

NREL Identifies Investments for Wind Turbine Drivetrain Technologies

Highlights in
Research & Development

NREL examines current U.S. manufacturing and supply chain capabilities for advanced wind turbine drivetrain technologies.

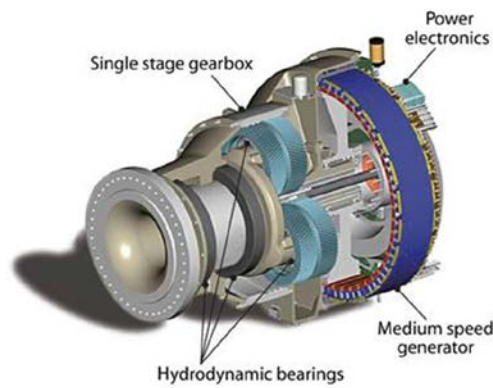
Innovative technologies are helping boost the capacity and operating reliability of conventional wind turbine drivetrains. With the proper manufacturing and supply chain capabilities in place, the United States can better develop and deploy these advanced technologies—increasing the competitiveness of the U.S. wind industry and reducing the levelized cost of energy (LCOE).

National Renewable Energy Laboratory (NREL) researchers conducted a study for the U.S. Department of Energy to assess the state of the nation's manufacturing and supply chain capabilities for advanced wind turbine drivetrain technologies. The findings helped determine the following priority investments needed to bolster the domestic industry going forward.

The first priority investment is technical research and development and manufacturing capability for medium-voltage and permanent-magnet generators because these technologies appear to have the greatest likelihood for reducing mass, improving efficiency, and lowering LCOE. These technologies also have the smallest amount of existing manufacturing or research and development activity in the United States—making this the one investment with the biggest possible impact. Other recommended investments include high-torque speed increasers and full silicon carbide (SiC) switches. High-torque speed increaser technologies (such as new bearing configurations for high-torque gearboxes) are also expected to reduce LCOE, but changes are anticipated to have a lesser effect on the manufacturing and supply chain for these technologies. Full SiC switches have significant potential to reduce LCOE as well, but because they are already being funded by other industries, investment in this area is a lesser priority.

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Reference: Cotrell, J.; Stehly, T. (2013). *An Assessment of U.S. Manufacturing Capability for Next-Generation Wind Turbine Drivetrains*. NREL/TP-5000-58909. Golden, CO: National Renewable Energy Laboratory.



Wind turbine drivetrains now include advanced technologies (shown here) that require innovative manufacturing and supply chain capabilities.

Illustration by Powertrain Engineers Inc.

Key Research Results

Achievement

NREL researchers performed a study of advanced drivetrain technologies that included a literature survey, interviews with industry experts, and onsite tours of manufacturing facilities.

Key Result

NREL identified and prioritized the key investments needed to strengthen manufacturing and supply chain activities for advanced drivetrain technologies in the United States—with the first priority investment being medium-voltage and permanent-magnet generators, followed by high-torque speed increasers and full silicon carbide medium-voltage switch technologies.

Potential Impact

Study findings can be used to develop a long-term strategic plan to improve the competitiveness of U.S. industries and reduce the levelized cost of wind energy.

NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

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