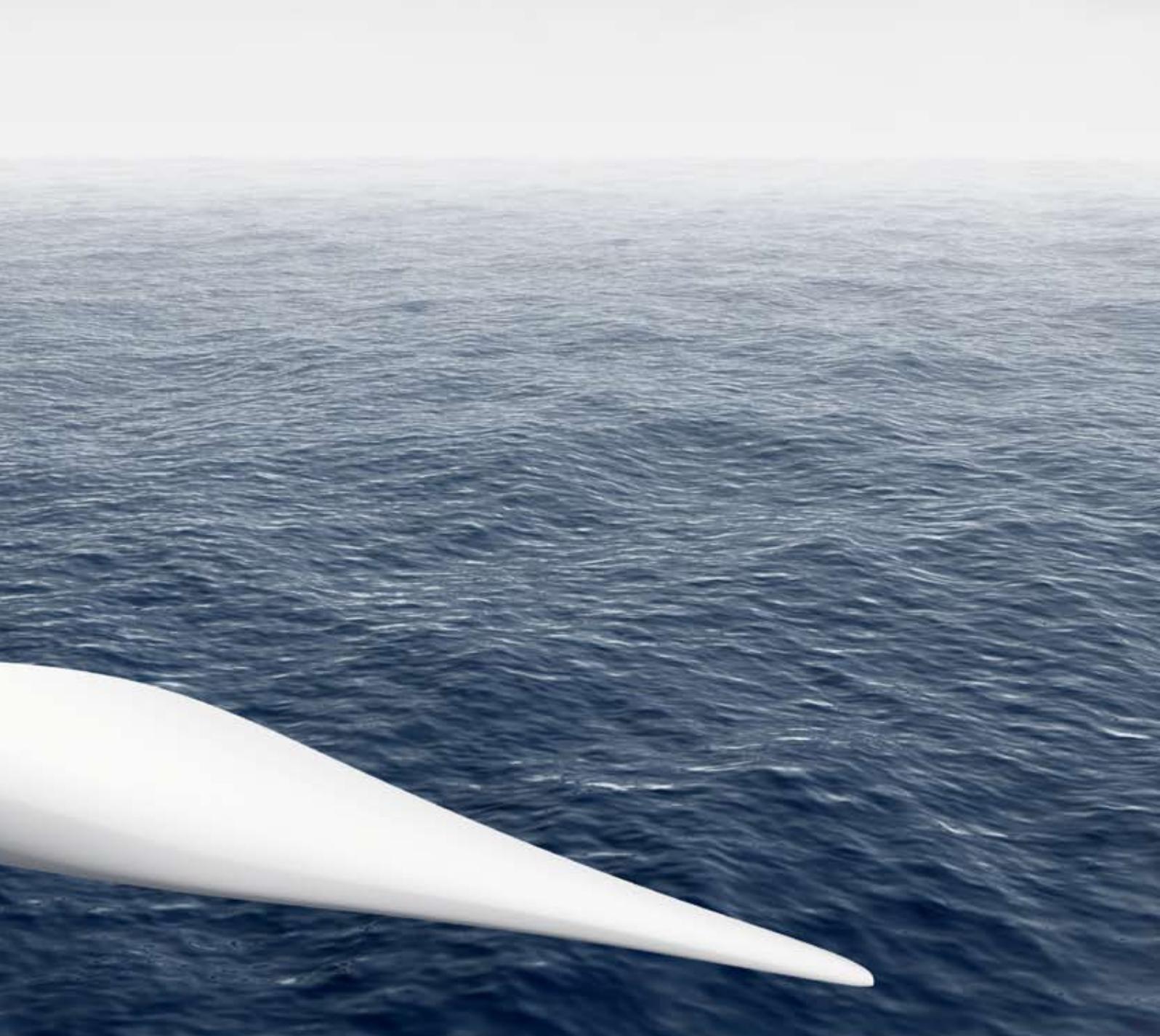
More than 400 offshore turbines installed

Since 1995, Vestas has installed more than 400 offshore wind turbines, providing a total capacity of over 900 MW. We know how to harness the raw power of offshore wind and transform it into clean, reliable and predictable energy.

