WINDCUBE WATCH

N° 2

Features

From the Editor

The resiliency of the global wind industry in the face of financial crisis and evolving energy policies is a testament to its myriad strengths and innovations.

GWEC's 2015 forecast shows how investment in Asian countries will make this continent the global leader of our industry with over 40% share. It also shows how Europe's offshore wind will help the "old continent" to maintain a technological first-rank position and a steady 30% share of the global installed capacity.

When more cautious investors require a better return, turbine manufacturers and developers need to lower the cost of the produced kW/h. To do this, with no hesitation, they innovate. New technologies are then expected at every level in the value chain, from wind resource assessment to wind farm optimization.

New terrains, new territories, more demanding investors: these are the words that Lidars love to hear!

Indeed, now that our technology has shown its inimitable ease of use to operators including in very complex terrain, now that bank engineers commonly use Lidar data to arbitrate between projects, now that Lidars have shown their very low total cost of ownership in offshore projects, now that leading consulting companies operate Lidars on buoys, there is no frontier to Lidar use. With more than 200 Lidars produced and deployed worldwide, Leosphere and NRG Systems are proud to service the most universal remote sensing solution dedicated to the wind industry.

Yet, that is not enough. It is also time we asked the Lidar to tackle one of the most challenging issues of this industry: increase profitability. Our answers to this are the same as our clients: innovation, robustness, and operational continuity.

In this unstable financial environment, we remain very confident that our industry will thrive. Our role as a Lidar manufacturer will be to accompany this steady growth across regions and terrain types and to help increase project profitability. Because growth and profit are indeed the key drivers to attract investment when capital becomes a scarcer resource.

NRG SYSTEMS LEOSPHERE Lidar Environmental Observations

Global Partners in Lidar Wind Technologies

Customer experience: Element Power, USA

As Lidar technology gains increasing acceptance in the wind industry, wind farm developers are finding novel ways to use the WINDCUBE® in order to begin resource characterization at prospective sites as quickly and efficiently as possible.

Element Power LLC acquired a WINDCUBE in March 2010 to begin gathering wind data on short notice at the proposed Wildflower Green Energy Farm in Antelope Valley, California. Geoff Brown, Director of Wind Resource Assessment at Element Power explains, "We were on a tight timeline to begin a wind assessment campaign quickly, and just as important, quietly. Element Power had not yet filed a formal project application with the regional planning authority, and we needed confirmation of our wind resource estimates before we could undertake this crucial step in the permitting process. The WINDCUBE was deployed just two weeks after we placed our order with NRG Systems, and has proven to be very reliable from the day we started measuring."

Element Power has since installed met towers at other locations within the project site to further characterize the wind resource, but with a large time lag and some height limitations as a result of permitting restrictions.

The WINDCUBE provides invaluable measurements at and above hub height, which helps to minimize wind shear uncertainty and to optimize turbine selection and layout. In addition, the WINDCUBE now also serves as a longer term on-site reference for correlation to newer met tower installations within the project area.

