ZX Measurement Services

The easier way to measure in renewables

Integrated Wind Lidar and Met Mast Campaign – Crystal Rig Wind Farm

Client – Fred. Olsen Renewables Ltd

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1 Project Overview

ZX Measurement Services delivered an integrated wind measurement campaign at Crystal Rig Wind Farm for Fred. Olsen Renewables Ltd, combining early-stage ZX 300 wind Lidar deployment with the installation and commissioning of a fully instrumented 100 m meteorological (met) mast.

This phased approach enabled early wind data collection while establishing a long-term reference measurement system, accelerating project timelines and improving early-stage decision-making.

Figure 1: Multi-technology wind measurement campaign set up with ZX 300 wind Lidars, co-located with met mast.

2 Wind Measurement Technology

In this project, three ZX 300 wind Lidars and a met mast were used to provide a multi-technology, integrated wind measurement campaign. The Lidars were deployed first, enabling wind data collection to begin while planning and installation logistics for the met mast were underway. This approach reflects a more efficient model for wind measurement campaign design, where early deployment of Lidars enables immediate data capture while the traditional mast is being designed, permitted and installed, enabling the project to begin building a wind dataset from an early stage of project development.

ZX 300 wind Lidars measure wind speed and direction at multiple heights, capturing the vertical wind profile across the full rotor-swept area of modern turbines which can exceed 200m. In contrast, met masts typically host sensors at a limited number of fixed heights and, due to increasing turbine hub heights, rarely provide wind measurements across the entire rotor-swept area.

Both technologies are well established within the wind industry and are widely used for wind resource assessment, each offering their own benefits.

Used together, the technologies are complimentary. The Lidar enabled early-stage deployment and detailed profiling of the wind field, while the met mast delivered a continuous reference measurement at a fixed location. This combination strengthened the overall dataset while allowing the Lidars to be redeployed or utilised elsewhere once the mast was operational, maximising equipment utilisation and improving overall project efficiency.

3 Implementation

The campaign began with deployment of the first ZX 300 wind Lidars in November 2023, enabling rapid early-stage site assessment and immediate wind data collection without the permitting timelines typically associated with mast installations. The phased deployment enabled continuous data collection throughout the transition from Lidar to mast-based measurement, avoiding gaps in the data.

Building on these early insights, a 100m lattice met mast was installed in January 2025 to undertake a 12-month wind measurement campaign in support of future development at the Crystal Rig Wind Farm.

Following completion of the Crystal Rig mast campaign, consideration is being given to redeploying the mast at another proposed site.

4 A Lidar-First Approach

Crystal Rig Wind Farm continues to play a key role in the UK's renewable energy portfolio. To support future development planning, Fred. Olsen Renewables Ltd required accurate and reliable wind data to support informed decision-making and site optimisation.

The "Lidar First" strategy enabled early-stage wind characteristics to be understood quickly across the full vertical profile. The subsequent installation of the 100m lattice met mast built on this initial dataset,

strengthening the overall measurement campaign and supporting long-term, low-uncertainty wind analysis.

The Lidars and mast operated as complementary technologies within a single integrated campaign, with ZX Measurement Services managing both phases to ensure continuity in data quality, consistency in methodology and alignment with the client's development objectives.

Delivered by a single team, the integrated campaign ensured consistency across all stages of deployment while reducing the need for multiple contractors and repeat site mobilisation. Managed end-to-end by ZX Measurement Services, the team delivered a complete turnkey solution including:

- Deployment of ZX 300 wind Lidars for early-stage site assessment.
- Procurement and installation of a 100m lattice met mast.
- Full instrumentation design and configuration.
- Pre-deployment system construction and testing.
- Commissioning and data verification.
- Decommissioning.

5 Safe Installation, Managed End-to-End

Installation of the 100m met mast was completed in January 2025, with works carefully planned and executed to account for winter weather conditions. The experienced team at ZX Measurement Services oversaw all aspects of project delivery, including client liaison, health and safety compliance, subcontractor supervision, plant coordination and post-installation verification.

The mast was erected safely and efficiently within agreed weather windows reflecting ZX Measurement Services' disciplined approach to risk management and operational excellence across both remote sensing and mast-based measurement technologies.

6 One Measurement Partner, Complete Lifecycle Delivery

The integrated Lidar-to-mast campaign provided Fred. Olsen Renewables Ltd with high-quality wind resource data to support confident decision-making.

By using a single delivery partner, site activities could be combined wherever possible. The same team, already familiar with site access, conditions and safety requirements, was able to support both Lidar and mast operations. This reduced the need for repeat site visits, lowered logistical costs and improved overall project efficiency.

By combining remote sensing and mast-based measurement within a single managed programme, ZX Measurement Services reduced early-stage uncertainty, accelerated data acquisition and ensured technical consistency throughout the campaign lifecycle.

With more than 80 years of combined team experience, ZX Measurement Services continues to deliver technically rigorous, safely executed and commercially aligned wind measurement campaigns.

Our promise is simple: Excellence in measurements and project data.

ZX Measurement Services

About Us

At ZX Measurement Services, our primary focus is the acquisition of the highest quality data with the lowest measurement uncertainty. Our team has over 80 years combined experience in the design, installation and management of measurement systems, ensuring all measurement campaigns are designed and delivered to exactly meet our customers' needs whilst optimising new and existing technologies to provide comprehensive data sets.

Combining ZX Lidars' position as industry leaders in the development and supply of Lidars globally with our experience in the design, application and management of turnkey measurement campaigns offers the unique opportunity for Project Developers, Asset Managers and Owner / Operators to maximise data quality and availability whilst minimising measurement uncertainty and cost.

2018 - First ZX 300 installed for wind resource assessment
2018 - First wind farm permanent ZX 300 installed
2018 - First nacelle-based ZX TM installed
2018 - First ZX 300 installed outside UK
2018 - Design, construction and deployment of first ZX Power
2019 - First met mast installation including design and construction of power supply and measurement system
2022 - First non-renewables industry measurement system design and supply
2022 - First Sodar deployment
2022 - ISO 9001:2015 certification achieved
2023 - ISO 45001:2018 certification achieved
2023 - Achilles accreditation achieved
2024 - ISO 14001:2015 certification achieved
2025 - Installation of first ZX300e

Our Services

- Lidar Rental – Onshore & Turbine Mounted
- ZX Data Portal
- ZX Power
- Field Services
- Fleet Management
- Met Mast Installation Services
- Noise Monitoring Support Services
- Solar Resource Assessment & Monitoring