We've brought together our vast wealth of offshore knowledge and expertise in a single offshore energy organisation, which handles all our global offshore operations. Vestas' offshore unit delivers superior turbine technology, convenient and cost-effective transport, fast and safe installation, and comprehensive service and maintenance for the benefit of our customers.



Vestas®



HARNESS THE WIND WITH A HIGH-PERFORMANCE TURBINE

Hard-working and reliable

The V112-3.0 MW for offshore is based on the same technology as the onshore turbine. It's a hard-working, reliable turbine designed for offshore sites anywhere around the world. The V112-3.0 MW can generate more power than any other turbine in the 3 MW class. It offers an exceptional rotor-to-generator ratio for greater efficiency, and delivers high reliability, serviceability and availability under all wind and weather conditions – setting a whole new standard for turbine performance and efficiency.

The V112-3.0 MW Offshore turbine has been developed to take full advantage of conditions at sea. It operates with an extended production envelope, and delivers optimal output in average wind speeds up to 9.5 m/s. The turbine will be class IEC-S certified for each individual offshore project.



BUILT FOR FAST INSTALLATION AND EASY MAINTENANCE

Plenty of room to handle tasks of all sizes

The new nacelle design on the V112-3.0 MW Offshore is a good example of innovative technology with decades of experience and based on customer insight. The power converter is integrated into the nacelle floor, which provides more working space and makes it easier to service the components.

Significantly more floor space is an advantage that makes service and maintenance faster and easier.

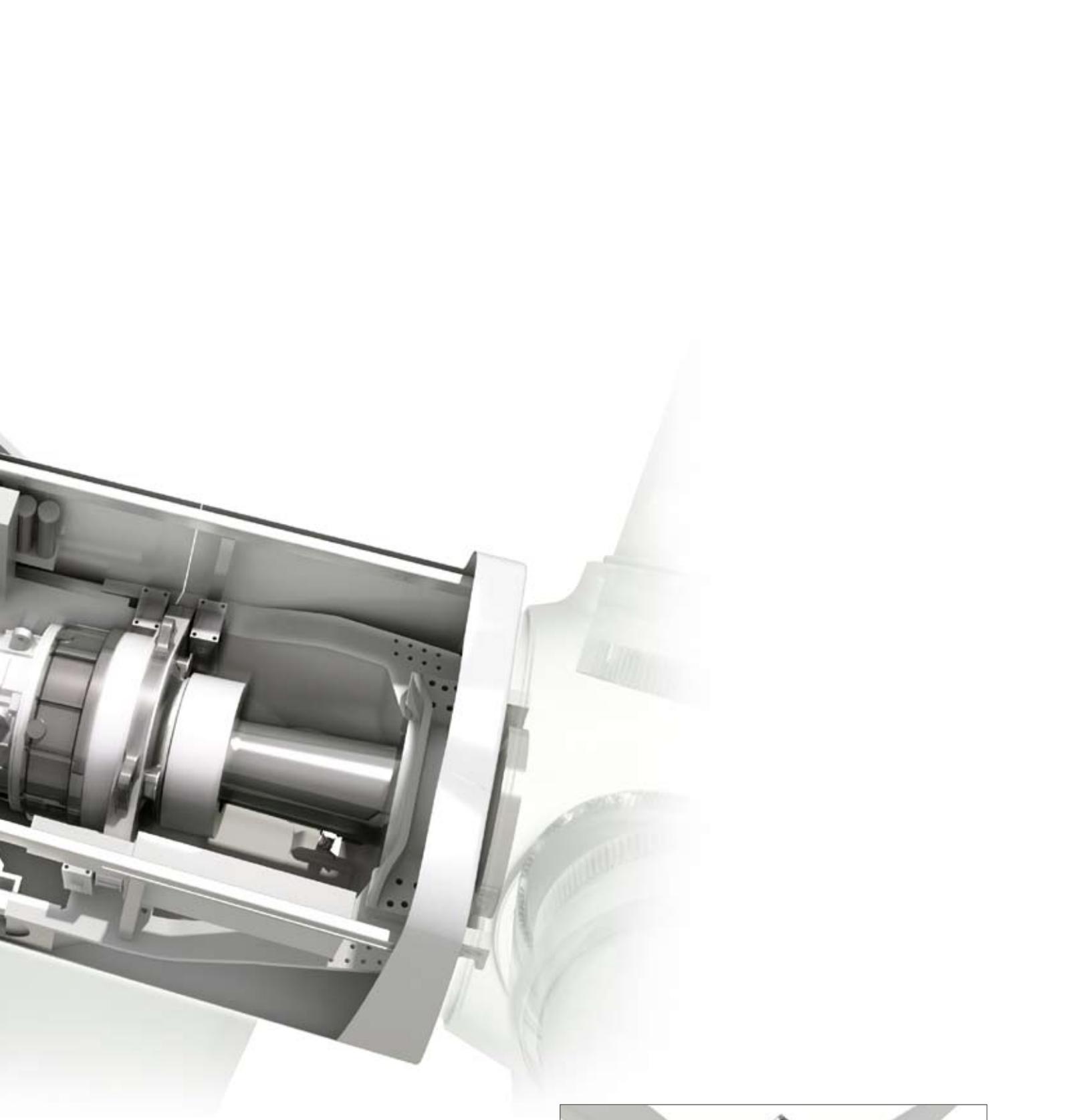
The design makes smarter use of space while also setting new standards for ergonomics and safety in the nacelle. Tasks of all sizes can be completed effectively without compromising safety.

