

NREL Collaborates with SWAY on Offshore Wind Demonstration

Highlights in
Research & Development

NWTC researchers gain valuable data from one of the first floating offshore wind prototypes.

The National Renewable Energy Laboratory (NREL) is collaborating with SWAY, a renewable energy company from Norway, on an offshore wind energy demonstration project deployed off the coast of Bergen, Norway. The project provides NREL with a unique opportunity to study one of the world's first floating wind turbines to be deployed and enhances SWAY's data collection program. SWAY hopes these data will validate its design for a 10-megawatt floating offshore wind turbine.

The SWAY one-fifth scale prototype has a 13-meter (m) downwind rotor on a 29-m tower, with a large portion of the tower beneath the ocean surface. The tower and turbine are designed to swivel on a mooring according to wind direction. A downwind rotor allows the tower to have support cables on the upwind side, reducing the structural requirements on the tower and saving weight and costs.

In June 2012, NREL sent staff members to Norway to install scientific equipment on the seabed and on the prototype above the water line to collect data that will help validate a computer model of the SWAY design. The equipment will provide NREL researchers with practical experience in testing floating offshore wind systems, and the data gathered from this project will accelerate the development of offshore wind design tools and models.

The instruments on the seabed will collect information such as wave height and direction, tidal variations, and sea temperatures. Instrumentation installed on the turbine prototype above the water will collect atmospheric data such as wind speed and direction and operational data such as platform motions, loads, and performance.

Since its commissioning on June 23, the equipment has been collecting data around the clock at a rate of 1.5 gigabytes per day, and NREL has completed a model of SWAY's system. NREL will use the data collected to validate SWAY's design.

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SWAY's one-fifth scale prototype demonstration wind energy system installed off the coast of Bergen, Norway. Photo by Eric Nelson, NREL/PIX 21966

Key Research Results

Achievement

NREL collaborated with a renewable energy company in Norway to gain experience testing a floating offshore wind demonstration project.

Key Result

NREL completed a model of SWAY's new system and will use the data collected to validate SWAY's design.

Potential Impact

NREL leveraged its wind power expertise and international contacts to collect data that will help address critical needs for the offshore wind industry, including the development and improvement of wind turbine design tools and the testing of dynamically active floating wind systems.

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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