Will New York’s Renewables Plan Work?

Can the state power through its myriad issues while increasing wind and solar?
page 18

Project Profile
EDP Renewables adds to its New York wind portfolio.
page 22

Energy Assessment
Is it time for the wind industry to rethink some common terms?
page 24
The S128 wind turbine is Suzlon’s newest and largest rotor diameter helping drive down the cost of energy. The S128 features a rotor diameter of 128 meters and a swept area of more than 12,860 square meters generating one of the highest-yielding IEC Class II (3.0 MW) and III (2.6 MW) medium speed full converter wind turbines in their class. Suzlon has more than 2,700 MW of installed capacity throughout the United States and Canada, with a team of over 200 trained Operations, Maintenance and Service technicians providing industry leading service in North America | Wind turbine manufacturer with an installed capacity of over 15 GW | Operations in 17 countries across 6 continents | R&D facilities in Denmark, Germany, India and the Netherlands. To drive down cost contact us today at 773-328-5077 ext. 201 or ext. 203.
16 Lighting Considerations During Wind Farm Development
Federal guidelines underscore the importance of adhering to obstruction lighting requirements.

Spotlight
18 New York’s 50% Clean Energy Standard: Making It Real
There are a variety of moving parts in the evolution of New York’s clean energy mandate.

Project Profile
22 EDP Renewables Adds To New York Portfolio
The developer’s latest New York project is online and operational.

24 Seeking A Better Understanding For Uncertainty
Does the wind industry need to rethink some common energy assessment terms?

On the cover: The 322 MW Maple Ridge Wind Farm, a joint venture between EDP Renewables North America and Avangrid Renewables. The wind farm, located about 75 miles northeast of Syracuse, is situated in the towns of Lowville, Martinsburg, Harrisburg and Watson in Lewis County, N.Y. Photo courtesy of EDP Renewables North America.
This month’s cover story focuses on New York’s effort to increase its renewable portfolio standard to 50% renewables by 2030. The article, written by Anne Reynolds, executive director at the Alliance for Clean Energy New York, nicely lays out New York’s challenges if it is to meet the ambitious renewables mandate.

On the surface, it all appears positive. A top wind state is redoubling its efforts to develop more electricity emanating from terrestrial-based wind, as well as offshore wind. However, because New York is the subject, any enthusiasm generated by the announcement must be tamped down.

Why? Well, any wind developer will tell you that developing in New York is not for the faint of heart. For starters, its environmental reviews are the most comprehensive and stringent anywhere this side of California. Then, in 2011, the state brought back Article X, which was supposed to create a one-stop shop for permitting and shorten the length of time for projects to be signed off. Yet, here we are, six years later, and there has only been one wind project (Everpower Wind Holdings’ Cassadaga Wind) that has completed a full application. That’s right - the project still needs formal approval.

Further complicating matters is the New York Independent System Operator’s (NYISO) class year process, a system impact study that determines the network upgrades needed under the generator’s interconnection agreement. But instead of simplifying the process, the NYISO may have made the process harder, as indicated by a dizzying 35-step process found on its website.

As Reynolds writes, “There are some signs that the market is responding to Gov. Cuomo’s 50 percent renewable pledge. The New York Independent System Operator queue now shows a total of 36 wind proposals (totaling more than 4.9 GW) and 40 solar projects (totaling 920 MW).”

That’s good news, right? Perhaps, but what evidence has New York provided to make me believe that it has fixed all of its issues? Wind developers are still grappling with the state’s thorny permitting and interconnection regimes.

In short, although the state’s efforts are laudable, I’m not buying into it. Wind developers need New York’s actions to keep pace with the rhetoric. Despite its best intentions to keep pace with the likes of California, New York wind development will always remain a slog.
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U.S. Wind Industry Boasts Strongest Start In Years

With the installation of 908 utility-scale turbines in the first quarter of 2017, the U.S. wind industry is boasting its strongest start in eight years, according to the American Wind Energy Association’s (AWEA) U.S. Wind Industry First Quarter 2017 Market Report.

New wind turbine installations in the first quarter totaled 2 GW of capacity and spanned the U.S. – from Rhode Island and North Carolina to Oregon and Hawaii. Great Plains states Texas (724 MW) and Kansas (481 MW) led the pack, says AWEA.

According to AWEA, the early burst of activity reflects how 500 factories in America’s wind power supply chain and over 100,000 wind workers are putting stable, multiyear federal policy to work: The industry is now in year three of a five-year phase-down of the production tax credit.

The report says Texas continues as the overall national leader for wind power capacity with 21 GW installed – which is enough to power more than 5 million average homes.

Notably, North Carolina became the 41st state to harness wind power when it brought online the first wind farm to be built in the Southeast in 12 years: Avangrid Renewables’ Amazon Wind Farm US East.

Horace Pritchard, one of nearly 60 landowners associated with the North Carolina project, explains what it means to him and his neighbors:

“Farms have been growing corn, soybeans and wheat for a long time here, and the wind farm revenue means a lot of families are protected from pricing swings, floods or droughts going forward. We’re just adding another locally grown crop to our fields, with very little ground taken out of production, and the improved roads really help with access. So it’s a great fit here.”

AWEA notes that expanding wind farms continue to benefit rural America, considering over 99% of wind projects are built in rural communities. According to AWEA’s recently released 2016 Annual Market Report, wind now pays over $245 million per year in land-lease payments to local landowners – many of them being farmers and ranchers.

Further, American wind manufacturing facilities remained busy in the first quarter. With 4,466 MW in new construction and advanced development announcements recorded in the first quarter, the near-term pipeline has reached 20,977 MW of wind capacity; that’s about as much as the entire Texas wind fleet’s existing capacity, AWEA points out.

Additionally, demand remained strong in the first quarter, the report says. There was 1,781 MW of wind power signed in long-term contracts, representing the most in a first quarter since 2013. Utilities and Fortune 500 companies frequently sign these power purchase agreements (PPAs), and in the first quarter, Home Depot and Intuit – the maker of TurboTax – joined a host of Fortune 500 companies, such as GM, Walmart and Microsoft, that purchase wind power.

AWEA says wind is also supplying a growing number of cities, universities and other organizations, including the U.S. Department of Defense. Notably, in the first quarter, a Texas wind farm came online to supply a PPA with the U.S. Army.
Got Grid Issues?

Is your plant connected to a weak part of the grid?
Are you connecting near series capacitors?
Are there other renewable connections, HVDC ties, or complex devices nearby?
Are you concerned about harmonics?
Will your project ride through a fault?

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“We switched on more megawatts in the first quarter than in the first three quarters of last year combined,” states Tom Kiernan, CEO of AWEA. “Each new modern wind turbine supports 44 years of full-time employment over its life span, so the turbines we installed in just these three months represent nearly 40,000 job years for American workers.”

**Avangrid, Vineyard Wind Form Offshore JV**

Avangrid Renewables and Vineyard Wind have formed a strategic partnership to jointly develop a large-scale offshore wind project, located off the coast of Massachusetts.

Avangrid is acquiring a 50% ownership interest in Vineyard Wind, an offshore wind energy developer that is part of the Copenhagen Infrastructure Partners (CIP) portfolio.

Avangrid is a subsidiary of AVANGRID Inc. Iberdrola S.A., a worldwide leader in the energy industry with significant offshore wind holdings in Europe, and owns 81.5% of the outstanding shares of AVANGRID common stock.

Last summer, Massachusetts required utilities to procure 1,600 MW of offshore wind energy within the next decade, setting off an intense competition among offshore wind developers in the region. Three companies to date have acquired lease rights to build projects off the coast, including Vineyard Wind. Vineyard Wind’s project area is about 15 miles south of Martha’s Vineyard.

Iberdrola holds offshore wind projects under development or construction in England, Germany and France. Avangrid recently won its first offshore wind lease auction in the U.S. off the coast of North Carolina. CIP is providing investment and management for projects under construction in Germany and Scotland. Executives with extensive offshore wind experience from these European projects will now be joining Vineyard Wind’s local development team, based in New Bedford, Mass.

According to the company, CIP and its executives have developed or invested in some of the biggest offshore wind projects in the world, including the 402 MW Veja Mate project off the coast of Germany and the 588 MW Beatrice project off the coast of Scotland. CIP manages more than $4 billion in assets. It acquired Vineyard Wind in August 2016.

