Latest technology in wind turbines

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While the United States has excellent wind resources over much of the country, some locations are less windy and, as a result, have not seen much wind energy development. Harnessing wind power in a cost-effective manner has long been a challenge in these areas. But new technologies could make it possible to profitably capture winds blowing higher above the ground across much of the United States.

In a recent National Renewable Energy Laboratory (NREL) study, researchers found that technology innovations making their way into commercial markets today and in coming years could unlock 80% more economically viable wind energy capacity within the contiguous United States. This could go a long way toward helping the nation meet its clean energy goals.

A significant portion of this potential wind energy occurs in regions of the United States with little or no existing wind farm deployment--the Southeast, Gulf Coast, and parts of the East Coast. These areas are close to electrical demand centers, potentially reducing the need for new transmission to deploy wind energy at the scale needed to meet renewable energy goals.

"These results show an unexpected opportunity to utilize wind power more extensively in regions where transmission infrastructure already exists or where incremental transmission could be built relatively cost effectively," said Owen Roberts, an NREL analyst and member of the study, which was funded by the U.S. Department of Energy"s Wind Energy Technologies Office.

"Deploying wind power in these regions would reduce the need for governments and utilities to import energy from distant areas to serve local demand and would enable local jobs and local economic growth from land leases and tax revenues," Roberts said.

Wind energy technology innovations studied by NREL can reduce the cost of energy at nearly all locations in the contiguous United States and enable growing access to clean wind energy.

"Rather than simply continuing to build wind turbines in already-developed regions of the country, this study shows that we can expand wind energy into areas of the country where we historically haven"t seen it," said NREL researcher Travis Williams, who participated in the study. "Innovations, especially low-specific power and taller towers combined with modest cost reductions, could dramatically increase wind energy"s potential in the United States."

The study"s results, published in a technical report titled Exploring the Impact of Near-Term Innovations on the Technical Potential of Land-Based Wind Energy, reveal an opportunity for the United States to use wind power more extensively when meeting renewable energy targets. To realize the full potential of these technological advancements, more work remains.

For instance, policymakers can play a critical role in reducing other barriers, such as increasing public knowledge of or experience with wind energy, utility experience with integrating wind power (which may not be a consistent supply), workforce capabilities, and developer experience in regions with new wind energy markets.

"We"re talking about bringing a new industry and new technology to parts of the United States that have hardly seen wind energy," Roberts said. "The more we can show there"s potential, the more people will understand the opportunity--creating more pathways to meet our national energy goals."

Learn more about NREL"s land-based wind energy research. And be sure to subscribe to NREL"s wind energy newsletter for more news like this.

Researchers in the industry are working to develop better turbine technology, such as higher efficiency generators and more reliable blades to minimize energy and manufacturing costs.

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