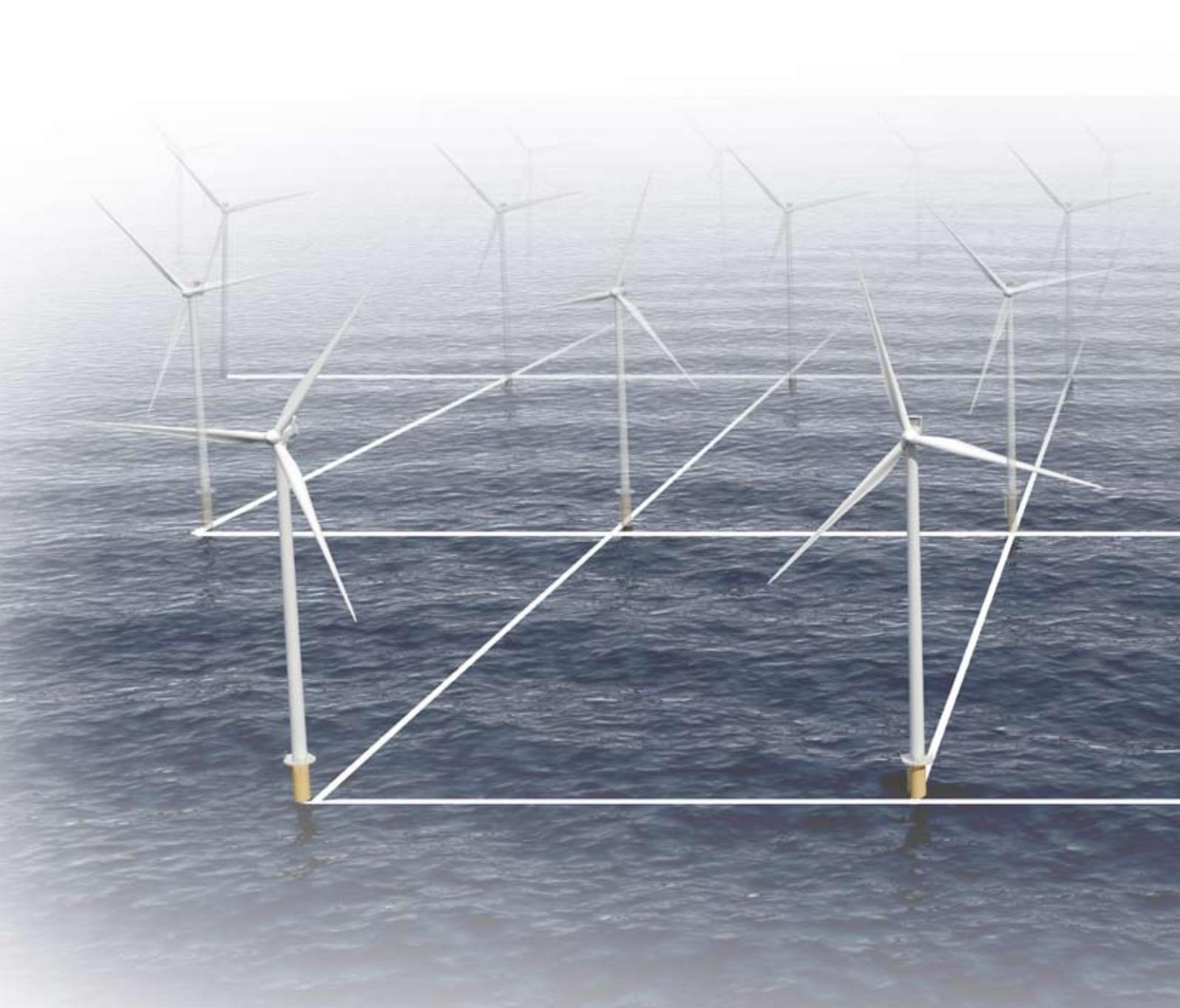
There's plenty of room for handling all spare parts, and the main components can be lifted in with ease.

