

New offshore wind turbine boosts energy yield by nearly ten percent

11 August 2015, by Norbert Aschenbrenner



The prototype in Østerild, Denmark was installed only a few months after the product launch at EWEA Offshore trade show in Copenhagen.

Siemens has increased the generator capacity of its gearless offshore wind turbines from six to seven megawatts.

Under typical offshore conditions, a single new turbine can generate 32 million kilowatt hours of electricity in a year, sufficient to supply up to 7,000 homes. This SWT-7.0-154 wind turbine has the same rotor diameter of 154 meters as the predecessor model, but delivers a nearly ten percent higher energy yield. After its presentation at the EWEA Offshore trade show in Copenhagen, a prototype recently started test operation in the Danish Østerlid test field.

Lighter, More Compact and Less Prone to Wear

Siemens has relied on gearless technology for its [offshore wind turbines](#) since 2010. A synchronous generator with permanent magnets converts the rotor motion directly into electrical energy without

the use of a gearbox which normally steps up the low speed of the wind rotor to high speed for generating electricity. With the new technology, the entire drive train operates with significantly fewer components, making it lighter, more compact and less prone to wear. The SWT-7.0-154 is thus the lightest wind turbine in its performance class. The gearless turbine also delivers more power. Since the use of permanent magnets for exciting the generator obviates the need for electrical power or for the corresponding control system or slip rings, a high level of efficiency is achieved even at low wind speeds.

Optimizing Proven Technology

The latest increase in performance has been attained through optimization measures to the generator and the associated electrical components. The key modifications are more powerful [permanent magnets](#) in the rotor and suitably strengthened generator segments. In addition, the converter and transformer that transform the [electrical energy](#) produced by the generator for feeding into the supply grid have been re-engineered for the higher power output. The electrical systems are also optimized with respect to reactive power compensation, a function that is important for the stability of the power supply grid. The prototype now installed is designed to test the operation of the more powerful [generator](#) and the upgraded [electrical components](#).

All in all, the Siemens engineers have succeeded in increasing the output of the turbine without basically altering its essential components. The proven technology and reliability of its predecessor have been retained and the new system can be brought to production maturity more quickly. The start of series production is planned for the beginning of 2017.

Provided by Siemens

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