Vineyard Wind plans to begin construction of its project in early 2020 in order to bring the economic development and clean energy benefits of offshore wind to Massachusetts as soon as possible. Vineyard Wind has also worked hard to establish long-term relationships and partnerships with the local community that will provide significant benefits to the project.

**Renewable NRG Systems Sold**

Hinesburg, Vt.-based Renewable NRG Systems has been sold to St. Louis conglomerate ESCO Technologies. The terms of the transaction were not disclosed.

A manufacturer of filtration and fluid control products for the aviation, space and process markets, ESCO says it sees Renewable NRG Systems as a way to enter the renewable energy market. The company says Renewable NRG Systems will operate inside ESCO’s Utilities Solutions Group with Doble Engineering Co., a service provider in the electric power industry, offering solutions and services to minimize risk, improve operations and optimize electric power infrastructure performance.

Renewable NRG Systems’ capabilities span resource assessment products and wind plant optimization equipment, such as turbine control sensors, LIDAR and condition monitoring systems. The deal is expected to complement Doble’s product line, which includes diagnostic equipment, intelligent software, advanced services, comprehensive support and professional training.

ESCO reports privately held Renewable NRG Systems has annualized sales of approximately $45 million (with nearly half of its sales coming from international markets) and operating margins in the mid-teens.

“Adding NRG to our existing utility segment introduces a unique and exciting growth opportunity for ESCO,” says Vic Richey, chairman and CEO, in a statement. “NRG’s capabilities are a great complement to Doble’s product and solution portfolio, providing an immediate entry point into a large and growing market. Clean, renewable and sustainable energy is a $300-billion-plus-per-year global industry, where approximately 600 GW of new wind

**Timken Co. Acquires AeroTorque Corp.**

North Canton, Ohio-based Timken Co. has acquired AeroTorque Corp., a U.S. manufacturing and engineering firm for torque damping products and torque monitoring for wind turbines. Terms of the deal were not disclosed.

According to AeroTorque, the deal includes the assets of PT Tech, as well as wind turbine controls, industrial clutches and brakes.

“Acquiring the AeroTorque business expands our offering in existing and comparable end markets,” says Hans Landin, Timken’s vice president of mechanical power transmission.

Timken engineers, manufactures and markets bearings, gear drive systems, chains, belts, couplings and lubrication delivery systems.

“This acquisition allows us to better serve our customers by offering a broader, more diverse package of products and services,” says Richard G. Kyle, Timken’s president and CEO. The addition of PT Tech will also provide ample growth opportunities as we leverage our portfolio to drive growth across complementary markets around the world.”

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**New & Noteworthy**

North American Windpower (NAW) is a monthly magazine covering the latest news and developments in the North American wind power industry. NAW provides readers with comprehensive information on the technology, policies, and markets that drive the wind energy sector.
A RENEWABLE ENERGY POWERHOUSE

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capacity and 700 GW of solar PV capacity is expected to be added over the next 10 years. NRG is clearly a market leader with an exceptional brand, reputation and strong management team, and I’m excited to welcome the outstanding and dedicated employees of NRG to our team.”

The news sent shock waves throughout the wind industry.

“Although RNRG complements ESCO’s product line well, they will most likely see more growth in RNRG’s wind plant optimization equipment offering rather than their site assessment products,” notes Bruce Hamilton, energy director at Navigant Consulting. “There is a relatively small and rapidly closing window of opportunity in the U.S. market to develop new greenfield wind projects.”

As site assessments are conducted for at least a year and more commonly and ideally for two years, Hamilton says this is a market where construction and commissioning of wind plants will peak in 2020 and then rapidly drop.

“Therefore, there’s a short window of time for met tower and anemometer demand in [the] U.S. That being said, NRG has been increasingly successful selling to the international market so the downturn in the U.S. will be insulated by growing international sales.”

EDPR Renews Suzlon’s Service Portfolio

Suzlon Wind Energy Corp. (SWECO) has inked a long-term renewal on a wind energy portfolio that consists of four sites in three U.S. states totaling 399 MW of Suzlon’s S88 turbine technology.

According to Suzlon, the operations and maintenance contracts were renewed in January for a period of six years. The customer did not release the names and nameplates for the wind farms.

“I am exceedingly happy to see EDP Renewables North America renew these key contracts, demonstrating confidence in our ability to provide long-term economic value, along with high performance,” says Andy Cukurs, SWECO’s CEO, in a statement.

“We were pleased to renew these contracts with Suzlon and are looking forward to a continued partnership delivering consistent performance at those projects,” says Gabriel Alonso, EDPR Renewables’ CEO.

LCOE Numbers For Wind, Solar Continue To Drop

The global renewable energy industry has grown significantly since 2010, enabling widespread achievement of cost reductions and lowering the levelized cost of electricity (LCOE) for renewable technologies, according to new research from MAKE Consulting.

Although regional variability in LCOE for wind and solar will persist, MAKE notes that the lowering of costs continues to improve the competitiveness of renewable technologies globally relative to fossil fuel-based power generation. As costs have declined for renewables, the added cost of environmental regulations and declining load factors have reduced the cost-effectiveness of fossil fuel technologies despite record-low fuel prices.

The LCOE of wind and solar power in the U.S. is very cost-competitive, according to MAKE. The LCOE for solar in the U.S. on average has dropped to levels achieved for wind due to significant module cost reductions. A low LCOE for wind in the U.S. is due to quality wind resources and advantages of economies of scale in Texas and north to Canada. The deployment of the latest generation of blades and advanced operations and maintenance (O&M) practices allow for lower levels of LCOE. However, further reductions in LCOE are critical for future development opportunities for wind and solar as federal incentives phase out.

Variability in LCOE exists in other regions of the Americas, especially as many markets are still developing.

In Mexico, wind and solar, at least the projects awarded at auction that have yet to be built, are cost-competitive with gas-fired generation. The cost position in Brazil is much higher than in Mexico due to supply-chain dynamics. Moreover, significant currency risk in Brazil has increased the LCOE for wind and solar and may impact it over the long term.

The latest generation of 3 MW+ turbine models positions the German onshore wind energy market well for the auction system of renewables pricing that will replace the feed-in tariff as part of the energy policy restructuring. The solar market in Germany has experienced several rounds of renewable auctions and is nearly cost-competitive with wind energy, the company notes.

As for the global markets, MAKE says the LCOE of onshore wind in China and India will need to be reduced for national targets to be met under evolving market mechanisms. Lastly, MAKE says the European offshore market will experience a significant improvement in LCOE over the next five years due to infrastructure investments in the North Sea, the latest generation of 7 MW+ turbines and optimization of O&M practices.
Vestas Leads Second-Half Global Wind Orders

During the second half of 2016, global wind turbine orders from 11 vendors totaled nearly 15 GW, and leading the pack was Vestas, which reported 6,445.15 MW, according to a new report from Navigant Research.

Navigant Research tracked all publicly announced wind turbine orders between July and December in 24 different countries. The latest version of the firm’s “Wind Turbine Order Tracker” reports a total of 14,743.9 MW of sold capacity.

With its total, Vestas sold nearly 3,000 MW more than it did in the first half of 2016, the report points out.

“Wind farm developers are becoming more willing to explore regions of less-than-ideal wind resources, and wind turbine manufacturers are using larger rotors and higher hub heights to maximize capacity factors in these regions,” says Adam Wilson, research analyst with Navigant Research. “Vestas is a good example of this: The company’s average turbine rating for orders received in the second half of 2016 decreased from 2.96 MW to 2.8 MW, while average rotor diameter actually increased slightly to 114.5 meters from 112.7 meters.”

With 2,011.0 MW of announced orders, Gamesa came in second place behind Vestas, says Navigant. Thanks to four large offshore wind orders, MHI Vestas – a joint venture of Mitsubishi Heavy Industries and Vestas – came in third place.

Regionally, Asia Pacific led the pack: It showed an increase of 1,800 MW over the first half of the year, thanks to strong showings in both India and Australia.

Citing a “strong finish” for the U.S., second-place North America, with 3,688.1 MW, narrowly beat out Europe, which placed in third with 3,522.8 MW of disclosed turbine order capacity. Despite more than doubling its order total from the first half of the year, Latin America came in fourth place. Lastly, the Middle East and Africa took fifth, the report concludes.  

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Cloud delivery platform provider Akamai Technologies says it will source enough energy from the 80 MW Seymour Hills Wind Farm to offset its aggregate Texas data center operations, representing approximately 7% of its global power load. It’s part of Akamai’s commitment to source renewable energy for 50% of its global network operations by 2020.

