

Efficient on-site Wind Resource Assessment (WRA)

Case Study



The client:

Mainstream Renewable Power

Vaisala solution:

2 WindCube® vertical profiling lidars

THE CHALLENGE:

Confirm wind speeds with on-site measurements

Proving wind availability and characteristics through a WRA campaign is essential to ensure project viability and return on investment. When the project began, an 82m onshore met mast was already in place. However, the unique conditions of the region and the limitations of the onshore met mast require on-site measurements.

During the design of the measurement campaign, several measurement options were considered. An offshore mast was ruled out as it would involve extensive and time-consuming permits, exorbitant building costs, and, in this case, international contractors.

THE APPROACH:

Verifiable WRA with offshore lidar

Based on its extensive experience with Vaisala lidar equipment, Mainstream integrated two WindCube® vertical profiling lidars – chosen specifically for their proven reliability and accuracy in harsh offshore environments. Fortunately, the organization already had a WindCube at another location, which was available for immediate use.

After validation next to the onshore mast, the team quickly installed the first WindCube on a fixed offshore platform about 4km from the shore. In September 2020, the second WindCube was installed on another offshore platform 17km from the first one. The fixed locations ensure consistent placement and data collection regardless of tidal

"In an intertidal zone, you have complex wind flow effects, and it's not well captured by mesoscale maps, so having on-site data helps us to validate wind speeds we expect to see on-site."

*Christiaan Homann
Senior wind analyst, Mainstream*

conditions. Fixed lidar installations also allow easy and quick access to the lidar if needed.

In addition to the importance of validation, Homann sees the lidar validation step proving consistency and reliability enough that eventually it likely won't be needed. "So, one of the main things now is to validate it against a met mast, and we do that for all projects for which we deploy lidars at the moment. But there is definitely a shift in the industry so hopefully one day we can deploy them without met mast validation."

THE RESULTS:

Dependable on-site wind data for proving bankability

With both WindCube lidars in place, Mainstream is getting exactly what it needs to prove bankability and get to the next step in developing the Phu Cuong Soc Trang wind farm. The lidar provides the WRA data needed to validate the expected wind speeds. As Homann puts it, "That's the purpose of our lidars, and we also get that across various heights. The shear profile is also something we can better capture with the lidar offshore."

The advantages WindCube lidar provides would have been very time-consuming and expensive to replicate using an offshore met mast. Not only did Mainstream avoid a lengthy and expensive permitting and installation process, but it was able to quickly train two local contractors in Vietnam to provide support. Local support is especially valuable in saving time and costs and will be an asset to Mainstream as it expands development in the region.

Safety during on-site inspection is another advantage. WindCube sits on a platform 5m above average sea level, posing far less risk to a technician working at such a height compared to the 80–100m offshore met mast.

Mainstream counts on WindCube lidars for reduced uncertainty and eliminating bias. "My expectation [with lidar] is that your wind flow, your horizontal extrapolation uncertainty should decrease; your shear uncertainty on-site should definitely decrease. There are two parts to this: the first one would be to decrease uncertainty, but they [lidars] are also ruling out any form of bias [at the lidar measurement location]."

Phase 1 is currently undergoing third-party assessment, and Mainstream will discuss the results with an independent consultant before closing, but is excited to start Phase 2 measurements. "I am happy that we have got at least one year [of measurements] for each of the platforms because it gives us a good base and eliminates the seasonality effect, so your long-term assessments have slightly lower uncertainties because of that," Homann said.

Why Vaisala?

We are innovators, scientists, and discoverers who are helping fundamentally change how the world is powered. Vaisala elevates wind and solar customers around the globe so they can meet the greatest energy challenges of our time. Our pioneering approach reflects our priorities of thoughtful evolution in a time of change and extending our legacy of leadership.

Vaisala is the only company to offer 360° of weather intelligence for smarter renewable energy, nearly anywhere on the planet. Every solution benefits from our 85+ years of experience, deployments in 170+ countries, and unrivaled thought leadership.

Our innovation story, like the renewable energy story, continues.