The Fifth Beam Explained

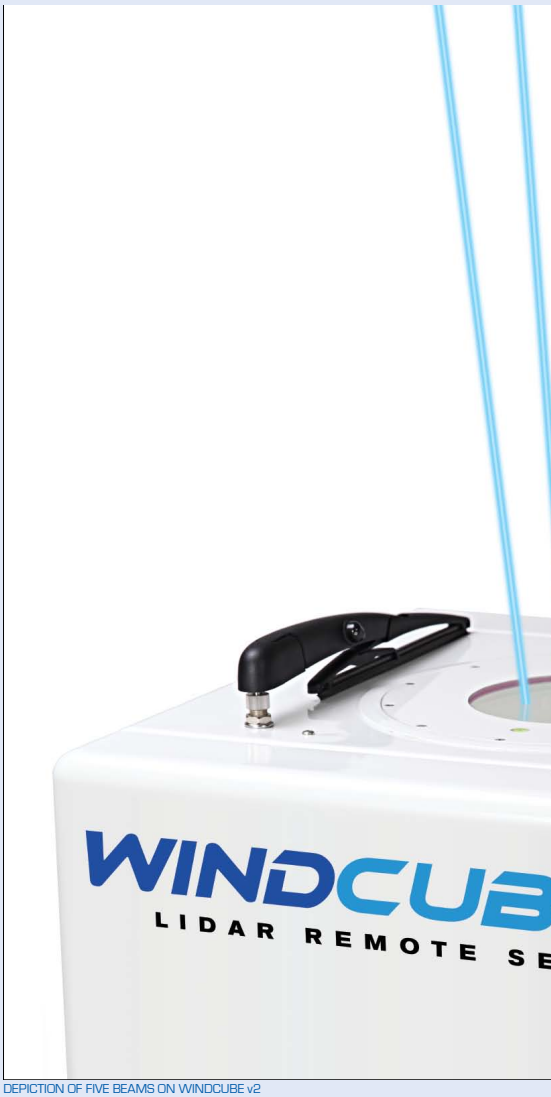
Although it isn't often the first component of the wind vector which comes to mind for wind farm developers (that would be horizontal wind speed), vertical wind speed (often referred to as the w component) is an important consideration in wind farm design and energy production nevertheless. The vertical motion of an airmass can provide an indication of overall atmospheric stability as well as the magnitude of off-axis wind flow, factors which influence wind turbine productivity as well as site suitability for different turbine models.

Vertical wind speed is typically measured on a met tower using a single vertically oriented 2D propeller type anemometer, if it is measured at all. Until now, the w component has never been measured directly by any of the vertical profiling remote sensors commonly used in the wind energy industry. Rather, it has been interpolated from measurements made on the periphery of the measured volume of air. Because vertical wind speeds are typically quite low (0.5 m/s is considered a strong vertical speed) and subject to high frequency variations, they are nearly impossible to interpolate with high accuracy, especially when considering their magnitude relative to the stated accuracies of measurement devices, both remote and in situ.

Leosphere and NRG Systems are pleased to announce the incorporation of a fifth, vertically oriented beam into WINDCUBE® v2. When coupled with the four existing beams used to date in all WINDCUBE devices, this fifth beam provides for highly accurate vertical wind speed measurements at all 12 user-selectable measurement heights simultaneously.

"We consider the fifth beam as a breakthrough technology for the wind energy industry in its quest to characterize the wind as completely and accurately as possible," says Matthieu Boquet, Supervisor of the Scientific Developments at Leosphere. "A true understanding of the wind resource at a site is about much more than just horizontal wind speed and direction. It is our mission to provide the industry with a remote sensor that measures the various components and turbulences of the wind in all terrain types and climate conditions, in order to improve wind farm design and energy production while driving uncertainty and cost out of the development process".

Independent proofs of the improved accuracy of vertical wind speed measurements offered by the fifth beam are available from Leosphere or NRG Systems upon request.



