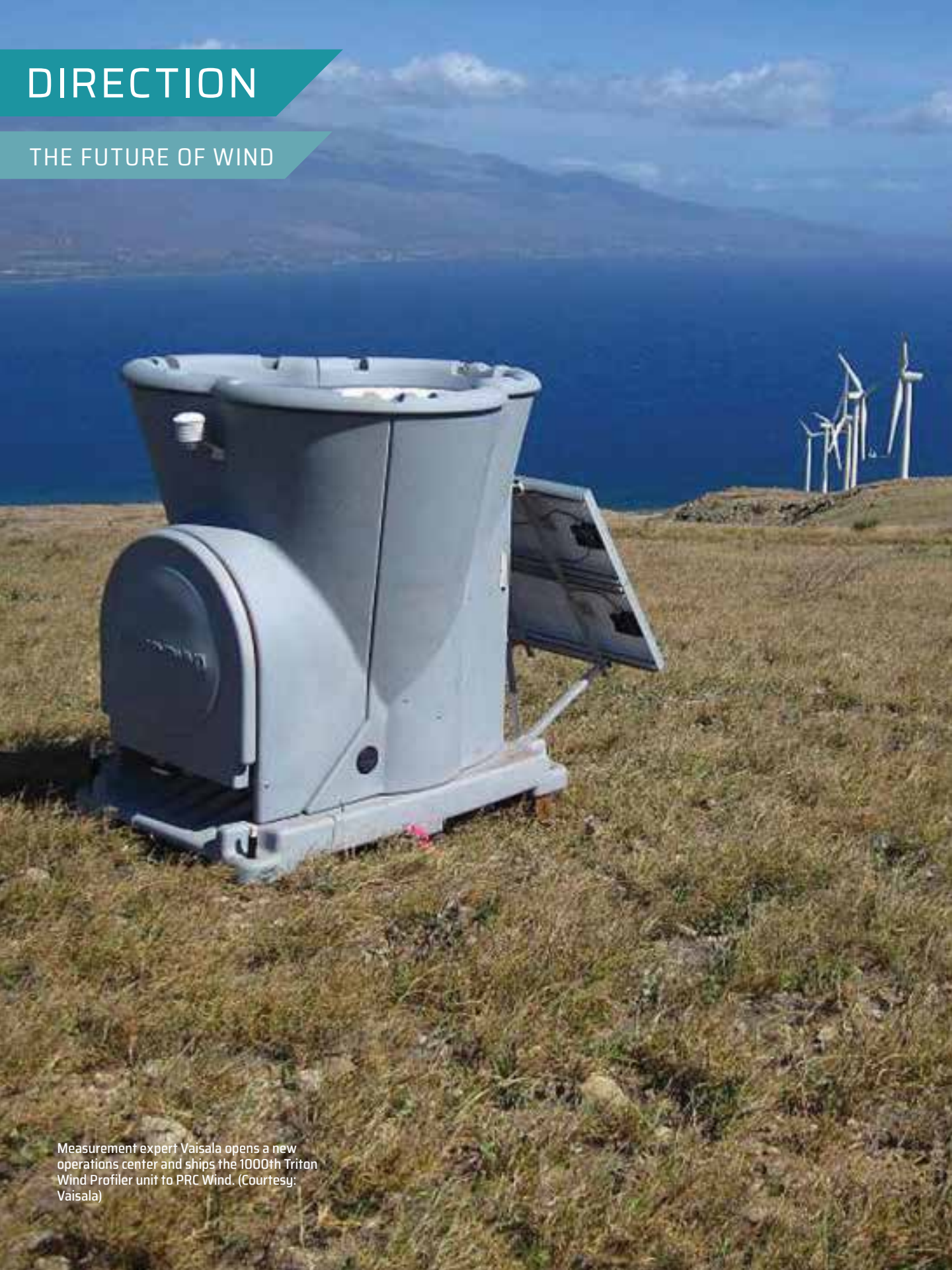
# DIRECTION

## THE FUTURE OF WIND



Measurement expert Vaisala opens a new operations center and ships the 1000th Triton Wind Profiler unit to PRC Wind. (Courtesy: Vaisala)

# Vaisala responds to increased global demand for remote sensing

Vaisala, a global leader in environmental and industrial measurement, has expanded its field support team and opened a new operations center in Birmingham, U.K., to better support service needs and requests for its Triton Wind Profiler. The expansion comes as remote sensing technology continues to be more widely adopted across a broad range of international wind energy markets. Vaisala recently shipped its 1,000th Triton to Minneapolis-based wind developer PRC Wind.