Based outside of Dallas and developed by Infinity Renewables, the project is slated to go online in 2018. Plans for the development call for the construction of 38 wind turbines across approximately 8,000 acres, according to Akamai.

Akamai says its 20-year investment places it at the forefront of an emerging trend in which mid-market corporations are investing in renewable energy projects as a means to decarbonize their operations.

“Akamai has been seeing a strong trend with customers that value and demand clean-powered, decarbonized services from their supply chains,” says Jim Benson, Akamai’s executive vice president and chief financial officer, in a statement. “This project is one of several in which Akamai plans to invest to reach our 50 percent goal. Only recently have companies like Akamai, with small, distributed loads relative to big buyers like Apple, Google and Amazon, been able to make a meaningful impact on decarbonizing operations that go beyond purchasing unbundled renewable energy credits. We believe our innovative procurement strategy can be a model for others, and we’re excited to help lead the way.”

EGPNAn’s Thunder Ranch Begins Construction

Enel Green Power North America (EGPNA) has started construction of the 298 MW Thunder Ranch wind farm, located in Garfield, Kay and Noble Counties, Okla.

The wind farm, which is owned by EGPNA subsidiary Thunder Ranch Wind Project LLC, is expected to enter into service by the end of 2017. Once fully operational, Thunder Ranch will be able to generate more than 1,100 GWh annually. The wind farm will be supported by long-term agreements for the sale of power and renewable energy credits, the company notes.

According to EGPNA, the overall investment in the construction of Thunder Ranch amounts to approximately $455 million, which is part of the investment outlined in EGPNA’s current strategic plan, and will be financed through the Enel Group’s own resources.

EGPNA currently ranks as the second-largest wind energy operator in Oklahoma, where it recently started construction at its new 300 MW Red Dirt wind project. The company already operates the wind farms Rocky Ridge (150 MW), Chisholm View I & II (300 MW in total), Origin (150 MW), Osage Wind (150 MW), Little Elk (74 MW), Goodwell (200 MW), and Drift Sand (108 MW) for a total capacity of more than 1.1 GW and overall investment of nearly $2 billion.
“Community-focused development, coupled with Texas’ significant investments in infrastructure; abundant wind, solar and fossil resources; and supportive business environment, contribute[s] to our national leadership in all forms of energy generation,” states Congressman Mike Conaway, R-Texas, who represents Glasscock County. “Wind energy projects like these positively impact local economies through job creation and increased tax revenues.”

**Enel’s Lindahl Begins Operating In N.D.**

Enel subsidiary Enel Green Power North America Inc. (EGPNA) has started operations on the 150 MW Lindahl wind farm, Enel’s first project in the state of North Dakota.

The project is capable of generating approximately 625 GWh annually, equivalent to the energy consumption needs of more than 50,000 U.S. households, says EGPNA.

The overall investment in the construction of Lindahl amounted to over $220 million. The wind farm is owned by EGPNA Renewable Energy Partners LLC, an equally owned joint venture between EGPNA and GE Energy Financial Services. Lindahl sells its energy and related renewable credits under a bundled, long-term power purchase agreement with the Basin Electric Power Cooperative.

“The completion of Lindahl furthers our strong growth in the U.S.,” comments Rafael Gonzalez, head of EGPNA. “We are proud to be a part of growing North Dakota’s energy economy.
and look forward to contributing our expertise and clean energy to the sustainable development of the local community.”

State Sen. David S. Rust adds, “The Lindahl wind project, which was organized by local landowners, represents a big win for the residents of Tioga and Williams County. The project provides a stable source of property taxes, jobs and landowner revenue to supplement the boom-and-bust cycles of economic development in the Bakken.”

EGPN&W, present in 23 U.S. states and two Canadian provinces, has more than 3.3 GW of managed capacity spread across wind, solar, geothermal and hydropower.

Lindahl is the second EGPN&W wind farm to begin operations this year, following the completion at the end of March of the 400 MW Cimarron Bend wind farm, which is the largest in Enel’s global wind portfolio.

**Rattlesnake Project Begins Construction**

Renewable Energy Systems (RES) and Goldwind Americas say that the 160 MW Rattlesnake Wind Project has received its notice to proceed on construction. The project was acquired by Goldwind from RES in May 2016.

Rattlesnake Wind, located in McCulloch County, Texas, will be RES’ 18th wind project in the state of Texas and the first in partnership with Goldwind. The development will consist of 64 Goldwind 2.5 MW permanent-magnet, direct-drive turbines. Once completed, Rattlesnake will be Goldwind’s largest U.S. wind project to date.

Rattlesnake Wind was developed by RES and will be constructed under a balance-of-plant agreement by the company.

The wind project was developed in coordination with local stakeholders and 32 participating landowners. The project has tax incentive agreements in place with McCulloch County, the McCulloch County Hospital District, the Brady Independent School District (ISD), and the Lohn ISD.

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**Pattern Acquires Interest In Broadview Wind**

Pattern Energy Group Inc. has acquired from Pattern Energy Group LP (Pattern Development) interests in the two wind projects that comprise the 324 MW Broadview facilities and associated Western Interconnect transmission line.

Broadview, which is located 30 miles north of Clovis, N.M., commenced commercial operations in late March.

Broadview interconnects to Western Interconnect, an independent, 345 kV transmission line approximately 35 miles in length. To wheel the output from Broadview to the California Independent System Operator system, where it is delivered to Southern California Edison, Broadview has entered into long-term, firm, point-to-point transmission service agreements to move the output through the Western Interconnect, Public Service of New Mexico and Arizona Public Service transmission systems.

Pattern Energy acquired an 84% initial cashflow interest in Broadview and a 99% ownership interest in Western Interconnect. Institutional equity investors have acquired from Pattern Development a 16% initial cashflow interest in and a 99% initial taxable income allocation from Broadview. Following the acquisition, based on its initial cashflow share, Pattern Energy retains an owned interest of 272 MW in Broadview.

Pattern Energy acquired the interests for $269 million, including cash consideration of $215 million and an assumed project loan of $54 million secured by Western Interconnect. The cash consideration was funded from available corporate liquidity. The Western Interconnect loan commitment was originally secured at the time of the agreement to acquire Broadview in June 2016. The interest on the debt is 90% swapped over the 19-year amortization term, and the debt has a maturity of 10 years. Broadview will begin receiving both pay-as-you-go contributions from the project’s tax equity investors and certain New Mexico production tax credits starting in 2018.

Broadview consists of 141 Siemens 2.3 MW wind turbines and has the capacity to generate 324 MW of energy – the power equivalent to the annual energy usage of approximately 180,000 California homes. However, Broadview is limited to 297 MW of injection capacity at the transmission interconnection point.

Pattern Energy expects Broadview and Western Interconnect to generate cash available for distribution (CAFD) of approximately $18 million in 2018 – increasing each year by approximately $2.5 million and generating an average of $23 million per year in CAFD over the five-year period starting in 2018.

“This extraordinary project brings inexpensive renewable power from eastern New Mexico, one of the highest wind areas in the west, using dedicated transmission capacity from several transmission systems into California,” comments Mike Garland, president and CEO of Pattern Energy.
Apple Signs Up For 200 MW Of Oregon Wind

To help power its data center in Prineville, Ore., Apple recently signed an agreement to purchase power from the Montague Wind Power Project, what the tech giant calls the “first Apple-created wind project.”

Apple announced the deal in its Environmental Responsibility Report, the company’s 2017 progress report covering fiscal year 2016.

Apple says it will purchase 200 MW of power from the wind farm, which is expected to reach commercial operations by the end of next year and be capable of producing 560 million kWh annually.

According to the Oregon Department of Energy, the 404 MW wind project is owned by Montague Wind Power Facility LLC, a wholly owned subsidiary of Avangrid Renewables LLC, and will be located in Gilliam County.

The company says it also signed a power purchase agreement for the 56 MW Solar Star Oregon II solar photovoltaic project, situated a few miles away from the data center. Also powering the data center are two micro-hydro projects generating 12 million kWh of energy per year.

Firms Tout Big Wind Investment In Kansas

State and local leaders and landowners joined executives from NextEra Energy Resources and Westar Energy to celebrate the commissioning of the Kingman and Ninnescah Wind Energy Centers in Kansas, which created hundreds of construction jobs and millions of dollars in economic benefits to the region.