New tools for fast and cost-effective installation and maintenance

Over the years, Vestas has developed a number of special tools and methods that reduce turbine installation time and maintenance costs.

Vestas' tower crane is a good example of this. In many situations, it does away with the need for expensive crane vessels, which are often in short supply.





THE ULTIMATE CHOICE FOR HIGH, STABLE OUTPUT OF YOUR WIND POWER PLANT

Innovative technology with decades of experience

The V112-3.0 MW is built on tried and tested technology that Vestas has improved even further. We call it innovative technology with decades of experience.

The V112-3.0 MW comes with significant innovations in areas such as blade design, nacelle design, cooling systems and load-optimised operation.

Finally, the V112-3.0 MW is designed around a large number of standard components that several suppliers can provide. These easily obtainable spare parts and components also help ensure reliability and high availability.



Flexible grid integration and stable output

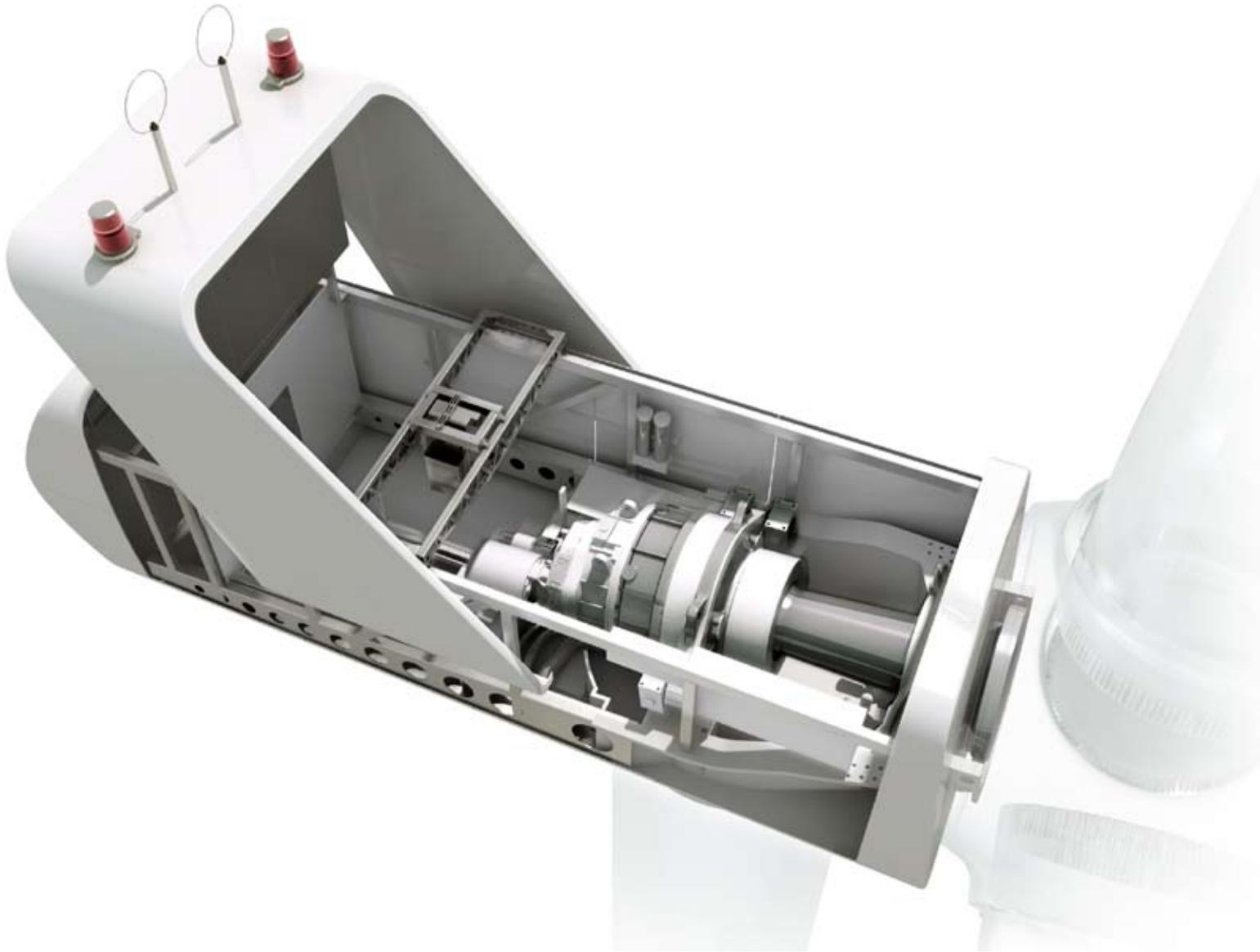
Vestas turbines such as the V112-3.0 MW are designed to make your wind power plant fully compliant with applicable grid codes at the point of common coupling.

