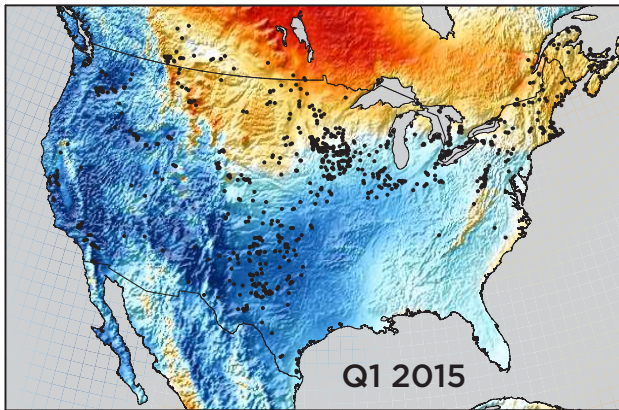


Why Weather Variability Matters

Hampered by low wind speeds, the first quarter of 2015 saw reduced wind production across much of the United States, particularly in the key markets of California and Texas, which experienced some of the lowest wind speeds on record. The so-called “wind drought” impacted the financial performance of many wind project portfolios and raised concerns across the industry.



Departure from normal wind speeds at 100m
-20% 0% 20%

While the legend shows departures +/-20% of normal, some areas saw wind speeds 50% below normal.

Over the past year climate scientists have debated the cause of the low wind anomaly, pointing to a large mass of warm water off the U.S. Pacific Coast as well as a blocking high pressure system over much of the West. These features are believed to be related to oscillations in large-scale climate signals, such as the North Pacific Mode and El Niño, which typically provide strong predictors of weather.

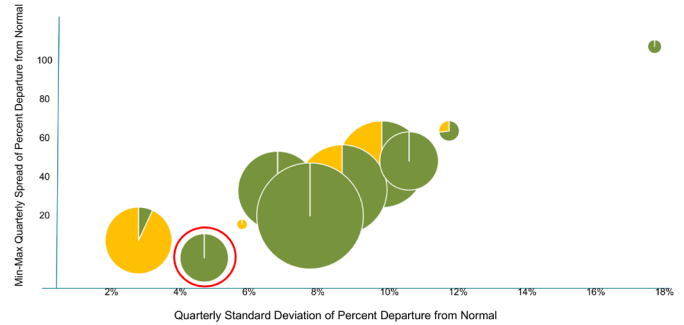
Wind Asset Portfolio Diversification

Portfolio diversification is a strategy of deploying assets in a range of different regions and technologies to mitigate the financial impact of below average performance in any one area. The concept is not entirely new to the wind industry, but considering recent events and the corresponding effects on investors, the way the strategy is currently implemented has been called into question.

Are wind developers and operators doing enough to ensure stable returns? How much diversification is possible given the number of regions usually targeted for wind development? What is the range of variability achieved by existing portfolios?

By examining the performance of a number of high-profile YieldCos along with a hypothetical portfolio optimized for climate resilience, Vaisala is beginning to address these industry questions.

YieldCo Departure from Normal Performance Compared to Climate Resilient Portfolio



Each YieldCo is scaled to the size of its portfolio with the mix of solar capacity (yellow) and wind capacity (green) depicted. The “climate resilient” portfolio optimized by Vaisala is encircled in red.

Using Climate and Weather Patterns for Wind Asset Revenue Forecasting

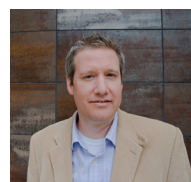
In September 2015, the largest El Niño event in recorded history was developing in the Pacific Ocean. With a climate signal this strong, weather predictability should have been high using past events as a proxy for future conditions. However, despite the magnitude of the event, it did not follow expected trends and is called a “Modoki” El Niño, a Japanese word that roughly translates as “the same but different.”

Despite the challenges of seasonal wind forecasting, operators must still set annual budgets based on expected project performance. Current methods are often oversimplistic and can result in large inaccuracies. These errors reduce shareholder value and confidence.

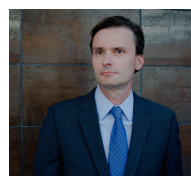
So in a business where revenue varies dramatically based on weather and climate, how can operators set responsible budget expectations? The best approach may lie in leveraging modeling and historical data. This allows operators to establish reasonable benchmarks across a portfolio, which can be recalibrated on a monthly basis to better forecast revenue.

Learn More

For further details, please attend these presentations.



How to Take Advantage of Portfolio Diversity
Speaker: Matthew Hendrickson
Session: Topics & Trends in Wind Assessment
Details: Tuesday, May 24, 2:15-3:15 pm, Tech Station



The ‘Godzilla’ El Niño of 2015/2016: Impacts on Wind Energy in North America
Speaker: Pascal Storck, Ph.D.
Details: Tuesday, May 24, 2:30-2:55 pm, Project Development Station