As reported, an affiliate of NextEra owns and operates the Kingman and Ninnescah projects.

The Kingman and Ninnescah Wind Energy Centers feature more than 240 GE wind turbines designed to pivot to capture the prevailing wind and convert it to renewable electricity. Together, they have a generating capacity of 400 MW, capable of powering more than 100,000 homes. The energy serves customers of Westar and its wholesale partners Midwest Energy and the cities of McPherson, Chanute, Iola, Fredonia and Sabetha through energy management service agreements.

The projects have created a significant economic boost for Kingman and Pratt Counties, creating approximately 500 jobs during the construction phase in 2016 and approximately 35 full-time jobs once the projects became operational in December. The projects will provide more than $40 million in guaranteed payments to the county governments over their projected 30-year operational life and nearly $100 million in payments to local landowners. From labor and materials, to housing, healthcare and construction, a wide variety of local businesses have benefited from the influx of economic activity.

“Kansas, and Kingman and Pratt Counties in particular, is fortunate to have some of the best wind in the nation,” says Rep. Jack Thimesh of Spivey. “These projects are evidence of what we can do when we build strong partnerships to develop this resource, create good jobs and long-term benefits for our communities.”
The Federal Aviation Administration (FAA) serves a historically important role in the mitigation of hazards to air navigation in the U.S. Thus, it was no surprise when the FAA addressed safety issues that arose from the construction of wind turbines, singularly or as part of a wind farm. The FAA’s Advisory Circular No: 70/7460-1L (2015) (Chapter 13: Marking and Lighting Wind Farms) specifically identified the height at which a turbine becomes an obstruction and, ultimately, a hazard to safe air navigation during all phases of construction, from start to finish. Given the vast ranges of topography throughout the continent, safety concerns are real, with the potential for a deadly consequence, as witnessed in past turbine/aircraft accidents. The FAA guidance gives wind turbine contractors and owners the predictability and clear guidance to plan airspace hazard mitigation early on in their projects.

In the AC 70/7460-1L, the FAA recommended that turbine owners become familiar with the different types of lighting systems and specify the necessary type of lighting system required. Lighting system manufacturers responded to the FAA’s recommendation by designing lighting to fit specific purposes and requirements.

Engineering and construction firms, however, are ultimately the parties responsible for the installation of required lighting and are open to FAA inspection and enforcement of marking and lighting requirements on turbines once a height of 200 feet (approximately 61 meters) is reached (typically achieved during the construction phase). The FAA lighting recommendations apply to both single wind turbines and entire farms. Achieving safe, navigable airspace for all pilots is the FAA’s ultimate objective in setting turbine visibility or conspicuity lighting standards. Again, the consequences can result in an aircraft collision and significant liability to the wind farm owner, general contractor or erector.

Nighttime conspicuity of a turbine under construction becomes clearer with the update to the FAA guidelines. To ensure turbines are marked as a hazard once they reach 200 feet, and well before the obstruction is marked on FAA aeronautical charts, pilots must be visually warned that an under-construction wind turbine is within their flight path. The purpose of the FAA’s installed and operational temporary lighting requirement is simple: hazard elimination and safety. It is also why only those marking and lighting systems that meet established technical standards are recommended in AC 70/7460-1L. Hazard conspicuity and aircraft safety are critical enough that the FAA specifically prohibits a Notice to Airmen as a substitution for temporary turbine lighting. Simply put, there is no substitute for a steady-burning red light.

While a turbine is under construction, temporary lighting is a basic and mandatory minimum requirement once a height of 200 feet is reached. The temporary lighting requirement is for an FAA-compliant L-810 steady-burning red light. For a turbine under construction, the FAA-compliant L-810 is the only
temporary lighting solution to ensure a turbine’s nighttime conspicuity until the installation and operation of permanent lighting can be achieved, but the permanent lighting configuration will vary slightly according to the height of the rotor tip at top dead center. FAA-certified and -listed L-864 synchronized flashing red lights are the mandatory permanent lighting solution when power allows, but that is not always possible during the construction phase, as power may be intermittently available. During this construction phase, when permanent power is not available for the permanent obstruction light, the FAA has included an important amendment.

Chapter 13.8 of the AC 70/7460-1L guidelines (Lighting of Wind Turbines During Construction Phase) allows the use of a “self-contained, solar-powered, LED, steady-burning red light that meets the photometric requirements of an FAA L-810 lighting system.” FAA certification of the temporary lantern is not required by the FAA, but the solar-powered light must be compliant with the photometric requirements of the FAA’s AC 150/5345-43H for certified lighting. These minimum specifications are designed to provide a universal functionality among manufacturers and to ensure vital performance indicators are met, including those for vertical beam spread (of 360°); candela intensity (32.5 candelas); autonomy (seven days); and lux levels, a measure of light intensity.

Because a turbine’s lighting requirements change as its height does during the construction period (as it evolves from temporary, during construction, to permanent, upon completion), lighting selection is a vitally important consideration when evaluating compliance issues.

Besides selecting temporary and permanent lighting, making the right mounting selection can also have an effect on safety. Mounting brackets and hardware that are universal from the temporary-to-permanent marking offer safety benefits. In 2015, an independent federal agency noted the results when using aftermarket products from various manufacturers as an inoperative hazard light.

Another unintended benefit of universal mounts is increased safety for erectors, climbers and maintenance personnel. Crews can ascend with no duplication of mounting hardware and with fewer tools. That translates into less time aloft for crews when changing, adding or maintaining FAA lighting. No matter how competent a climber, eliminating excess equipment weight and unnecessary time aloft helps reduce the potential for injury. With an estimated 100,000 turbines needed to help satisfy demand for electricity by 2033 (according to the American Wind Energy Association), safety advances become critical.

FAA-compliant and -certified obstruction lighting and universal mounts offer the benefits of reduced installation and maintenance time and the potential to add to the safety of rigging personnel. The ability to offer different lights, across multiple platforms (varying use and heights), through all phases (from construction to completion) is how lighting manufacturers can offer turbine engineers and constructors the best financial return on their lighting investments, with the added benefit of a safer platform aloft and full FAA compliance and/or certification across all lighting products.

Purchasing economies; safety; and high-quality, FAA-compliant lighting can be successfully packaged together to mark wind farms, no matter how large or small the wind farm, when all aspects of turbine lighting requirements are carefully considered.

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New York’s 50% Clean Energy Standard: Making It Real

An aerial view of the Maple Ridge Wind Farm, a joint venture between EDP Renewables and Avangrid Renewables.

Photo courtesy of EDP Renewables.
Here’s what it’s going to take to satisfy the state’s ambitious renewables goal.

By Anne Reynolds

It has been nine months since New York’s Public Service Commission (PSC) issued its order establishing a Clean Energy Standard (CES). In an instant, it seemed the state turned from creating the new 50% by 2030 CES to implementing it. But what progress has there been? First, there has been a series of five follow-up orders from the New York PSC, all geared toward setting up a system of compliance with this new structure and answering remaining policy design questions.

In its order providing clarification, the PSC said that the state, specifically the New York State Energy Research and Development Authority (NYSERDA), would not resell the renewable energy certificates (RECs) it owned by virtue of NY-Sun and other programs to support customer-sited renewables, and the 2017 obligation for electricity suppliers was reduced accordingly. The second order, Order Approving Administra-

tive Cost Recovery, Standardized Agreements and Backstop Principles, addressed key questions about how NYSERDA would recover the costs of procuring RECs and approved language for NYSERDA REC-sales agreements.

Then, in December, the PSC issued an Order on Petitions for Rehearing that denied all petitions for rehearing it had received (save one, from Exelon, regarding the nuclear portion of the CES) but also directed commission staff to re-examine eligibility for Tier 2, which applies to existing renewables. This issue is relevant to all of the pre-2015 biomass, hydro and wind projects in New York. Petitions, submitted by the Alliance for Clean Energy New York and others, questioned the fairness of counting these resources toward the 50% goal without compensation, as well as the risks of these facilities shutting down operations or exporting to the New England REC market. An exploration of the eligibility...
requirements for Tier 2 is due from PSC staff in August. Hopefully, this expected white paper will set the foundation for a fair and sustainable program to maintain New York’s existing fleet of renewable generators so that they can contribute to the 50% goal.