How this is achieved may differ from country to country, but in general, our advanced grid compliance system provides active and reactive power regulation, frequency regulation and fault ride-through capabilities to support grid levels and stability in the event of disturbances.

Advanced power electronics conversion

Advanced power electronics conversion ensures stable and scalable output from the turbine.

Combined with a flexible operations strategy, advanced power electronics conversion allows you to increase power production by temporarily increasing the power output of the turbine in favorable conditions.

**Load reduced operation**

Load reduced operation enables the turbine to automatically protect itself against needless wear, which can damage the turbine and shorten the service life of some components.

Main component preheating

The cooling system in the V112-3.0 MW is also used for preheating, which prevents condensation. Primary components such as the generator, the gearbox, the converter and the blade hydraulic system are heated from inside by means of hot water in the cooling coils when the turbine restarts after a production stop in cold climates.

Automatic lubrication

Automatic lubrication of the blade bearings, the yaw system, the main bearing and the generator boosts reliability while reducing the frequency of service calls.



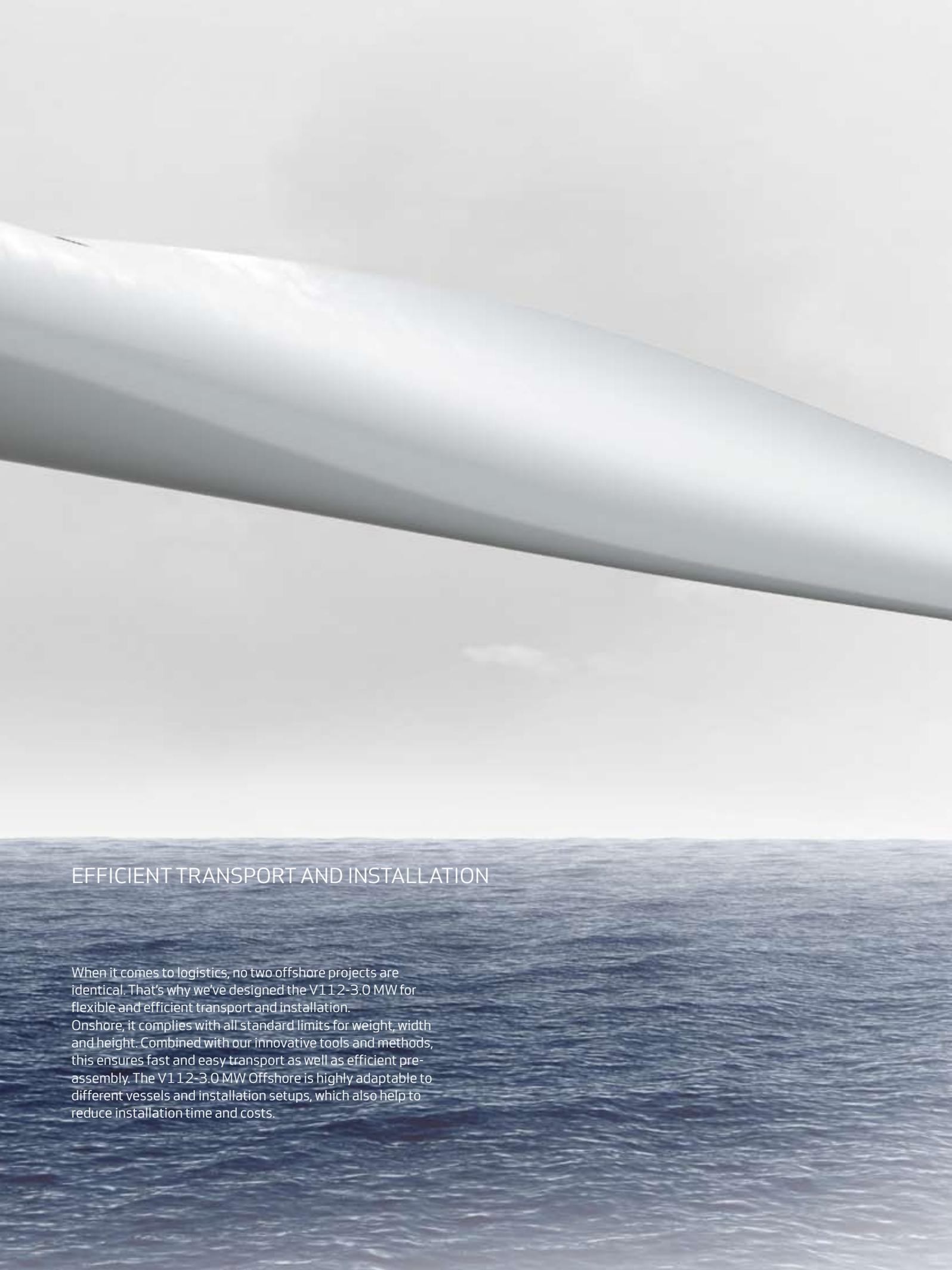
OPTIONS

The V112-3.0 MW is available with a number of special options that ensure compliance with local requirements or special customer requests. These options include:

- Condition monitoring system
- Switchgear
- Aviation markings on the blades
- Aviation lights
- Service personnel lift
- Smoke detectors
- Fire extinguishing system in nacelle
- Company logo
- Low temperature operation to -30°C
- Ice detection system
- Extended Uninterruptible Power Supply in nacelle and tower
- Plug for external power supply
- Survival kit
- Site specific tower



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EFFICIENT TRANSPORT AND INSTALLATION

When it comes to logistics, no two offshore projects are identical. That's why we've designed the V112-3.0 MW for flexible and efficient transport and installation.

