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E N E O S Renewable Energy Corporation

Offshore wind measurement research by ERE employees wins the research encouragement award from Japan Wind Energy Association, the first time for a private-sector company

ENEOS Renewable Energy Corporation (headquarters: Minato Ward, Tokyo; President, CEO, and Representative Director: Kazuhiro Takeuchi; hereinafter "ERE") employee Keiichiro Watanabe received a research encouragement award[*1] from the Japan Wind Energy Association (JWEA) in recognition of successful research into offshore wind measurement using a Dual Scanning Doppler LiDAR[*2] (DSL) over the past several years. This is the first time that a private-sector company has received the award. The award ceremony was held in May 2024.

The design of an offshore wind farm requires highly accurate measurement of wind speed, direction, and turbulence intensity at multiple heights above the target sea, to assess the robustness and potential of wind power generation. Up to now, the two most common offshore measurement methods have been offshore met masts and floating Doppler LiDARs[*3]. Although offshore met masts are able to measure wind speed, direction, and turbulence intensity accurately, installation is costly and time-consuming. Floating Doppler LiDARs, on the other hand, require less time and money to install than offshore met masts, but the measurement of turbulence intensity has been an issue, due to measurement error resulting from the motion of the floating buoys.

The award-winning research proposes simultaneous measurement of a single point at multiple heights above the target sea using two scanning Doppler LiDARs, with accuracy comparable to the offshore met masts.

The award recognizes the contributions in reducing the cost of offshore wind measurement and to early decisions on the robustness and potential of wind power, as well as expected

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contributions to both science and industry.

The measurement method used in this research is also quoted in the Offshore Wind Measurement Guidebook published by the New Energy and Industrial Technology Development Organization (NEDO), and is broadly used in offshore wind measurement, mainly at nearshore offshore wind farms, which are located comparatively close to coastlines in Japan. The Japan member of the International Electrotechnical Commission (IEC) is currently preparing a proposal using the DSL measurement method in anticipation of international standardization.

ERE will continue to contribute to the development of the wind power industry and will strive to promote the proliferation of renewable energy and the realization of a carbon-free society.

*1 The JWEA research encouragement award is presented to papers recognized as demonstrating creativity and future potential, from among papers submitted to JWEA and the Wind Energy Symposium.

*2 Doppler LiDAR: A measurement device that determines wind speeds using the principles of the Doppler effect with lasers reflected off of water vapor or dust moving on the wind through the atmosphere. A scanning Doppler LiDAR uses this principle to measure lasers covering 360 degrees on a horizontal axis and 180 degrees on a vertical axis. The device used in this research is referred to as a Dual Scanning Doppler LiDAR because measurements are executed using two scanning Doppler LiDARs simultaneously.

*3 A measuring device with a vertical Doppler LiDAR installed on a floating buoy.

Related papers

Keiichiro WATANABE, Susumu TAKAKUWA, Chikara HEMMI, Takeshi ISHIHARA; Verification of dual scanning LiDAR measurements for offshore wind assessment; 42nd Wind Energy Symposium; p.108–111, 2020.

https://www.eneos-re.com/pdf/2021article/article.pdf

Keiichiro WATANABE, Susumu TAKAKUWA, Chikara HEMMI, Takeshi ISHIHARA; A study of offshore wind assessment using dual-Doppler scanning lidars; Journal of Wind Energy, JWEA; Vol. 45, Issue 2; p. 40–48; 2021.

https://www.jstage.jst.go.jp/article/jwearonbun/45/2/45_40/_article/-char/ja

Keiichiro WATANABE, Susumu TAKAKUWA, Chikara HEMMI, Takeshi ISHIHARA; Offshore wind assessment using dual scanning lidar and missing data complement using MCP method; 43rd Wind Energy Symposium; p. 136–139, 2021.

https://www.jstage.jst.go.jp/article/jweasympo/43/0/43_136/_article/-char/ja/

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