Mapping the wind as part of DOE offshore wind demonstration project

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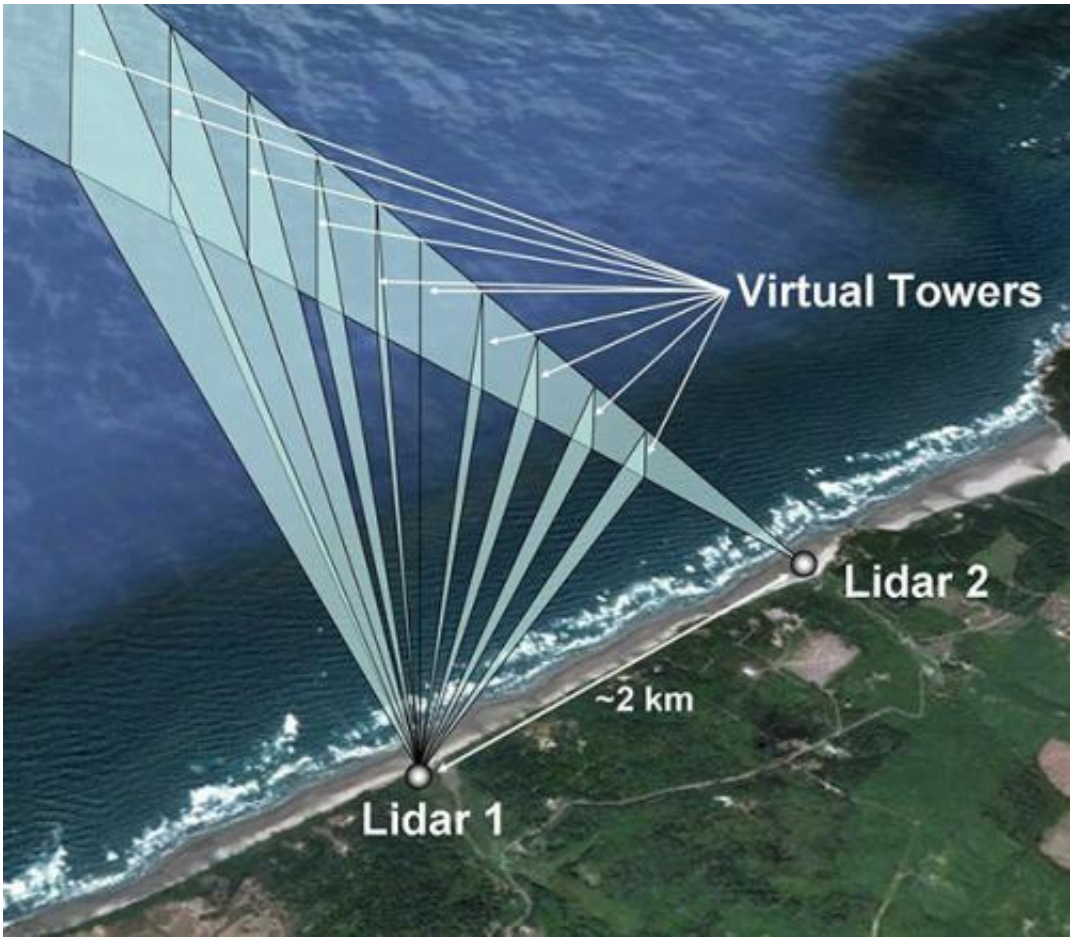

Conceptual drawing of proposed dual Doppler lidar scanning technique installed on the coastline. The two Doppler lidars are installed approximately two kilometers apart and set up to scan the same area of the atmosphere. Data will be combined to provide measurements of the detailed wind field in the regions where the scans overlap or intersect (virtual towers).

Mapping the wind patterns off the Oregon coast is just one part of the innovative work that scientists at Pacific Northwest National Laboratory will be performing in a new demonstration project just announced by the U.S. Department of Energy (DOE). As part of the U.S. government's "all of the above" strategy to develop more secure, domestic energy sources, the DOE announced seven offshore wind demonstration projects with an initial phase investment of $4M each over 2 years.

One project, led by Principle Power, Inc. based in Seattle, Wash. will support the WindFloat Pacific Demonstration Project, sited in Coos Bay, Oregon. PNNL is leading the resource assessment team, first to identify the amount of wind available at the site, then to optimize the site location based on wind resources. Using mesoscale meteorological models and dual-Doppler lidar measurements, they will map the wind field and project the estimated wind at potential sites from onshore and offshore locations.

"Using coordinated lidars with meteorological models is a new method of assessment of wind energy in the boundary layer of the atmosphere, just above Earth," said Dr. Will Shaw, team lead and meteorologist at PNNL. "Weather buoys just don't provide the kind of measurements needed to accurately describe wind resources that would drive these 6-megawatt turbines."

In the first phase of the assessment, the team, including PNNL scientists Drs. Larry K. Berg and Rob K. Newsom, will deploy dual Doppler scanning lidars on the Oregon coastline aimed out to sea. Lidar is a remote-sensing laser instrument acquiring detailed wind measurements used in atmospheric research. Two lidars working together can provide a map of the wind speed and direction over large areas. These measurements will provide information that will validate the models used to help optimally locate the offshore turbine field. In the next phase, they will deploy lidars off shore, on the turbine platforms. Data

gathered during this phase will provide detailed measurements of the wind coming into the turbine array and the wakes induced by the turbines. The measurements will be used to validate and optimize the meteorological models, providing ongoing information for project operation.

"We'll also make use of historical data on winds in the boundary layer to define wind speed, direction and other characteristics of offshore winds in the Coos Bay area," said Shaw. "this measurement and modeling work will be extremely valuable for the project and to advance knowledge of how wind turbines behave in these turbulent environments."

Dr. Andrea Copping, a PNNL oceanographer at the Marine Sciences Laboratory in Seattle, is the overall and environmental assessment lead for the PNNL portion of the project receiving $805K over the 2-year initial phase.

Principle Power's innovative semi-submersible, triangular floating foundations will be assembled near the project site in Oregon, and deployed 10 to 15 miles off shore.

More information: www.principlepowerinc.com/news …ess_PPI_DOE_ATG.html

Provided by Pacific Northwest National Laboratory