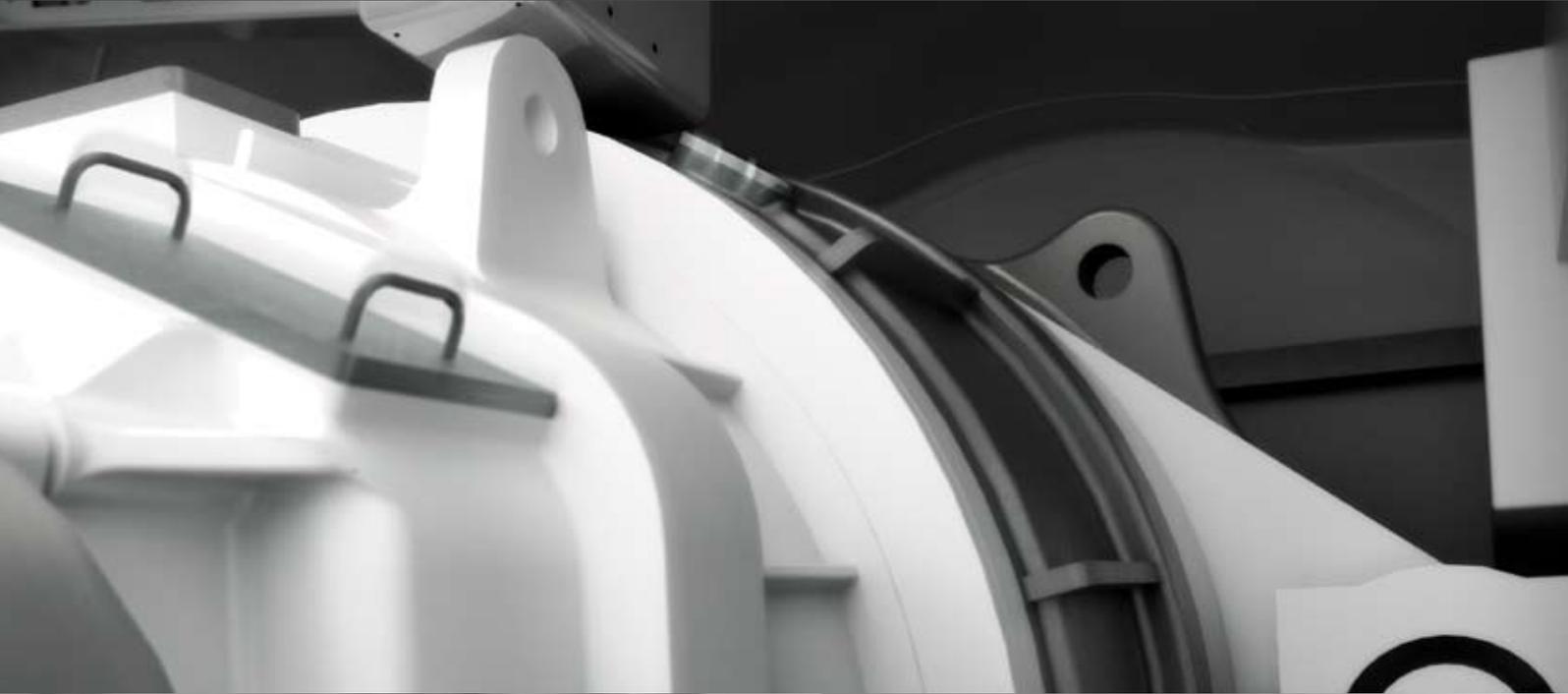
Onshore, it complies with all standard limits for weight, width and height. Combined with our innovative tools and methods, this ensures fast and easy transport as well as efficient pre-assembly. The V112-3.0 MW Offshore is highly adaptable to different vessels and installation setups, which also help to reduce installation time and costs.



A giant stride in aerodynamics

Vestas is famous for designing and producing some of the world's lightest and most effective blades – blades that deliver the greatest possible output while causing the least possible loads to the turbine.

With the groundbreaking 54.6-metre blades on the V112-3.0 MW, Vestas has taken another giant stride in aerodynamics. Although these blades have the same width as our 44-metre blades, they sweep an area that is 55% greater to deliver considerably higher output. Finally, the blades are designed to be less sensitive to dirt, resulting in better performance at sites affected by salt, insects or other particles in the air.





VESTAS TAKES CARE OF YOUR INVESTMENT, AROUND THE CLOCK

Verified component lifetime

At our Vestas Technology R&D testing centres, engineering experts and technicians use state-of-the-art testing methods to ensure that all components and systems meet our standards for safety, performance and reliability throughout the turbine's 20-year service life. These tests push the components beyond their specifications. One method is known as Highly Accelerated Life Testing, where some of the testing is conducted in a HALT chamber. Extreme fluctuations in temperatures combined with heavy vibrations are just some of the stress tests the components are subjected to here. This enables Vestas to eliminate design flaws long before the turbines reach the market. In addition, we employ Six Sigma quality assurance principles to ensure continuous improvements in the quality of our components.

