

## Wind Energy Research Center Growing; Two New Turbines Going Up

The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) is installing two new wind turbines at the National Wind Technology Center (NWTC) to study the performance and reliability of a new generation of larger land-based turbines. Data from each of the new turbines will help industry and policymakers determine how the United States could economically generate as much as 20 percent of its electricity from the wind in the next 20 years.

Both turbines will be erected on the NWTC's eastern perimeter. Beginning on Aug. 20, crews using a crane will install the Department of Energy's (DOE) 1.5 megawatt turbine manufactured by General Electric. A Siemens 2.3 megawatt turbine is expected to be fully installed by Sept. 10. Both turbines are scheduled to be commissioned and operating by early October.

Key elements of the DOE turbine were delivered to the NWTC in a convoy of five truckloads beginning last December. In July, NREL engineers worked with Renewable Energy Systems Americas, Inc., (RES Americas) to pour the large customized concrete foundations for this turbine. NREL and RES Americas have signed a cooperative

research and development agreement to study the design and performance of turbine foundations, cabling and other systems in order to increase the reliability of non-turbine components and lower the cost of wind-generated power. RES Americas recently established its U.S. headquarters in Broomfield, Colo.

Additional trucks will be delivering the Siemens wind turbine, the cranes, and other installation equipment over a six-week period.

The DOE turbine will operate atop a 262-foot steel tower. The diameter of its rotor will reach 253 feet. The Department of Energy bought the turbine and awarded it to the NWTC for long-term studies.

The Siemens turbine will use a second tower of the same height, but its rotor diameter is 331 feet. The Siemens turbine employs an advanced new rotor design. Field testing in the NWTC's gusty and challenging conditions will provide valuable data to Siemens' engineers. Siemens has opened a research office in Boulder to provide engineering support and maintenance.

NREL is providing the site, installation services and expertise in field aerodynamics testing, structure and reliability testing and meteorological analysis. NREL and Siemens have signed a cooperative research and development agreement that is expected to continue into 2014.



*This 1.5 MW General Electric wind turbine at the Colorado Green Wind Farm near Lamar is similar to the DOE turbine being installed at the NWTC.*

In addition to producing valuable research data, the turbines will generate clean energy that will help NREL meet its sustainability goals and reduce greenhouse gas emissions. DOE, NREL and Xcel Energy are working to define an agreement that will allow surplus energy to be exported. ■

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For construction updates, visit [www.nrel.gov/news/construction\\_update.html](http://www.nrel.gov/news/construction_update.html) or call 303-275-4087.



*Sections of the Department of Energy's 1.5 MW wind turbine were delivered last winter to the National Wind Technology Center. Installation is scheduled to begin Aug. 20 after months of planning and site preparation.*

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## NREL Community News

### New Meteorological Towers will Feature Energy-Saving Lights

Two new meteorological towers to be installed at the NWTC will feature LED lights that require virtually no maintenance and use a fraction of the energy of conventional lights.

Each of the new towers also will feature more than 60 instruments to collect the most advanced information on the wind, temperature, dew point, precipitation and other weather features that can influence the performance and lifespan of a wind turbine.

The new meteorological towers will stand 440 feet high. Each of the towers will be positioned west of the new Department of Energy and Siemens wind turbines that are being installed on

the NWTC's eastern boundary.

The painted towers each will be secured by 36 steel cables connected to the ground with anchor bolts and concrete anchors. After the towers are completed this fall the red flashing warning lights atop the new turbines will be removed. Warning lights will be removed from three of the existing towers, too, leaving the NWTC with a total of three lighted meteorological towers.

NREL and the wind energy industry are turning to taller towers to characterize the wind resources and conditions higher up where new, larger turbines operate. ■



*Two new meteorological towers at the NWTC will feature energy-saving LED lights. Like this one, they'll be painted a familiar orange and white and will gather data for researchers.*

### NREL Designing Expanded Dynamometer Facility

Engineers are designing an expanded dynamometer testing facility at the National Wind Technology Center. The facility will be funded with \$10 million of NREL's \$110.7 million share of American Recovery and Reinvestment Act funding announced by U.S. Department of Energy Secretary Steven Chu when he visited the Laboratory in April.

The current 5,600-square foot dynamometer facility offers the wind industry a unique opportunity to conduct lifetime endurance tests on a wide range of wind turbine drive trains and gearboxes at various speeds and torque levels. It includes a powerful 3,350-horsepower electric motor coupled to a 2.5 megawatt (MW) gearbox. A few months of endurance testing on the dynamometer can provide engineers with data that is equal to 30 years of operating life in the field.

The expanded facility would include a 5 MW capacity to allow NREL to thoroughly test the new, larger generation of wind turbines for the growing North American clean energy market. Plans for the expanded facility are in the earliest design stage. The expansion is not expected to be completed before mid-2012. ■

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