Wind Data as a Service

Supporting a changing industry

ZX Measurement Services

Excellence in measurements and project data.

By ZX Lidars

ZX Measurement Services

Reducing risk and catering for more flexible business models

Data is the cornerstone of every energy project. Whether it is wind resource data for the purpose of project development, operational data used in the monitoring and optimisation of an existing power plant or power performance data used in the verification and acceptance testing of existing or newly installed individual turbines, the need for low cost, accurate and reliable measurements has never been more important.

The wind energy market is continuing to experience a process of change. The removal of subsidies onshore and the challenging pricing framework offshore is driving the need for developers and project owners to achieve commercially competitive stand-alone energy pricing across all new wind projects, whilst optimising the performance and extending the life of existing wind farms. As a result, demand for large volumes of high quality data is increasing as developers try to maximise project finances.

To meet this ever increasing demand for high quality wind data, project developers, owner / operators and asset managers are turning to the now established Lidar-based measurement campaigns as a means to replace or supplement traditional mast-based measurements. ZX Lidars (formerly ZephIR Lidar) has firmly secured its place in the Renewable Energy market as a leading provider of an extensive range of high quality wind Lidars – remote sensors capable of providing wind measurements from ground-level up to wind turbine tip heights and beyond, or from turbine nacelle to several rotor diameters ahead of the wind turbine in free wind streams. They are ideally placed to meet the needs of the industry across the entire project lifecycle, from the initial project development phase through to performance optimisation of installed assets.

Through the introduction of ZX Lidars' new subsidiary, ZX Measurement Services, we can now provide every energy project with the high quality wind data it needs through an innovative industry model: Wind Data as a Service.

Here, under the Wind Data as a Service model, customers gain access to the latest Lidar technology and expertise without increasing overheads through capital expenditure or recruitment which can be attractive for certain types of organisations as it places tight controls over project costs associated with the acquisition of data. This can both reduce a range of project development risks and corporate overheads, leading to reduced uncertainty and a more financially rewarding project.

As such, Wind Data as a Service is an ideal solution for those organisations struggling with the realities of funding and implementing energy projects in today's fierce marketplace or those operating a business model where capital expenditure is not the most economical way to fund project development.

Introducing ZX Measurement Services

OK, so here's the sales pitch bit. Feel free to skip this section!

At ZX Measurement Services, we have an underlying and fundamental understanding of the requirements for site measurements and the provision of project data. With more than 70 years' combined experience in the design, installation and management of measurement systems, our background and experience in project development and operation ensures we never lose sight of these key project imperatives. Our primary focus is to ensure all measurement campaigns are designed and delivered to meet the exact needs of the customer, whilst optimising new and existing technologies to provide comprehensive data sets.

The combination of ZX Lidars' position as industry leaders in the development and supply of Lidars globally, with ZX Measurement Services' experience in the design, application and management of turnkey measurement campaigns presents Project Developers, Asset Managers and Owner / Operators with a unique opportunity. Now, you can maximise data quality and availability whilst minimising measurement uncertainty and cost.

Introducing the technology

Whereas traditional anemometers provide wind data at a series of fixed points, with a typical maximum measurement elevation of the proposed turbine hub height, Continuous Wave Lidars, such as ZX 300, can provide finance-grade data (data that Banks' engineers will accept for the purposes of project financing when used in conjunction with accepted practices for energy yield reporting and analysis) across the entire wind profile from ground-level to several hundred metres above the system. Understanding the flow conditions across the entire swept area of the turbine rotor increases the fundamental understanding of the operational parameters and requirements of the turbine, thus reducing costs and financial uncertainty.

A core advantage of Lidar measurements is the quality of the data you receive. Using a traditional anemometry setup, you may erect one or two masts to gather data on your proposed site and then use this data in conjunction with a energy assessment model to predict the performance of your wind farm site.

With a Lidar, you receive a rich data set that removes the vertical and horizontal measurement uncertainties associated with traditional masts. Lidar wind data outputs include: wind speed and direction; temperature, pressure and humidity; the calculated vertical wind shear; wind veer; and Turbulence Intensity (TI). Our ground-based systems are exactly that - ground-based - which reduces the health and safety implications of working at height on tall mast structures, the visual impact of the design and alleviates planning concerns. Furthermore, by removing the impact of a tall structure itself on the wind, the free and unobstructed wind stream can be measured.

Understanding the free-flow wind conditions above the conventional hub-height measurements obtained from traditional mast-based measurement system, combined with the flexibility and granularity of the data from the Lidar can have a significant effect on the resulting wind farm and its performance. For example, in complex or harsh environments (where capturing sufficient site data to reduce financial uncertainty from a mast-based system can be challenging), the ability to better understand the flow and shear characteristics over the complete rotor diameter and the flexibility to quickly move the Lidar to different locations on the site, could potentially decrease the project uncertainty, increasing the project value significantly.

This is emphasised by the inclusion of Lidar in the latest IEC 61400-12-1:2017 standards for turbine power performance testing, which introduces the concept of reduced measurement uncertainties associated with understanding the wind conditions across the entire rotor swept area.

Using a Lidar can also remove the uncertainties associated with traditional mast-based campaigns such as flow distortion, cup calibration and seasonal issues. The Lidar also removes the need for certain planning permits that would be required when working with tall mast structures, as well as removing the and health and safety concerns over working at height when installing, maintaining or removing a mast.

Lidars provide a resilient solution to traditional met masts. We only use the best wind monitoring sensors and we supply robust methanol fuel cell based modular remote power supplies, designed and proven to operate in the harshest of environments, all to ensure maximum data availability.

Furthermore, Lidars provide greater flexibility thanks to their portable design. If you need to take measurements across a range of locations, you can just make a request and within a couple of days, your Lidar will be in a new location.

