STI
SUPERCONDUCTOR TECHNOLOGIES INC.

CONDUCTUS®

MOTORS & GENERATORS

Generation

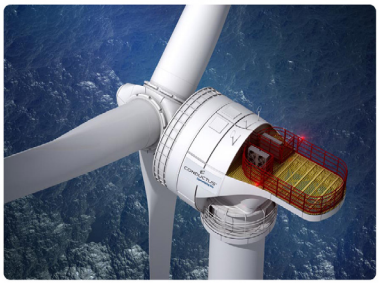
Rotating Machines
Motors & Generators

- **Offers significant size reductions and increased performance over conventional technologies**
- **Motors and generators utilize 10's to 100's of kilometers of superconducting wire per device**

Superconducting turbines and other rotating machines are expected to generate the largest future demand for superconducting wire.

Superconducting wire will enable electric motors and generators to operate at much higher power densities. When compared to a copper wire based electric machines with equivalent output power, future superconducting motors and generators will enable a significant size reductions with higher efficiencies.

One potential sweet-spot for high-powered superconducting generators is expected to be 10+ megawatt offshore wind turbines. Offshore superconducting wind turbines promise to capture clean energy at a lower cost than competing renewables, while delivering power directly to growing coastal cities.



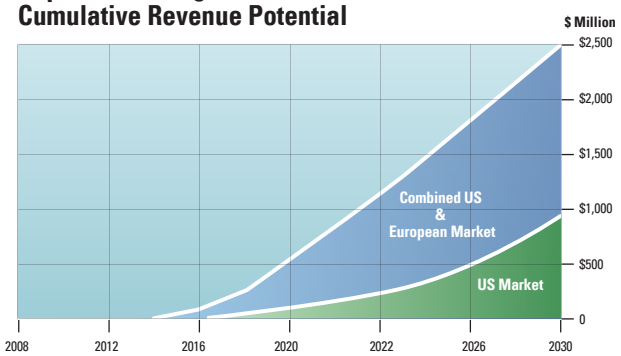
Conductus® 10 MW wind turbine

Superconducting wind turbines are expected to play a unique role offshore as conventional technology cannot achieve the "power per tower" requirement. Although initial costs for large offshore turbines are higher due to the foundations and mechanical structures, these costs can be recouped by higher energy yields.

The increase in power density provided by superconducting turbines significantly reduces generator weight and maximizes power per tower, turning wind power into an economically viable alternative.

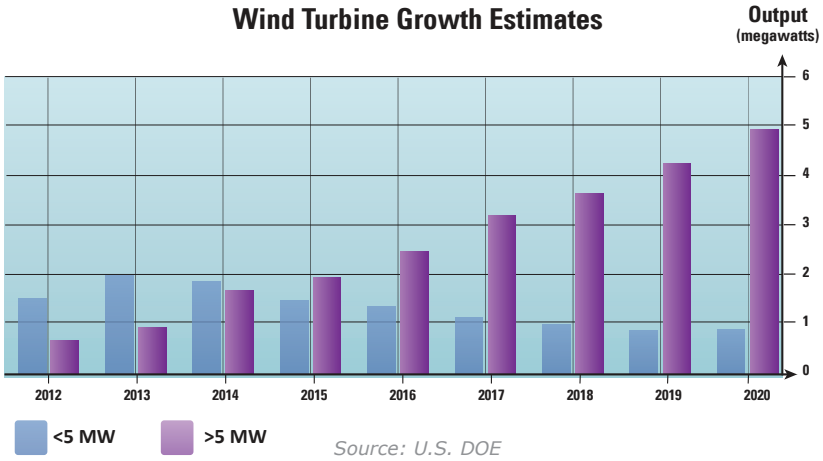
Wind energy is taking shape as a critical world resource for electric power. Today, wind energy is primarily land based. The expected future trend is to exploit a largely untapped supply of offshore wind energy. However, it will take time to build enough infrastructure for offshore wind power to significantly contribute to the power grid.