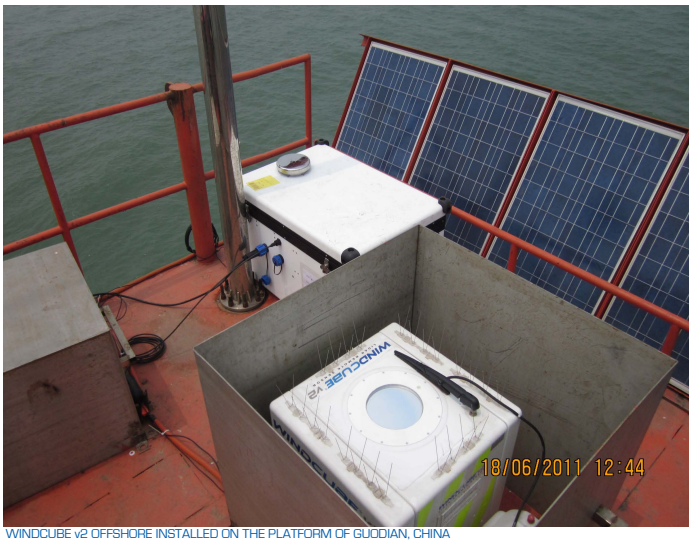
DEPICTION OF FIVE BEAMS ON WINDCUBE v2

WINDCUBE v2 Offshore: Shandong, China

Offshore wind energy projects are flourishing in China. China Guodian Corporation purchased a WINDCUBE v2 Offshore to evaluate the wind resource twenty-five kilometers off the shores of China's Shandong Province, in the Yellow Sea. To support this measurement campaign, Beijing Leviathan Technology Co. Ltd. constructed a 4x5 meter platform on top of a 12 meter pillar. China Guodian Corporation's WINDCUBE v2 Offshore was deployed atop the platform, powered by solar panels and a methanol fuel cell to provide the platform with a two month supply of autonomous power.

Installation of the platform and deployment of the WINDCUBE v2 Offshore was completed in just two weeks, enabling China Guodian Corporation to access and evaluate wind data up to 200 meters or hub height. This impressive feat would not be possible with a typical 100 meter offshore meteorological mast, which would also be a significantly more costly approach than the WINDCUBE and small fixed platform combination. The developer saved as much as 40% on capital costs as compared to the 100m mast approach.

After only six months of data collection, the WINDCUBE v2 Offshore has already provided a considerable amount of information regarding the wind resource at this large offshore project, and is continuing to prove itself as the measurement tool of choice for offshore site assessment around the globe.



WINDCUBE v2 OFFSHORE INSTALLED ON THE PLATFORM OF GUODIAN, CHINA


WINDCUBE IN THE ANTELOPE VALLEY, USA

WINDCUBE
WATCH

Employee Introduction

Evan Osler
Technical Sales Lead - LIDAR, NRG Systems

What do you like most about working at NRG Systems?
I like the variety that my job offers, from field work to scientific collaboration to managing WINDCUBE sales efforts out of NRG's office in Vermont.

What interests you most about the wind industry?
I have a great deal of interest in clean energy generally, but I have always been especially captivated by wind energy in particular. The industry is dynamic and vital, and advances in technology continue to fascinate and inspire me.

What is the biggest change you've seen in the wind industry during your professional career?
In 7+ years working in the wind industry, probably the biggest change I've seen is general maturation. National or multinational developers have replaced or acquired local companies, rigorous standards exist now where none did before, and the debate about whether or not wind power really works and can play a major role in the overall energy mix is now settled in most minds.

How do you see wind measurement evolving?
I see remote sensing playing a larger and larger role in wind measurement campaigns, but in most situations it will continue to be used to complement conventional anemometer measurements. Each technology provides unique and important benefits, and when deployed at project sites in tandem they offer the greatest value to wind developers.

Describe your most unique WINDCUBE deployment.
I've been fortunate to have taken part in a number of interesting deployments over the last few years. I really enjoyed going back to the city where I was born and raised (Cambridge, Massachusetts) to help the MIT Energy Club deploy a WINDCUBE in the middle of their campus. The measurements were used to help supplement the Club's CFD modeling of wind flows in a complex built environment.

Recent WINDCUBE v2 installation highlights:

Nordex USA Inc., USA - Nov. 2011
IFREMER, France - Sept. 2011
SUNCOR Energy Inc., Canada - Sept. 2011
LUT, Finland - Aug. 2011
Alpha Wind, Spain - Aug. 2011
Acciona Energy & Barlovento Recursos Naturales, Spain - Aug. 2011
Swisswinds, Switzerland - Jul. 2011
Boralex Inc., Canada – Jul. 2011
Guodian, China - Jun. 2011
SOL E, Switzerland - Mar. 2011
Iberdrola Renewable Energies, USA – Mar. 2011
EDISON, Italy - Mar. 2011

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Meet us

AWEA Wind Resource & Assessment Seminar 2011
Seattle, Washington USA
14-15 December 2011

American Meteorological Society Annual Meeting
New Orleans, Louisiana USA
22-26 January 2012

EWEA 2012
Copenhagen, Denmark
16-19 April 2012

AWEA WINDPOWER 2012
Atlanta, Georgia USA
3-6 June 2012

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