The new operations center will enable Vaisala to provide better technical support coverage around the world, particularly as Triton continues to be deployed in a number of new markets. In the past few months, units have been deployed across increasingly geographically diverse markets, including Indonesia, Iceland, Panama, China, and Japan. Each of these presents unique operational challenges and the new operations center will conduct daily monitoring of Triton fleets in these locations.

"With remote sensing units increasingly replacing met masts as developers' preferred method of wind measurement, there's a need to provide additional support and build out global supply chains," said Tero Muttilainen, offering manager at Vaisala.

"Typically, a wind measurement campaign will gather 18 months' worth of data prior to a wind farm becoming operational. Triton's latest milestone in having collected 25 million hours of data is a testament to its increasing role in these campaigns worldwide. Building on this, our new operations center will allow us to respond quickly and efficiently to challenges in the field as they arise, with real-time support for operators deploying our units across a growing range of international markets.

"This year also marks the 10th anniversary of the Triton's commercialization, and developing its supporting infrastructure will help further global adoption of remote sensing and enhance the growth of the wind industry worldwide," Muttilainen said.

Triton possesses a number of practical advantages over met masts and other remote sensing systems that makes them well-suited to emerging wind markets. Many prospective sites, for instance, are located far from the power grid, in challenging terrain or in heavily forested areas. Here, Triton's low power consumption and ability to be deployed quickly and operate effectively in restricted space makes it ideally suited for use in many areas where met towers or other remote sensors would be impractical.

However, moving into areas of complex terrain poses an additional challenge to maintaining the accuracy of the wind measurement data recorded. The effects of complex terrain on wind measurement using remote sensing devices were previously highlighted in a study produced by Vaisala and WindSim, a pioneer in computation fluid dynamics (CFD) modeling. This collaboration involved the most extensive validation of remote sensing data recorded in complex terrain to date, and explored how its effects on data accuracy can be mitigated.

Building on this collaboration, Vaisala now offers a Wind Flow Curvature Study to the degree of uncertainty in remote sensing data. The service can easily be run to order by Vaisala's production team and can be used at any point during a wind measurement campaign to increase the accuracy of collected data.

Commenting on the receipt of the 1,000th Triton to be shipped, Jay Regnier, vice president, projects at PRC Wind said, "Triton is extremely useful to us because of its ruggedness and flexibility. We can use it to provide bankable hub-height data for use in our packages, to verify our prospecting efforts, and to cost-effectively reduce spatial and rotor height wind resource modeling errors."

**MORE INFO** www.vaisala.com

## California Senate Bill 100 moves state closer to clean energy

With the recent signing of Senate Bill 100, Gov. Jerry Brown and the State of California have taken a historic leap forward for clean energy.

Recent commercial advancements in floating technology mean California's offshore wind resource is an awakening goliath. By including offshore wind as a key resource to meet its new goal, California will grow local businesses, create thousands of good jobs, attract billions of dollars in private investment, and deliver not only clean but affordable electricity to California's grid.

The National Renewable Energy Laboratory (NREL) estimates the state's net offshore wind capacity at 112 GW with a net annual energy potential of 392 TWh, even after excluding areas for military, environmental, and other uses. To put this in context, California's entire 2017 electricity generation from both in-state and imported power sources was 292 TWh — 100 TW/h less than the state's offshore wind energy potential.

California Gov. Jerry Brown

Although the Pacific Ocean drops off more steeply than the Atlantic — making fixed foundation turbines impractical — floating turbine technology is advancing rapidly. Already, the world's first commercial-scale floating wind farm is delivering electricity off the coast of Scotland, at an unprecedented capacity factor of 65 percent.

