

NREL Study Finds U.S. Wind Energy Potential Triples Previous Estimates

The maximum potential to generate wind power in the contiguous United States is more than three times greater than previously estimated, according to a National Renewable Energy Laboratory (NREL) study.

The new analysis is based on the latest computer models and examines the wind potential at wind turbine hub heights of 80 meters and 100 meters. These hub heights, which reflect current and future models of wind turbines, are higher than those used in previous national estimates and are mainly responsible for the increased wind potential in the study.

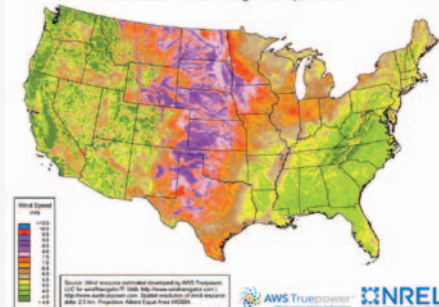
Developed in collaboration with renewable energy consulting firm AWS Truepower, this study is the first national update since 1993, when hub heights of 50 meters were the norm and turbines were less efficient. The current study also benefited from highly detailed 200-meter resolution maps.

The NREL analysis found enormous U.S. wind energy potential. The previous survey pegged annual U.S. wind potential at 10.8 million gigawatt-hours (GWh). However, the potential for an 80-meter hub height operating in a windy area at a 30% or higher capacity factor is almost 10,500 gigawatts (GW) of wind capacity, generating 37 million GWh per year. Even greater, the potential for 100-meter hubs operating in windy regions with at least 30% capacity is 12,125 GW of wind capacity, which could produce 44.7 million GWh of electricity per year. The “capacity factor” used in the study is the amount of power produced per year divided by the amount of power that would be produced if the wind turbine operated at full capacity all the time. To put these calculations in perspective, the installed U.S. wind power capacity is now about 35 GW.

While most of the wind potential comes from the windy central regions, some states not previously considered major wind sources, such as Indiana and Ohio, moved onto the list of the top 20 windiest states for the first time with these findings.

Reference: Dennis Elliott, Marc Schwartz, Steve Haymes, Donna Heimiller, George Scott, and Larry Flowers, National Renewable Energy Laboratory; Michael Brower, Erik Hale, and Bryon Phelps, AWS Truepower/NREL/ PO-550-48036

United States - Annual Average Wind Speed at 80 m



Key Research Results

Achievement

NREL's analysis of the 80- and 100-meter wind energy resource potential for the contiguous United States provided the first national update of wind potential since the 1990s.

Result

The report found that the potential to generate wind energy in the United States is more than three times greater than previously estimated.

Potential Impact

Accurate information about the wind resource and the wind energy potential in each state, required for federal and state policy initiatives, will help expand the use of wind energy in the United States.