The fourth implementing order was the Order Directing Tariff Amendments, issued in February of this year, creating a backstop financing mechanism for the program and directing utilities to modify their tariffs to implement it. Also in February, the PSC released Order Approving Phase 1 Implementation Plan, which lays out the details and timing of the REC purchase obligation for electricity suppliers and the structure and timing of the planned NYSERDA procurements, a topic of great interest to wind developers.

This plan, for example, indicated that NYSERDA will issue annual requests for proposals for new renewable generating projects. Responding bids will be judged 70% on price and 10% on each of three factors: project viability, local economic impact and operational flexibility (e.g., generation at times of peak demand or ability to dispatch).

Meanwhile, during this same period, New York announced the outcome of its 2016 solicitation for projects – the last under the old renewable portfolio standard – which resulted in 11 contract awards for a total of 260 MW of new renewable capacity, including two wind projects, one solar project, one fuel cell project and seven hydropower projects. Although just two of the 11 awards were for wind power, the resulting generation is expected to be roughly 80% wind. These awards represent a down payment on the total new capacity needed to reach 50%.

The CES consists of two distinct parts: the 50% renewable energy standard (RES) and the Zero Emissions Credit program, which is the nuclear portion. The renewable component itself also has two basic parts: a new obligation for electricity suppliers to purchase RECs annually and a new NYSERDA program to procure RECs under 20-year contracts. Therefore, NYSERDA takes on the role of buying RECs under long-term contracts and selling RECs on a one-year tenure.

During its deliberations leading up to the CES order, the state released the CES cost study white paper. The cost study projected that half of the new renewable generation required by 2030 would result from land-based wind power, with another 20% coming from new in-state hydropower and bioenergy and imports. The remaining 15% would be from utility-scale solar and 14% from offshore wind. This is just one of many possible scenarios, of course, but it equates to 4.5 GW of wind and 3.9 GW of solar – clearly an ambitious goal. The actual mix will evolve over time in response to trends in technology costs, the availability of sites, challenges in permitting and interconnection, and related policies.

There are strong signs that the market is responding to the new 50% CES in New York, even as the details of the program are still being hammered out. The New York Independent System Operator (NYISO) queue now shows a total of 36 wind proposals (totaling more than 4.9 GW) and 40 solar projects (totaling 920 MW). The great majority of these proposals, although not all, were added to the NYISO queue since Gov. Andrew Cuomo announced the 50% goal in December 2015.

History shows that many of the proposals that appear in the queue do not come to fruition, as companies or investors change plans or projects encounter public opposition. All of the projects in this list need to successfully navigate New York’s complex siting, permitting and interconnection process. To make progress toward the 50% mandate, New York needs to make sure that projects keep progressing through the parallel processes of the Article 10 permitting procedure (administered by the state’s siting board) and the lengthy interconnection process at the NYISO.

For both of these processes, there are positive signs but

The Howard Wind Farm, located in Steuben County, N.Y., is owned and operated by Everpower Wind Holdings. Photo courtesy of Zack Dufresne, ACE NY
real concerns. On the permitting side, just one wind project has submitted its full Article 10 application, but there are 15 wind projects that have embarked on the process. And on the NYISO side, a new “class year” study commenced March 1 of this year and includes seven wind projects and one solar project. But despite its name, the class year has been a multiyear process in New York – a problem that the NYISO is striving to address through its queue reform initiative. In sum, a significant list of projects have gotten out of the gate and begun the slog toward the finish line.

Competing for contracts
For developers, the ability to compete for a 20-year contract with the state to sell RECs is the enticement to begin this race. The first solicitation from NYSEDA was due out in April and was intended to be for 1.9 million MWh. This would represent a real and significant increase from the past 10 years in New York, and developers are anxiously awaiting this first call for projects under the new 50% regime. The CES order calls for a NYSEDA solicitation in 2018 and 2019 of 2 million MWh, rising to 2.1 million MWh in 2020 and 2.2 million MWh in 2021. Meeting this demand will require a healthy pipeline of projects and the ability for projects to successfully navigate the permitting and interconnection process.

Also since the August order, Cuomo announced a state goal of constructing 2,400 MW of offshore wind by 2030, and agencies are directed to finalize a plan to make this a reality – the Offshore Wind Master Plan – by the end of this calendar year. Meanwhile, the Long Island Power Authority (LIPA) has signed a power purchase agreement for the state’s first offshore wind project, Deepwater Wind’s 90 MW South Fork Wind Farm. Arguably, New York needs offshore wind development to make it all the way to 50% by 2030, and the offshore wind component is a crucial, but still evolving, component to a successful CES policy.

There are a variety of moving parts in the evolution of New York’s 50% RES – the release of the NYSEDA solicitations and the level of response each solicitation receives; the next actions of LIPA and the New York Power Authority to meet their share of the 50%; design of the offshore wind portion of the program; possible changes related to procurement of the existing, pre-2015 fleet of renewables; and the pace of progress of projects through the siting and interconnection procedures. Separate from these issues concerning grid-scale renewables, there are continuing developments in the nuclear portion of the program (e.g., litigation) and with policies to support distributed renewables, which will also count toward the 50%.

What the industry now has in New York is a strong policy foundation for the successful achievement of ambitious renewable energy goals, but all of these moving parts need to move in harmony for the state to make solid progress toward 50%. That is what it takes to make it real. wwp

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EDP Renewables’ (EDPR) 77.7 MW Jericho Rise Wind Farm is the latest in its long line of New York wind farms that were developed and built by either the company or its predecessor, Horizon Wind Energy.

The company’s New York wind portfolio comprises not only the state’s oldest wind project (the 11 MW Madison Wind Farm in 2000), but also its largest (the 322 MW Maple Ridge, which it co-owns with Avangrid Renewables). Now, with the completion of Jericho Rise in December 2016, EDPR also has the latest wind farm spinning in the state.

Situated in the towns of Chateaugay and Belmont, Jericho Rise is powered by 37 Gamesa 2.1 MW G113 turbines with a hub height of 93 meters. A decade in the making, the project began as little more than a land position and a meteorological tower when EDPR acquired it in 2006, explains Aron Branam, development project manager at the site.

The site, Branam notes, has many of the hallmarks of a great wind project: a decent wind source, access to interconnection, compatibility from a wetlands standpoint, and supportive elected officials and landowners. In fact, the project is located about 10 miles west of Marble River and adjacent to wind farms developed by Essex, Conn.-based Noble Environmental Power.

After compiling several years of wind resource monitoring, as well as completing the New York Independent System Operator’s System Reliability Impact Study and a draft environmental impact statement as part of the State Environmental Quality Review (SEQR), the wind farm was put on the back
burner following the fallout of the global financial crisis of 2009.

By 2010, EDPR began to reassess its global portfolio of wind assets and decided to shelve Jericho Rise. The wind farm lay dormant until 2014, when a market opportunity presented itself in the form of funding from the New York State Energy Research and Development Authority (NYSERDA), the state agency that oversees New York’s renewable portfolio standard.

Although the funding details were not disclosed, Jericho Rise was among four projects that were awarded $206 million under NYSERDA’s ninth Main Tier solicitation. According to NYSERDA, the average award price for the ninth Main Tier solicitation was $22.96/MWh of production over the 20-year contract term – about one-third less than the average contract price for the previous solicitation in January 2013, which was $34.95/MWh of production over 10 years. (For more on the New York wind market, see “New York’s 50% Clean Energy Standard: Making It Real” on page 18.)

**NYSERDA to the rescue**

The NYSERDA funding provided the impetus to move forward. The challenge quickly became mobilizing the project team quickly enough to meet NYSERDA’s end-of-year deadline.

First, Branam says, there was the matter of completing New York’s rigorous environmental reviews.

Within about 16 months, he explains, the project team was able to complete the supplemental environmental impact statement and receive a finding of no significant impact under the SEQR, which is required for permitting.

One challenge early on related to the presence of the northern long-eared bat (NLEB), a protected species. Acoustical bat surveys performed from June 2015 to August 2015 identified two NLEB echolocation calls, Branam explains.

To minimize potential impacts, the New York State Department of Environmental Compliance restricted tree clearing between April 1, 2016, and Oct. 1, 2016.

However, the project was also waiting on a nationwide wetlands permit from the Army Corps of Engineers. “Each day of waiting for the permit reduced the schedule for clearing,” notes Branam. “In the end, EDPR collaborated with the Army Corps of Engineers and received permission to clear 130 acres

in the less than three weeks prior to the April 1 restriction.”