Equally Lidar can be used effectively in combination with any existing met masts to both verify mast performance and calibration and then create a greater wealth of data utilising the benefits present from both measurement devices now available on a site.

What is ‘Wind Data as a Service’?

At ZX Measurement Services, we provide a range of stand-alone field and back office support services to our clients, ranging from Lidar rental, through to measurement system design, installation and management.

However, ‘Wind Data as a Service’ combines a number of stand-alone services to provide a complete Lidar-based data set for any given site or project. This ensures the approach taken in developing, installing and managing the measurement campaign is optimised for each individual deployment and all costs are controlled through the project budget. Simply paying for the data without the need to procure and capitalise on any monitoring equipment allows developers or owner / operators to not own assets once the project is finished, thus reducing costs and financial risk. This can be particularly useful if the project is part of a partnership or Special Purpose Vehicle (SPV).

How does the service work?

Let’s walk through a typical user scenario. Let’s say you’re working in partnership and need to source wind resource data to assess a site’s suitability and profitability. Under the Wind Data as a Service model, we would agree your aims and objectives for the site with regards to your requirements for the Lidar data, provide a Lidar system (or systems) over the period of the campaign, and provide the expertise to deploy and commission the system. We would also manage the campaign and check the data (on a weekly basis), thus ensuring maximum data availability and low measurement uncertainty.

Every Lidar system we use is less than two years old at the date of installation. As a result, you receive data from the latest ZX Lidars systems and gain access to highly trained and experienced technicians and engineers from ZX Measurement Services.

A key benefit to many of our customers is the reduced risk of this scenario, particularly as an SPV. When working in partnership or as part of an SPV, procuring hardware can result in expenditure solely associated with one particular project given the financing structure and this can be hard to reconcile once the project is complete. Additional costs, such as increased development costs, often mount for one partner, which could have an impact on the financial merits of the project and increase overall project risk. Buying data from ZX Measurement Services effectively removes this risk, reducing your project costs and improving project cost control.

ZX Measurement Services

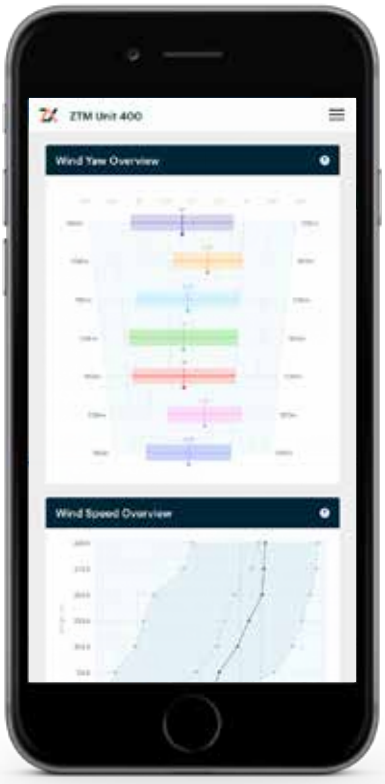
What if I already have my own Lidar or wish to buy a new Lidar for multiple projects?

At ZX Measurement Services, we provide a full turnkey solution for all measurement scenarios, applying the same ethos as described in the 'Wind Data as a Service' section, but using your own devices to measure the wind resource. This includes managing your own fleet of Lidars or other Remote Sensing Devices, the design and optimisation of your measurement campaigns and, if required, we can supply robust methanol fuel-cell based power supplies designed for remote operation. As an example, whether you have one Lidar or multiple Lidars, we can install, manage, operate and decommission your system(s), helping you to optimise your deployments and leaving you to focus on the most important aspect of your project: the data. We are technology agnostic so we are both experienced and pleased to work with your fleet of Remote Sensing Devices, regardless of the make, model or age.

A range of scenarios

The scope of ZX Measurement Services' work covers a range of scenarios both onshore and offshore including wind resource assessments, wind monitoring, wind farm operations, and environment and weather monitoring. For example, ZX Measurement Services can also supply and install nacelle-mounted Lidars for power performance verification and optimisation (including Power Quality Monitoring, turbine yaw misalignment calibration and wake mitigation identification).

Here, a Lidar system is mounted on a wind turbine nacelle to accurately measure the power performance of the turbine. The identification and either rectification or attribution of underperformance helps to reduce uncertainty in the long-term P90, P50 and post-construction energy assessments and can provide more attractive options for refinancing a wind farm with better-understood rates of return. Lidar is used more as a Due Diligence tool here but again is borne from approaching the project with data in mind and the whole campaign rather than just the system hardware.



Conclusion

As the wind energy market changes, the need for a greater understanding of the flow conditions throughout sites and up to and above wind turbine hub-heights is now more important than ever. While it is easy to get caught-up in the discussions such as mast versus Lidar or the pros and cons of each measurement approach, we should never lose sight of what is important: the data.

ZX Measurement Services can helps you to realise the full value of your measurement opportunities or create new opportunities for you. We can provide a suite of software for the management, analysis and reporting of your data and our expert staff can provide you with full training and technical customer support as required.

At ZX Measurement Services, we offer a range of services that will help optimise data quality and data capture, thus contributing to a lower project uncertainty and risk. The Wind Data as a Service model combines a range of stand-alone services, including system supply (ground- or nacelle-based Lidars), operation, data management and system optimisation, unleashing a range of benefits to the wind industry, namely controlled expenditure, reduced risk and access to up-to-date equipment and expertise.

For more information visit www.zxmeasurements.com

Let’s talk

Your Lidar adventure starts today by speaking to ZX Measurement Services.

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Or come and visit in person by just asking!


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