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HALIADE 150-6MW OFFSHORE WIND TURBINE

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PROVEN TECHNOLOGY AND INNOVATION

Thanks to its 150-meter diameter rotor (with blades stretching 73.50m), the Haliade 150-6MW turbine can supply power to the equivalent of about 5,000 European homes. Currently, this offshore wind turbine is powering the state of Rhode Island. Located on Block Island, GE constructed and installed the first offshore wind farm in the USA in 2016.

Developed for all offshore conditions, our 6 MW direct drive wind turbine combines proven technology and innovation. Building on our unique Pure Torque design, it provides high yield and uncompromising reliability that



will lower the cost of offshore energy and create more efficient offshore turbines.

GE Renewable Energy

Integrated Solutions For Offshore Wind Farms

Onshore DC/AC Converter Station & AC Substation
For far offshore wind farms DC often provides the best techno-economic solution for transmission to the shore. Leader in HVDC with over 30,000 MW of installed capacity worldwide, GE has developed efficient grid connections.

Offshore AC Substation
To connect the offshore wind farm to the onshore electricity network or to an AC/DC converter station, GE supplies several types of offshore wind substations, such as selffloating and self installing solutions.

Haliade* 150-6MW
Built upon GE's Pure Torque* technology for reliability, the turbine features a 6 MW direct-drive permanent magnet generator and is suitable for all offshore conditions.

Offshore AC/DC Converter Station
To convert the power generated by the wind turbines in alternating current (AC) to direct current (DC) for transmission to shore, GE offers the HVDC MaxSine* VSC technology for sustainable grid connections.

From wind turbine installation to grid connection

- A reliable, efficient and high yield offshore wind turbine
- An innovative AC platform and efficient transmission over long distances with HVDC technology

Non proportional scale image. *Trademark of General Electric Company

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DESIGN

Innovative technology: Pure Torque and Direct Drive

- The Pure Torque design (<https://www.gerenewableenergy.com/wind-energy/technology/pure-torque>) protects the generator to ensure and improve its performance by diverting unwanted stresses from the wind safely to the turbine's tower through the main frame.
- The innovative Advanced High Density direct-drive offshore wind turbine's Permanent Magnet Generator (PMG) is more compact and lightweight design compared to earlier generation direct-drive systems.

Reliable

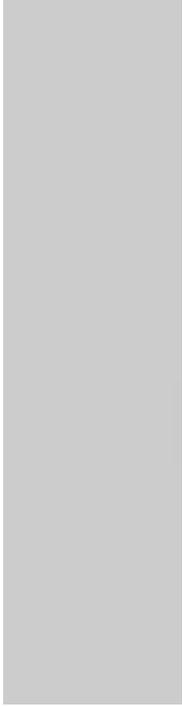
- GE's unique and proven rotor support with direct-drive PMG increases reliability, enhances offshore wind turbine availability and reduces maintenance



Efficient

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- Strength combine
- Yield is in
- Supplies



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Technical Specifications	
Class	I-B IEC-61400-1 / IEC-61400-3
Rated Power	6 MW
Rotor Diameter	150m
Blade Length	73.5m



Rotor Swept Area	17,860m ²
Hub Height	100m
Tower Type	Tubular Steel
Rotor Type	Direct Drive Permanent Magnet

LET US HELP YOU

Want to get the most out of your wind power assets? Reach out to GE's team to start the conversation.

Contact Us (<https://www.gerenewableenergy.com/contact-us>)



Haliade* 150-6MW Offshore Wind Turbine

Generator

In charge of generating the electricity, the direct-drive permanent magnet generator has fewer rotating parts, which increases reliability, maximizes availability and reduces maintenance costs.

Hub

Supports the rotor blades and houses their pitch assembly. It is designed to provide easy access.

Rotor Bearings

Directly transfer the unwanted load on the rotor towards main structure, bypassing the drive train.

Pitch

Controls the blade angle optimizing the area exposed to the wind, the rotation speed to ultimately increase the yield.

Helipad

A helicopter winching area allows for quick access in case of emergency at sea.

Elastic Coupling

Key element of the Pure Torque* system, includes a patented coupling system that avoid undesired load towards the generator.