As Jericho Rise moved into the construction phase, several high-wind days delayed construction and added to the project schedule. “There was a fast and furious nature with activity during construction,” he recalls, noting that EDPR was committed to meeting its December deadline.

Nonetheless, Infrastructure & Energy Alternatives, Jericho Rise’s balance-of-plant contractor, managed to meet scheduling milestones and deliver the project on time to NYSERDA.

With construction completed, there was still the matter of working through the New York Power Authority’s (NYPA) interconnection process – and its newly instituted Class Year process, a system impact study that determines network upgrades for interconnection.

According to Branam, the fact that the NYPA allowed interconnection customers, such as EDPR, to negotiate and execute an interconnection agreement prior to completion of the Class Year Study was critical. “I was very impressed with NYPA,” Branam says, noting that the NYPA worked with Jericho Rise to begin design work based on the expected results of the Class Year Study. “They played no small part in ensuring the process was done correctly and on time.”

Branam is also quick to credit two New York politicians: Franklin County Legislator Billy D. Jones, a Democrat, and Rep. Elise Stefanik, a Republican.

He calls Jones an important intermediary who connected town officials with EDPR on a tax abatement agreement. “He understood the benefits and helped to find a middle ground,” notes Branam. As for Stefanik, Branam says she was a key advocate who ensured the permitting processes were smooth and efficient.

When asked what he would remember most about Jericho Rise, Branam notes that it would be pulling off such a large project in such a short amount of time. Perhaps the numerology associated with the project played some part in its success.

“77.7 is a sign of good luck in some circles,” Branam says, referencing the project’s nameplate. “We had such a good amount of luck in completing this project and bringing it to fruition.”

Jericho Rise is the latest in a long line of New York wind farms, including Marble River, located in the towns of Clinton and Ellenburg. Photo courtesy of EDPR
Imagine that a year ago, two wind farms you invested in became operational – one in Texas (Project 1) and one in New York (Project 2). To set your expectations for how much energy the projects will produce, you contracted an independent engineer to conduct a pre-commercial operation date (COD) energy assessment for you; in response, you were provided with a lengthy report, a P50 energy estimate and various production levels that corresponded to different probabilities of exceedance (one-year P99 and 10-year P90, for example) for each project.

The independent energy assessments for the two projects had the same P50 and the same one-year P99, and you find that after a year of production, both Project 1 and Project 2 produced 5% less than the previously predicted P50. Concerned, you return to the same independent engineer and ask for an explanation. After a detailed investigation, you receive the following response:

Esteemed wind farm owner,

We have reviewed the operational data from your two projects and re-evaluated the expected future energy output. Given the windiness of the operational period in the two regions where the projects are located, you should expect the new long-term P50 of Project 1 will be 2% lower than the pre-COD P50, and the new long-term P50 of Project 2 will be 3% higher than the pre-COD P50.

Sincerely,
Independent Engineer

Still concerned, and now a bit confused, you demand an explanation for how this could possibly be the case. You then receive the following response from the independent engineer:

Both of the regions where Project 1 and Project 2 are located experienced lower-than-average wind speeds last year. The region where Project 1 is located is known to have relatively low variability in wind resource year to year; last year, the winds were 3% less energetic than the long-term average. The region where Project 2 is located is known to have high variability in wind resource year to year; in addition, Project 2’s production is particularly sensitive to changes in wind speed – last year, the winds were 8% less energetic than the long-term average. Both of these events represent events approximately one standard deviation off from expected production. Therefore, the data should be considered within the normal range of expected production.

You are a bit surprised that you should be expecting such vastly different fluctuations in production year to year from projects that looked so similar on paper. Had you recognized these differences prior to investing in the projects, you may have valued the projects differently, or at least taken different approaches to mitigating the production risk.

For more than 30 years, the wind industry has used the same language to understand a project’s production potential. However, the time has come to rethink such terminology.

By Taylor Geer
estimates to evolve to allow for a deeper understanding of a project’s value and risk.

**Energy assessment**

The current process of assessing the uncertainty for a preconstruction wind energy assessment has remained relatively unchanged for the last 30 years. The uncertainty around discreet steps in the energy assessment process is quantified as standard deviations of normal distributions, wind speed uncertainties are converted to energy uncertainties using a “sensitivity ratio,” and then the energy uncertainties are combined to tally up the overall project uncertainty.

Broadly speaking, the categories of uncertainty that are considered in a preconstruction wind energy assessment include measurement uncertainty, historical wind resource, vertical extrapolation, horizontal extrapolation, plant performance and project evaluation period variability. These are, in fact, the current proposed uncertainty categories coming from the International Electrotechnical Commission’s (IEC) 61400-15 Working Group, 2017. The first four of these categories are wind speed uncertainties that address the uncertainty of predicting the wind regime at the turbine locations from the measurements that are recorded on the project. Plant performance addresses the uncertainties associated with predicting the net energy from the wind regime at the turbine locations (including uncertainty in wake predictions, system availability, turbine performance, electrical losses, etc.).

The last category, project evaluation period variability, addresses fluctuations in the plant output due to varying conditions at the project over a period of concern (e.g., over a one-year period or the life of the project). The dominant, and most recognized, variability is the wind resource, which has a natural variation from year to year. System availability is another variability that might be considered in this category. The expectation with the variabilities captured in this category is that the impact they have on the overall project uncertainty diminishes over time. That is, if you are concerned with the energy output over any one year, then the variability of the wind will be a critical consideration; if you are concerned with the energy output over a 20-year period, then the variability of the wind will be less of a concern, as you expect the high-wind years to be largely balanced out by the low-wind years.

In the current process for assessing the uncertainty of a preconstruction energy assessment, the standard deviations from each of these six categories are combined to determine the shape of the expected project production profile over the evaluation period of concern. From this process, the P50, “10-year P90” and “one-year P99” are all derived. This process has served the industry well, but as our analysis methods have advanced, allowing for higher geographic and temporal resolution of project variabilities, for example, the traditional language for describing project production risk is beginning to fail us.

**Proposal**

The project production profile for a preconstruction energy assessment, from which the 10-year P90 and one-year P99 are derived, is determined by a combination of uncertainties and variabilities. The proposed refinement to the language we use to describe the evaluation of a preconstruction project is captured in the table.

Using the framework proposed by the IEC 61400-15 working group, the uncertainties can be quantified in five
Proposed Refinement To Energy Assessment Language

<table>
<thead>
<tr>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncertainty/project uncertainty/overall uncertainty</td>
<td>One-year production profile/10-year production profile</td>
</tr>
<tr>
<td>“Historic uncertainty,” or the uncertainty around the P50 with no variabilities</td>
<td>Uncertainty</td>
</tr>
<tr>
<td>Inter-annual variability (wind, availability)</td>
<td>Variabilities</td>
</tr>
</tbody>
</table>

categories: measurement uncertainty, historical wind resource, vertical extrapolation, horizontal extrapolation and plant performance. These uncertainties represent the distribution of possible results around the various inputs to the energy production estimate and capture the potential range of long-term P50 energy production levels of the project. It is these categories that should be evaluated to understand the risk in the long-term P50 output of a project.

The variabilities are quantified in the project evaluation period variability category and attempt to capture the year-to-year fluctuation in production, independent of the uncertainties already considered. Even if the long-term P50 value were known perfectly, the production each year will vary, which is what the variabilities model demonstrates. Generally, the largest contributor to project variability is the wind resource, followed by project availability. It is the variabilities that should be evaluated to understand production volatility on a project, whether on an annual, seasonal or hourly basis.

Example

Change is hard. Why go through the hassle of adopting a new vocabulary to evaluate the production risk in a project? Understanding the contribution of both uncertainties and variabilities to a project’s production profile allows investors and developers to fine-tune the financing or development of a project.

To illustrate this, let’s travel back in time to when we just received the pre-COD energy assessment for the two example projects, but this time, the difference between the uncertainty and variabilities has been made clear.

Project 1 has an uncertainty of 8% of the P50, and the variabilities are 4% of the P50. This could be a project with a single measurement mast being used to predict across a large region with a relatively high capacity factor and low expected inter-annual variation of winds. In other words, Project 1 has a relatively high risk on the long-term P50 but will experience small year-to-year variation. For Project 1, additional high-quality measurements or advanced modeling would provide the most risk reduction. If feasible, a true-up assessment done after the date of commercial operation would also significantly reduce production risk.