Superconducting Wind Turbine Cumulative Revenue Potential



Source: U.S. DOE

Wind Turbine Growth Estimates



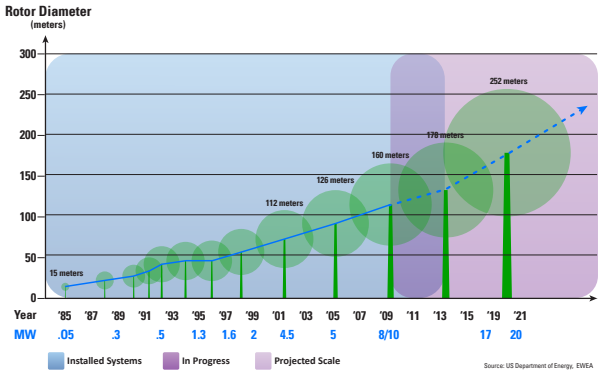
Source: U.S. DOE

Superconducting Motors & Generators (cont.)

Power output of offshore wind turbines will generally be much higher than that of on-shore turbines. The higher the power output of a single turbine, the better the payback will be. The longer the turbine blades the larger the swept area for more wind capture. A 10 MW wind turbine with a swept area three times larger in diameter than a comparably sized conventional wind turbine (i.e. 3.3MW) can capture 4.3 times the power.

Superconducting technology is the key enabler for a >5 MW wind turbine. Superconducting coils will drastically reduce the size (2-3 x) of the wind turbine while generating the same power output. Conductus® wire has a very high current density advantage over copper, reducing the size and weight of generators.

- *4 Amps/sq mm (Copper) vs. 400 Amps/sq mm (assuming 500A/cm width for Conductus® Wire) = 100X improvement.*
- *Size reduction translates directly to cost savings.*
- *Greatly reduces the amount of magnetic steel and structural steel required.*
- *Conductus® Wire power handling performance at a lower market cost will enable superconducting wire to compete and beat permanent magnet technology.*

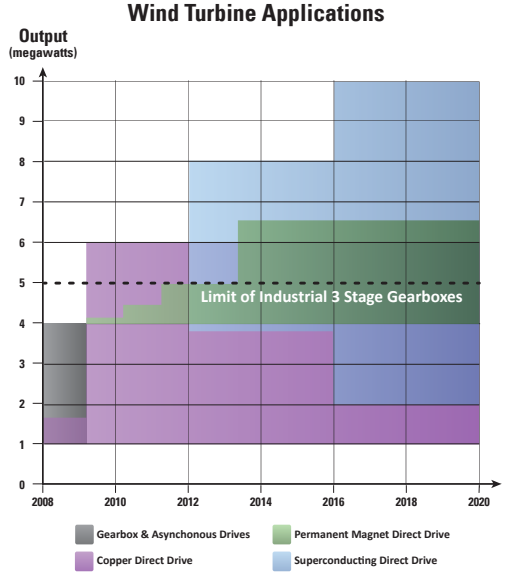


"A 10% increase in tower height creates a 33% increase in available energy." (DOE 20% Wind by 2030 Report, 2009)

Current Technology Will Not Serve the Offshore Wind Requirement

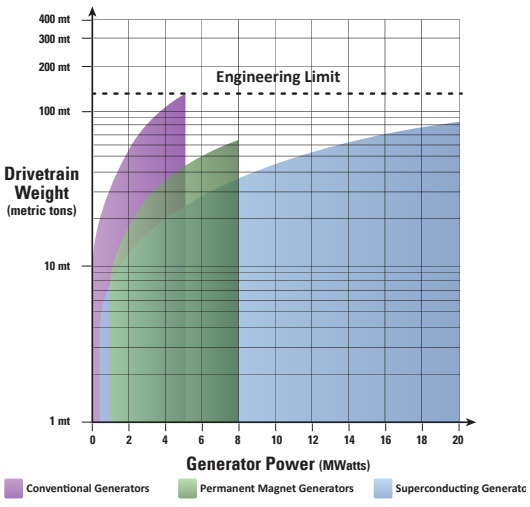
Wound rotor and stator generator technology, which is prevalent in current turbine designs, will prove inadequate at these higher levels. The combination of the weight and size of the generator and associated gearbox will require larger and more costly towers and foundations which will adversely impact payback. In addition, considering the prospects of moving beyond 10 MW of power output for a single turbine, it is obvious that new technologies will be required to support the growth of offshore.

Wind Turbine Applications



Source: U.S. DOE

Wind Turbine Technology Weight Comparison



Source: U.S. DOE