Main Frame & Tower

Made of cast steel, the frame supports the rotor and transfers the loads to the tower.



Innovative, reliable, efficient

- The new generation 6 MW direct drive offshore wind turbine
- Suitable for all offshore conditions, delivering renewable energy at competitive cost to 5,000 households

*Trademark of General Electric Company

A PARTNERSHIP IN FLOATING WIND

Floating offshore wind turbines provide an innovative alternative for enhancing the energy potential of maritime settings that are too deep to install fixed-bottom foundations. Such settings usually provide better wind conditions while being more extensive and less travelled than near-coastal areas.

In October 2014, GE joined with DCNS, founding a sector of excellence in the floating wind energy business. The partnership agreement aims at developing and then commercializing an integrated system for a semi-submersible floating wind turbine delivering a 6 MW offshore wind turbine.

On August 2016, GE's Haliade 150-6MW offshore wind turbine was selected as a preferred supplier (by EOLFI and CGN) for **one of the first French floating offshore projects**

(<https://www.gerenewableenergy.com/stories/france-future-is-floating->



wind), located in Groix, 14 km off the coast of Brittany and later in November that same year, GE's Haliade 150-6MW was considered as preferred wind turbine for Leucate floating project, located 13 km off the coast, and attributed to ENGIE, EDPR, Caisse de Dépôts and Eiffage.

KEY MILESTONES

April 2012: The consortium led by EDF EN for which GE is the exclusive turbine supplier won three offshore wind farms in France (Saint-Nazaire, Courseulles-sur-Mer and Fécamp for a total of 238 wind turbines).

December 2014: Type A certificate obtained, following the technology tests and performance measurement in Le Carnet, France, where GE installed the first Haliade 150-6MW prototype.

End of 2013: GE installed the first Haliade prototype off the coasts of Ostend harbor at the Belwind site in Belgium. GE undertook commissioning tests and Operations & Maintenance demonstration and training. This installation helped GE confirming how the machine behaved within the offshore environment for which it was specifically designed and developed.

December 2014: GE inaugurated the offshore wind turbine rotor and nacelle assembly factory in Saint-Nazaire, France.

March 2016: GE installed and started additional testing and technology optimization at Osterild, Denmark.

August 2016: Financial close for the **396 MW Merkur offshore wind farm project** (<https://www.gerenewableenergy.com/stories/building-merkur-offshore-wind-farm>), located in the North Sea, which will generate enough power for 500,000 homes. GE will supply 66 Haliade 150-6MW, and when Merkur is completed, it will become one of Germany's largest wind farms.

August 2016: GE installed the first offshore wind farm in the US at Block Island, located off the coast of Rhode Island. This 30 MW project generates enough power to meet the needs of the residents of the island. **See how the Block Island wind farm was installed using a magnetic rotor design** (<https://www.gerenewableenergy.com/stories/block-island-ge-store>). 

March 2017: GE Renewable Energy was selected by Chinese Fuqing Haixia Electricity Generation Company (a joint venture between China Three Gorges and Fujian Energy) to deliver three Haliade 150-6MW offshore wind turbines to the Fujian Xinghua Gulf demo project. GE is one of the several wind turbine suppliers to participate in the 73 MW windfarm project, capable to provide enough power to satisfy the needs of more than 20,000 households in the region.

March 2018: GE finished the installation of the Xinghua Gulf demo project, and became the first supplier in the world to have installed offshore wind turbines in the Americas, Europe, and Asia.

March 2018: GE announced the installation of the first Haliade 150-6MW at the Merkur offshore windfarm in Germany. Installation and commissioning activities are on-going.

Thanks to its unique innovative and proven technology, GE is a key player in the offshore wind turbine market, delivering efficient, reliable and environmentally-friendly power solutions to its customers. **Contact us today (<https://www.gerenewableenergy.com/contact-us>)** to learn how GE can help power your offshore wind turbines.

GE Renewable Energy

We take the earth's most abundant resources - the strength of the wind, the force of water, and the heat of the sun, - and put them to work with breakthrough technology that unleashes their true possibilities. Combining onshore and offshore wind, hydro and innovative technologies, GE Renewable Energy has installed more than 400+ gigawatts capacity globally to make the world work better and cleaner.

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