

# VAISALA

## Unrivaled thought leadership

The scientific innovation and superior metrology of WindCube

### Smarter wind energy

The success of our globally recognized WindCube® lidar suite is rooted in a long history of scientific discovery, investment, and advocacy.

Vaisala's scientific and R&D contributions are unrivaled. On the topic of wind lidar alone, we have produced more than 500 authored or co-authored scientific publications at the highest levels of study, and we collaborate with more than 20 highly respected wind and wind energy research institutes worldwide.

All of this creates reliable value for customers, who are always looking for the best solutions backed by the strongest and most trusted global partnership.

### Revolutionary hybrid wind reconstruction

One of our latest advancements, a hybrid measurement capability that integrates scalar and vector averaging to reduce uncertainty, is patent-pending and unlike anything offered elsewhere.

Vaisala scientists discovered that atmospheric turbulence exhibits two characteristic sources of bias in traditional measurements. Our hybrid reconstruction algorithm combines scalar and vector averaging, reducing these biases by an order of magnitude and improving accuracy over other lidar types.

**WindCube:**  
The iconic and trusted gold standard

15+ | Years of scientific lidar innovation

500+ | Co-authored or authored scientific publications in recent years

**Vaisala: Pioneers of environmental science**



**85+ years of experience**  
in environmental measurements and monitoring

1,900+ professionals and a large distributor network



**13% of net sales** invested in R&D

## Understanding lidar types

Two lidar types are most common in the marketplace: pulsed lidar and continuous wave (CW) lidar. Over decades of research and deployments, we have relied on pulsed lidar technology for a variety of reasons. We have continuously developed its strengths to meet the specific needs of wind energy.

Benefits of pulsed lidar and WindCube technology	
Measures multiple heights simultaneously, providing the full wind profile with no compromises in temporal resolution or accuracy	✓
Multiple heights produce much more data, more quickly (10 heights = 10x faster and 10x more data, for example)	✓
Provides spatial resolution that is constant throughout the entire wind profile	✓
Measures greater height and distance ranges, with constant accuracy	✓
Uses only 5 laser beams, which operate without moving mechanical parts	✓
Can use a unique hybrid wind reconstruction algorithm that combines scalar and vector data for the highest possible accuracy and reliability	✓
Maintains constant accuracy no matter the weather or cloud/aerosol layers	✓
Easy to position almost anywhere because its few (5) laser beams can easily be oriented to avoid obstacles	✓
Provides accurate wind direction over a 0-360° range; not vulnerable to possible 180° error	✓
Can use a 5 <sup>th</sup> (vertical) beam for direct, accurate measurement of vertical wind speed and flow angle	✓
Maintains high data availability and sample rates in a wide range of conditions	✓
Data recovery not affected by strong wind shear or wind turbulence intensity	✓
Uses 50% less power on average	✓

## Why Vaisala for renewable energy?

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 weather and environmental monitoring solutions for renewable energy are guided by several key priorities:

- Thoughtful evolution in a time of change
- Making renewable energy smarter at every stage
- Extending our legacy of leadership

Vaisala is the only company to offer 360-degree renewable energy solutions — from sensors and systems to digital services and actionable intelligence — nearly anywhere on the planet (and even on Mars). Every Vaisala solution benefits from our 85+ years of experience, pioneering deployments in 170+ countries, and unrivaled thought leadership.

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

## The value of leadership

WindCube is informed by the best data and meteorology available, and our track record of innovation and research contributions are unmatched. This global leadership is directly reflected in the reliability and accuracy of our lidar systems.

We invite you to join us in making the wind energy industry smarter.

# VAISALA

windcubelidar.com



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