Project 2 has an uncertainty of 4% of the P50, and the variabilities are 8% of the P50. This could be a project with multiple hub-height measurements and advanced wind flow modeling but with a lower capacity factor and high expected inter-annual variation of wind speeds. Thus, Project 2 has a relatively low risk on the long-term P50 but will experience large year-to-year production variation. For Project 2, where the uncertainties are low but high variabilities mean the variation in production year to year, or even season to season, could introduce temporary budget shortfalls, a wind insurance product or a production hedge might add substantial value.

The one-year P99 for these projects would be the same in this example, but how the production risk is treated and the potential tools to reduce the risk are very different.

As evidenced by more sophisticated methods of demonstrating value, such as the Monte Carlo statistical approach, analysis techniques have kept pace. However, the language to describe these advances has not. Any refinement worth making should provide additional clarity to the process it is describing.

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Svendborg Brakes, a supplier of yaw brakes to the global wind industry, has introduced a new yaw brake lifting and installation tool.

According to the company, the new tool aims to improve worker safety and reduce the time taken to maintain yaw brake systems on wind turbines. The tool uses a simple carriage assembly to position, raise and lower brakes to ensure that maintenance engineers minimize any heavy lifting and complete their tasks more efficiently, Svendborg Brakes explains.

The LBS 120 yaw brake lifting and installation tool has been designed to work on brake assemblies with a maximum width of 502 millimeters and a brake disc thickness of 40 millimeters. The tool incorporates a winch mechanism that is used to raise and lower the brake to floor level (with a maximum lifting height of 2 meters). The company notes that the tool is also easy to transport and assemble on-site.

Once the lifting tool has been installed, the original brake can be released – allowing it to rest on a sliding carriage, which is used to position the brake below the winch mechanism used to lower it to the floor. The process is reversed to install the new brake, after which the tool can be repositioned to work on the next brake.

Vaisala Delves Into Collected Wind Data

Vaisala, a provider of environmental and industrial measurements, says its Triton Wind Profiler will soon reach a major milestone of 20 million hours of collected wind data since the solution’s market introduction in 2008. In turn, the company is highlighting trends across wind markets over the past nine years.

According to the company, the solution has been deployed more than 3,700 times in 45 countries and six continents, where Triton has been used to provide wind measurements at sites both under development and in operations. In addition, Triton units have achieved a fleet-wide median up-time of 99.93%, says Vaisala.

Vaisala says its data illustrates the evolving applications of remote sensing technology by wind energy developers and operators in both established and emerging markets. An analysis of market-specific usage patterns over the past nine years reveals trends that correspond closely to the progress and overall maturity of those markets, the company explains.

In the more established European and U.S. wind markets, there have been close to 2,600 deployments of the Triton, facilitating a range of uses in both site planning and operations. On the planning side, as the height and capacity of modern turbines has increased, the Triton has been widely used as an easier and more cost-effective alternative to static met towers throughout the early phases of development – from site assessment to turbine siting.

Simultaneously, as these markets and their wind projects mature, Triton is increasingly being deployed to help optimize wind assets. The company expects the recent introduction of the International Electrotechnical Commission standard for the use of remote sensors in power performance testing to drive a further increase in deployments at operational projects.

Since 2008, the remote territories and emerging wind markets of Australia, Asia, Africa and Latin America have seen well over 900 Triton deployments. As these nascent markets continue to develop, there is often a greater emphasis on identifying suitable sites for development across terrain that is frequently complex, says Vaisala. Specifically, key emerging markets in which the Triton has seen a significant amount of deployment include Brazil, China and South Africa.

“It’s gratifying to see the range of markets in which Triton continues to be successfully deployed,” says Pascal Storck, head of renewable energy at Vaisala. “As the data bears out, the Triton is built to last; robust enough to perform in a variety of harsh environments the world over; and versatile in contributing to the many stages of a wind farm’s lifetime, spanning both development and operations phases.”
Firm Kicks Manufacturing Into High Gear

In accordance with its V164 manufacturing plan, MHI Vestas is continuing to ramp up production for its 8 MW offshore wind turbine.

According to the company, broad demand for the platform has resulted in a ramp-up of employment in Denmark and the introduction of a dedicated assembly facility for power converter modules (PCMs) at the Port of Esbjerg.

“Since MHI Vestas brought the game-changing V164-8.0 MW turbine to the offshore wind market, we have, as expected, seen extraordinary demand for the platform,” says Robert Borin, chief manufacturing officer for MHI Vestas. “The next phase of our production plan calls for a hiring ramp-up for blade manufacturing in Nakskov, nacelle production in Lindø and power converter modules at the Port of Esbjerg. PCM modules will be assembled in Esbjerg from Q4 2017.”

Construction is now in progress for the 5,600-square-meter facility, which will house PCM manufacturing exclusively for MHI Vestas.

Hempel Introduces New ‘Splash Zone’ Coatings

Hempel has launched two new coating products specifically developed to protect the area known as the splash zone located above the waterline on oil and gas rigs or platforms used in offshore wind.

According to Hempel, the Multistrength 35480 and 35482 coating products are nearly solvent-free and contain a much higher percentage of reactive diluents instead of conventional solvents to create superior cross-linking properties (a chemical reaction that helps harden the coating). This significantly enhances their resistance to corrosion. In addition, the coatings are reinforced with overlapping glass flakes to further enhance their water resistance and strengthen them against physical impact, Hempel notes.

The splash zone suffers from the dual impact of atmospheric and immersion-type corrosion, as well as physical damage, such as abrasion and impact, especially in areas around boat landings, the company notes.

Winergy Offers Technical Training

Voerde, Germany-based Winergy is offering its “Winergy Factory Training Program,” which provides technical training, to its preferred vendors and customers.
According to the company, it allows participants to improve their skills in the maintenance and repair of Winergy gearboxes and enables them to perform professional services on their own equipment.

The program features a variety of training modules designed to meet a customer’s request for skilled maintenance, up-tower repair or failure analysis. They include basic, standard and advanced levels of training.

Winery is a drivetrain component manufacturer of wind turbines. It has supplied more than 125,000 MW of gearboxes worldwide.

**TPI Composites Lands Vestas Wind Blade Deal**

TPI Composites Inc., an independent manufacturer of composite wind blades, has signed a multiyear supply agreement with Vestas to provide blades from two manufacturing lines (with an option to add more lines) for the V136 wind turbine for markets in Central and South America.

The blades will be produced at TPI’s new Matamoros, Mexico, facility, which is scheduled to open for production in the first half of 2018. TPI’s new manufacturing hub will serve wind markets in Mexico and Central and South America via land and rail and by water from the port of Brownsville, Texas. The facility, located on a 13-hectare site, will initially be 48,000 square meters (with room to expand).

“We are excited that Vestas has chosen to partner with TPI on blade production again and in a third geography to serve the growing Latin American wind market,” states Steve Lockard, president and CEO of TPI Composites.

Based in Scottsdale, Ariz., TPI operates factories throughout the U.S., China, Mexico and Turkey. The company has produced wind blades in Mexico since 2002 and is currently producing blades in three facilities in Ciudad Juarez.

**Suzlon Touts Load Factor In New Turbine Model**

Suzlon’s S111 120-meter 2.1 MW wind turbine has achieved an approximately 42% plant load factor (PLF) in its first 12 months of operation at the Jamanwada site in the Kutch district of Gujarat, India. The prototype was commissioned in March.

According to Suzlon, the 42% PLF is 20% higher than the 35% PLF achieved by the S97 120-meter turbine in its first 12 months of operation at the same location.

The S111 is the latest addition to Suzlon’s 2.1 MW platform and features doubly fed induction generator technology. With a swept area of 9,852 square meters, the S111 120-meter is designed to optimally harness wind resources at higher altitudes – in turn, making low-wind sites viable.

“It is a proud moment for us to witness the prototype of S111 120-meter 2.1 MW turbine deliver ~42 percent PLF,” comments J.P. Chalasani, CEO of Suzlon Group. “It has successfully generated yield of 7.66 million kWh over the last 12 months. With its reduced levelized cost of energy, cost-effective design and superior performance, S111 120-meter will unlock viable sites and set new benchmarks in the Indian wind industry.”

**Nordex Sells New Units In Medium-, Low-Wind Areas**

The Nordex Group says it is widening its range of efficient solutions for medium- and light-wind locations with the addition of two new turbine models.