The September bill signing is especially exciting because of its scale. Experience has shown that bold state

policy goals are key to establishing an offshore wind development pipeline over time. This unlocks even greater private sector investment in regional port infrastructure, manufacturing and other supply chain jobs, all of which drive costs down further.

So far, offshore wind activity in the United States has focused mainly on the East Coast. States from Massachusetts to South Carolina have set offshore wind targets totaling almost 9 GW by the 2030s, and prices have been falling dramatically: two years ago, Rhode Island's Block Island Wind Farm came online at a price of 22 cents per kilowatt hour (kWh). Last year, Maryland's two offshore wind farm contracts came in at 13.4 cents per kWh, a drop of almost 40 percent in one year. And just last month, Massachusetts announced a levelized electricity price of 6.5 cents per kWh, less than 50 percent of the Maryland price announced just a year before.

Now, SB 100 positions the Golden State to reap the benefits of this growing industry. California's offshore wind resource is the perfect balance to the state's massive solar program, because it provides peak power in the winter and in the late afternoon/early evening, when electricity demand is high and solar production is less strong.

The Business Network for Offshore Wind is the only national 501(c)3 non-profit dedicated to growing the offshore wind industry and its supply chain.

**MORE INFO** www.offshorewindus.org

## DOE reports distributed wind has surpassed 1 GW

The U.S. distributed wind market surpassed the 1 GW milestone with 81,000 turbines generating power across 50 states, according to the 2017 Distributed Wind Market Report released recently by the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy.

In 2017, 21 states added 83.7 MW of new distributed wind capacity. Iowa leads all states with 63.5 MW installed distributed capacity.

"Despite minimal policy support, the market is poised for further growth in response to the recent ITC extension," said Jennifer Jenkins, AWEA's Distributed Wind Program Director. "We are working with industry to leverage the ITC, its proven success in reaching this important milestone, and drive new markets like C&I and microgrids."

In contrast with utility-scale wind farms, which are larger with an average capacity of roughly 200 MW, distributed wind systems are generally connected behind the meter or to a local distribution grid. Distributed wind can range in size from a 1 kW or smaller off-grid wind turbine, to a 10-kW turbine at a home or farm, to sev-

eral multi-megawatt wind turbines at a university campus, manufacturing facility, or small community.

**MORE INFO** wind.pnnl.gov

## Siemens Gamesa announces commitment to SBTi

Siemens Gamesa Renewable Energy (SGRE) announced its formal commitment to the Science Based Targets Initiative (SBTi) during the Global Climate Action Summit in San Francisco, California, USA. SGRE is committed to addressing climate-related risks and opportunities, together with setting absolute reduction and efficiency targets related to emissions. By signing this agreement with SBTi, SGRE will be developing a measurable, science-based emissions reduction target within 24 months, which will be independently validated by SBTi's team of technical experts.

SBTi, a collaborative initiative between the Carbon Disclosure Project, the United Nations Global Compact, World Resources Institute, the World Wide Fund for Nature, and the We Mean Business coalition, encourages companies to commit to making measurable reductions in carbon emissions at a level necessary to meet the 2-degree Celsius warming target set in the Paris Climate Accord. With technical resources, case studies, and promotional events, SBTi is working toward science-based reductions targets becoming standard business practice by 2020. Nearly 500 companies have already made the commitment, of which 100 companies have already turned their commitments into targets, and SGRE is proud to join their ranks.

In order to realize the fullest value of climate benefits from wind energy and to reach the ambitious climate goals set in Paris, SGRE understands that this requires deep decarbonization of supply chains. "We are confident that SBTi will provide valuable support in reporting corporate contributions to reducing greenhouse gas emissions in line with the Paris Agreement goals and the 2 degrees Celsius scenario," said Markus Tacke, CEO of Siemens Gamesa. "We look forward to working with other business leaders who have made similar commitments with the aim of finding solutions to climate change, and will continue to encourage our fellow corporate citizens to make the bold commitments that are necessary to move the world toward a carbon-free future," he asaid.

As a provider of clean and affordable energy for generations to come, the company's scale and global reach ensure that it will continue to play a central role in shaping the energy landscape of the future.

**MORE INFO** www.siemensgamesa.com