

Powerful campaigns and more: How SSE uses WindCube Nacelle lidar to improve offshore Power Performance Assessment campaigns and conduct new research projects



“SSE recognizes the importance of understanding the performance of a wind farm throughout its lifetime; PPAs are a key component of this and lidars are the enabling technology.”

*Andrew Davidson
Wind Analyst at SSE*

Installation of Wind Iris 2-beam (earlier version of current WindCube Nacelle) by SSE



SSE Renewables is known as a leading developer and operator of renewable energy across the UK and Ireland. Their portfolio includes the largest offshore wind development pipeline in the region at over 6GW and an onshore wind pipeline across both markets in excess of 1GW.

SSE aims to increase their renewable energy output to 30TWh by 2030 and, ultimately, achieve net zero emissions while significantly contributing to the decarbonizing of the power sector by 2050.

The challenge: Conduct efficient offshore PPA campaigns

SSE maintains several offshore wind farms in their portfolio and works hard to keep the turbines running in top condition — no small feat in the demanding ocean environment. When they wanted to carry out some blade erosion repairs at the Greater Gabbard site, SSE decided to run a Power Performance Assessment (PPA) campaign to help determine the impact of the blade repairs on turbine performance.

The challenge for SSE was deciding the best method for getting the most accurate data available. They had previously

been using traditional met masts but were interested in newer technology that could provide a more complete view of the wind profile. The solution had to be timely, cost-effective, and flexible enough to be used for multiple purposes.

A typical met mast, with its expensive and time-consuming construction process, provides measurements up to hub height. Nacelle-mounted lidar, however, collects data over multiple heights and distances in front of the turbine, is straightforward to install and configure, and costs far less to implement.

The solution: Nacelle-mounted lidar

Based on their experience using WindCube® vertical profiling lidar equipment, SSE selected WindCube Nacelle lidar to conduct their PPA campaign.

SSE had previously run a demonstration PPA project using a WindCube Scan lidar and a WindCube Nacelle lidar, alongside a met mast to compare against. The results were impressive: With nearly equivalent measurements across all devices, SSE gained confidence that the nacelle lidar could offer the accuracy and dependability they need to perform PPAs.

“Vaisala is a leading developer of lidar technology and we have a strong relationship with Vaisala through our fleet of WindCubes which we have been using for a

number of years,” said Andrew Davidson, Wind Analyst at SSE. “At [our Greater Gabbard wind farm], we wanted to demonstrate the potential of new lidar technologies for Power Performance Assessments and Vaisala was uniquely suited to deliver both a scanning lidar and a nacelle lidar for that purpose.”

The benefits: Accuracy, flexibility, and new applications

With a Nacelle lidar, SSE can measure multiple parameters, relocate the device to other locations as needed, and conduct their own research projects.

The flexibility of WindCube Nacelle lidar allows SSE to measure different ranges at the same time. Mr. Davidson said, “The obvious benefit for us is the different ranges that we can measure at...

[For example,] it is valuable to have data from in front of the turbine rotor to give insight into turbine induction effects.”

The organization also beta tested WindCube Analytics — Insights software. Their review was positive and the feedback they provided, along with several other customer beta testers, resulted in several enhancements to the software. “For me, the biggest benefit of the software is bringing everything to one place,” Mr. Davidson said.

SSE plans to continue using the WindCube Nacelle and WindCube Scan lidars on other wind farms and are already adding a WindCube Nacelle to another site. The combination of lidars will ensure efficient and reliable PPA and research projects long into the future.



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