U.S. Department of Energy - Energy Efficiency and Renewable Energy
Wind and Water Power Program - Wind Powering America

New Wind Resource Maps and Wind Potential Estimates for the United States

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

The new resource maps and wind potential tables were developed through a collaborative project between the National Renewable Energy Laboratory (NREL) and AWS Truewind, LLC, of Albany, New York. The resource maps for the contiguous United States, and separately for each state, show the predicted mean annual wind speeds at 80-m height. Presented at a spatial resolution of 2.5 km (interpolated to a finer scale for display), they are derived from 200-m resolution maps developed by AWS Truewind for the windNavigator system® (http://navigator.awstruewind.com).

Areas with annual average wind speeds around 6.5 m/s and greater at 80-m height are generally considered to have suitable wind resource for wind development. NREL has conducted a preliminary review and validation of the AWS Truewind's 80-m map estimates for 19 selected states (6 Western states, 6 Midwestern states, and 7 Eastern states) based on tower measurements at heights of about 50 m and above from more than 300 locations.

AWS Truewind also developed a national dataset of estimated gross capacity factor (not adjusted for losses) at a spatial resolution of 200 m and heights of 80 m and 100 m. NREL estimated the windy land area and wind energy potential in various capacity factor ranges for each state and the entire contiguous United States, using the gross capacity factor data. The table (Excel 108 KB) lists the estimates of windy land area with a gross capacity of 30% and greater at 80-m height and the wind energy potential from development of the "available" windy land area after exclusions. These areas are generally considered to have suitable wind resource for wind development. The "Installed Capacity" is the potential megawatts (MW) of rated capacity that could be installed on the available windy land area, and the "Annual Generation" is the estimated annual wind energy generation in gigawatt-hours (GWh) that could be produced from the installed capacity. NREL reduced the wind potential estimates by excluding areas unlikely to be developed such as wilderness areas, parks, urban areas, and water features (see Wind Resource Exclusion Table in the Excel file for more detail).

NREL also produced graphs showing the wind resource potential above a given gross capacity factor at both 80-m and 100-m heights. The wind potential graph for the contiguous United States is available (PDF 106 KB) Download Adobe Reader. Additional wind potential graphs and tables are included for each state.

This is the first comprehensive update of the wind energy potential by state since 1993. NREL has worked with AWS Truewind for almost a decade on updating wind resource maps for 36 states and producing validated maps for 50-meter height above ground. U.S. Department of Energy's Wind Powering America project supported the mapping efforts.

More Information

- State Wind Resource Estimates Webinar
  The National Renewable Energy Laboratory hosted a one-hour Webinar to discuss the new wind potential estimates and maps. Audio and text versions of the Webinar are available.

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