

Eight-MW giant makes offshore wind power cheaper

September 5 2016, by Christine R  th

A new offshore wind turbine from Siemens is set to lower the cost of wind power generated on the high seas. Siemens believes it is well on the way to reaching its goal of producing offshore wind energy at a total cost of less than ten euro cents per kilowatt-hour (kWh) by 2020. In fact, it expects that generation costs for offshore wind power plants will decline to less than eight cents per kWh by 2025. Siemens and other companies in the wind energy business agreed on this target at the beginning of June 2016.

Siemens' new wind turbine can generate eight megawatts (MW) of electrical [power](#) – previous systems were capable of no more than seven MW. The new turbine has a rotor diameter of 154 meters, which is the same as its predecessor model, but it can generate up to ten percent more energy per year, depending on its location. That is enough to supply 8,000 households with electricity.

Considering these figures, under appropriate conditions, a wind farm could therefore supply the same amount of energy with nine instead of ten turbines, which naturally lowers associated investment and operating costs per watt of generated power. The key to the increased output lies in stronger [permanent magnets](#) in the generator. A prototype of the new wind turbine, the SWT-8.0-154, will be installed at a test site in   sterild, Denmark, in early 2017. Type certification is planned at the beginning of 2018.

Stronger Magnets Induce more Power

Direct drive [wind turbines](#) do not need a gearbox to increase their speed from the rotors to a higher speed suitable for the generator. Instead, a synchronous generator with permanent magnets converts the movement of the rotor directly into electrical energy. Without a heavy gearbox, the system is lighter and more compact. Since it has fewer components, it also requires less maintenance. Furthermore, directly driven wind turbines achieve good efficiency rates even at low wind speeds, because no power outlays are needed to operate electromagnets in the generator.

To further boost generator output, the magnetic strength of the permanent magnets was increased so that more current is induced. Siemens achieved this by changing the magnets' composition in cooperation with the manufacturer. To ensure that they can operate at greater power, design changes were also made to the converters that adjust the voltage and frequency of the generated power before it is fed into the electrical grid. Siemens manufactures the converters for its wind turbines itself. They have a modular design so they can be adapted to a variety of turbine power levels. It was therefore a simple matter to extend them to the generator's output of eight megawatts.

All the other components of the new system – particularly the rotor blades and power transformer – remain the same. From long-term observations of the seven-megawatt turbines, engineers concluded that the mechanical elements, such as the bearings, will remain stable when operating with the higher torques of the eight-megawatt variant. Siemens can therefore preserve the tried and tested technology and the reliability of its predecessor model to take full advantage of its well-established logistics processes and supply chains. That's the key to the rapid market launch of the eight-megawatt [wind](#) turbine.

Provided by Siemens

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