Surveillance 24/7/365

Our surveillance services are manned 24/7 all year round to provide real-time surveillance, remote troubleshooting and other services. These services can also detect potential errors and disruptions before they occur, as data from your turbines is gathered and analysed. This enables us to prepare a plan for preventative maintenance, saving you from unexpected production stops and costly downtime.

Service and maintenance

Vestas provides each individual offshore installation with its own customer-tailored service programme. We can cover your every need – from simple cleaning and planned maintenance to emergency call-outs and site-specific inventories for your turbines.



Asset management and operation risk mitigation

Your wind turbines have to be maintained with great care to avoid exposing your investment to unnecessary risks. And that is exactly what Active Output Management (AOM) is designed to ensure – that you get the greatest possible return on your investment in a Vestas wind turbine.

AOM provides a number of advantages, such as detailed plans for service and maintenance, online monitoring, optimisation and troubleshooting, and a competitive insurance plan. We even offer an availability guarantee and a complete 5 to 10-year service package.

Project management for effective plants

The better your turbines fit your offshore wind site, the more profitable your plant will be. That's why Vestas is ready to help with a full range of services, from project management to wind power plant start-up and subsequent service and maintenance. More than 30 years of international experience and local expertise enable us to facilitate or complete:

- Wind and site studies
- Designing the wind power project
- Selecting wind turbine types
- Installing the wind farm
- Servicing and maintenance throughout the turbine's service life
- Monitoring and remote troubleshooting

TECHNICAL DATA FOR V112-3.0 MW OFFSHORE

Power regulation pitch regulated
with variable speed

Operating data

Rated power 3,000 kW
Cut-in wind speed 3 m/s
Rated wind speed 12 m/s
Cut-out wind speed 25 m/s
Wind Class - IEC S
Operational temperature range standard range
-20°C to 40°C

Rotor

Rotor diameter 112 m
Swept area 9,852 m²
Operational interval 6.7 to 17.7 rpm
Nominal revolutions 14 rpm

Tower

Type tubular steel tower
Hub heights site specific

Electrical

Frequency 50 Hz
Converter type full scale converter
Generator type permanent magnet
generator

Main dimensions

Blade

Length 54.6 m
Max. chord 4 m

Nacelle

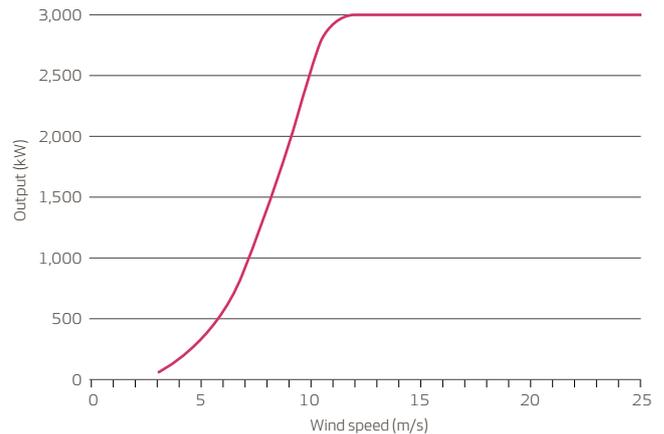
Height for transport 3.3 m
Height installed 3.9 m
Width 3.9 m
Length 14 m

Hub

Height 3.9 m
Diameter 3.2 m

Max. weight per unit
for transportation 70 metric tonnes

Power curve V112-3.0 MW Offshore



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No. 1 in Modern Energy

The world needs ever-greater supplies of clean, sustainable energy. Modern energy that promotes sustainable development and greater prosperity for all our planet's inhabitants. Vestas wind turbines are already generating more than 60 million MWh of electricity every year – enough to power all of Spain, for example.

After more than 30 years, Vestas continues to pioneer the wind energy business, with technological breakthroughs that have utterly transformed our industry. The V112-3.0 MW turbine for offshore wind power plants is the next great stride for modern energy.



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Vestas Wind Systems A/S

Alsvej 21
8940 Randers SV
Denmark

Tel: +45 9730 0000
Fax: +45 9730 0001

vestas@vestas.com

Vestas

vestas.com