According to Nordex, the N131/3900 is an enhanced version of the N131/3600 from the Generation Delta range. With the N131/3900, the company is raising the nominal output of its most powerful light-wind turbine by 8%, thus enabling yield gains of between 1% and 4% to be achieved depending on the location.

Despite the increased output, acoustic emissions could be kept low at 106.2 decibels by using serrations at the rear edges of the blade. Moreover, the company says noise-optimized operation modes are available for the turbine, meaning that it can also be used in sound-sensitive locations.

Nordex is offering the N131/3900 with hub heights of up to 134 meters. As reported, the turbine will be available in North America and large parts of Europe from January 2018. The first N131/3900 will be installed in Germany at the end of 2017.

Nordex says it is now also offering the N131/3600 for locations with medium wind speeds. The N131/3600 was launched in autumn 2016 as a turbine for light-wind locations. It has now been assigned to a higher wind class, allowing Nordex to supplement its range with a larger rotor for medium-wind-speed locations.

According to the company, the rotor sweep in this wind class is 25% greater than that of the medium-wind turbine N117/3600. As a result, the turbine yield is up to 15% higher depending on the conditions prevailing at the location.

This has been made possible thanks to adjustments to two variables: First, the turbulence curves are tailored to meet the target markets, meaning that the turbine is able to meet actual turbulence requirements of the specific location. Second, the operations management has become even more intelligent, permitting load-optimized turbine control by means of individual pitch control.

Nordex says the N131/3600 is ideally suited for locations characterized by medium-wind conditions in Germany, Scandinavia and Turkey. The first turbine of this type was installed in January 2017 close to Husum in northern Germany. The N131/3600 will be available in hub heights of between 84 and 134 meters.
Lawmakers Unveil Offshore Incentive Bill


The bill would extend the 30% investment tax credit (ITC) for offshore wind through 2025. The 2015 omnibus bill extended the production tax credit and ITC for wind until 2019, but because of the longer planning and permitting times currently needed for offshore wind, the legislators explain, the U.S. Department of Energy has found that no additional offshore wind projects are projected to be able to qualify for these tax credits before they expire.

The U.S.’ first offshore wind project, Deepwater Wind’s Block Island Wind Farm, began operations in December after being initiated nearly nine years ago, the lawmakers point out.

“The WIND Act puts the ‘win’ in wind energy,” quips Markey, a member of the Environment and Public Works Committee. “Offshore wind projects are a crucial part of America’s energy future. Offshore wind has the potential to create tens of thousands of jobs in Massachusetts and up and down the East Coast, encourage local innovation, and reduce carbon pollution. But in order to realize this potential, we need to provide this nascent industry the long-term certainty in the tax code that it needs.”

“I’m proud to say that America’s first offshore wind farm is powering Rhode Island homes and businesses with clean, renewable energy,” adds Whitehouse, also a member of the Environment and Public Works Committee. “Building the wind farm off Block Island has been a boost for our economy, and those turbines are already reducing our region’s carbon footprint. This bill will extend an important investment tax credit to expand the benefits of offshore wind we’re enjoying in Rhode Island to coastal communities across the country.”

Other lawmakers co-sponsoring the legislation are U.S. Sens. Jeff Merkley, D-Ore.; Elizabeth Warren, D-Mass.; Jack Reed, D-R.I.; Cory Booker, D-N.J.; and Sherrod Brown, D-Ohio.

Groups supporting the bill include the League of Conservation Voters, the Natural Resources Defense Council, Environment America, the Sierra Club, Oceana, the Union of Concerned Scientists, Mass Audubon, and the Conservation Law Foundation.

“Rhode Island has positioned itself as a leader in offshore wind with the Block Island Wind Farm – the first of its kind in the United States,” notes Langevin, who serves as energy task force chair on the Sustainable Energy and Environment Coalition in the House of Representatives. “By incentivizing additional such projects, the Offshore WIND Act will encourage other states to follow Rhode Island’s example. Clean energy is our nation’s future, and we need a sustained commitment to investments in more efficient and sustainable energy solutions.”

New Hampshire Town Makes Renewables Pledge

The Town of Hanover, N.H., has voted to establish a goal of transitioning to 100% clean and renewable energy by 2050. The article approved at a recent town meeting sets a community-wide goal of transitioning to 100% renewable electricity by 2030 and a 2050 goal of transitioning heating and transportation to run on clean, renewable sources of energy.

According to the Sierra Club, Hanover now represents the 29th city/town in the country to officially commit to 100% renewable energy and the first in New Hampshire to establish such a goal. The vote comes after the Sustainable Hanover Town Committee in December endorsed a transition to 100% renewable energy in the town for electricity, heat and transportation by 2050.

“I am overjoyed that the town meeting voted unanimously to support a goal of 100 percent renewable energy,” says Hanover Town Manager Julia Griffin. “We look forward to working with Sierra Club and Sustainable Hanover to achieve this goal.”

The Sierra Club says town meetings like the Hanover vote have long been a form of direct democracy across New England. Unlike the other 28 U.S. cities and towns that have committed to 100% clean energy, Hanover represents the first municipality in the country to have a goal of 100% renewable energy.
energy voted on and approved by the residents of that community, according to the Sierra Club.

The vote also builds on Hanover’s growing investment in renewable energy. In 2014, Hanover was named the U.S. Environmental Protection Agency’s first Green Power Community in New Hampshire, and the town is currently at 22% renewable electricity through partnerships with Dartmouth College and other businesses and institutions and town residents.

The Sierra Club notes that the Town of Southampton, N.Y., similarly established a goal to transition to 100% renewable energy. Other cities that previously established commitments include major metropolises such as San Diego and Atlanta, along with small towns such as Abita Springs, La., and Moab, Utah.

**Okla. Tax Credits End Next Month**

In a not-so-surprising move, Oklahoma Gov. Mary Fallin has signed into law a bill that will end the state’s production tax credits for wind power on July 1 – way sooner than the original sunset date of Jan. 1, 2021.

H.B.2298, which was sponsored by Senate President Pro Tempore Mike Schulz, R-Altus, and House Speaker Charles McCall, R-Atoka, overwhelmingly passed the Oklahoma Senate by a vote of 40–3. The measure, however, was first laid out by the governor herself in a budget proposal earlier this year.

In a statement, Fallin maintains that the tax credits have, indeed, been “key to the growth of wind energy in Oklahoma,” where the industry supplies more than a quarter of the state’s electricity. Specifically, according to recent statistics from the American Wind Energy Association, wind’s share of total power generation in Oklahoma swelled from 18.4% in 2015 to 25.1% in 2016.

However, the Republican governor cites “challenging budgetary circumstances.” Though she notes the importance of the state’s “position as a prominent energy state,” she says it’s “time to ensure that Oklahoma has a bright future.”

Likewise, bill co-author Schulz said in a recent statement, “The zero-emissions tax credit did what it was supposed to do – help the wind industry get off the ground in Oklahoma. Our state ranks third in the nation in terms of wind power and will likely remain among the leaders in wind power for the foreseeable future. The state is facing extraordinary budget challenges, and we can no longer afford the zero-emissions tax credit. This measure provides certainty to the wind industry and stability in the long term for the state budget.”

In her recent budget proposal, Fallin said the wind industry was “incentivized sufficiently to now be a major player in the Oklahoma energy industry.” Moreover, she said the wind industry was also a “major winner of now-unnecessary incentives,” which referred to the production tax credits. (Notably, she also proposed a $0.005/kWh tax on wind produced in the state.)

Jeffrey Clark, president of The Wind Coalition, notes in a statement that the tax incentives “have helped Oklahoma bring much-needed diversification to its economy.” In addition, he says more than 7,000 residents “rely on wind energy for employment.”

Now, with the signing of H.B.2298, “the final wind energy tax incentive was eliminated.”

“As an industry, we are proud that these incentives worked so well for the benefit of Oklahoma, but we recognize that as an industry matures, incentives should be examined and adjusted to reflect that growth. We hope that other industries will recognize the state’s challenging fiscal situation and follow our lead.

“If it chooses to do so, Oklahoma can be a leader in the energy development that will drive our nation’s economy in the decades ahead,” Clark continues. “That includes natural gas, wind energy, solar power and energy storage.”

He adds, “While the path ahead for Oklahoma remains unclear, we look forward to working with state leaders to help them develop a plan to keep Oklahoma competitive for future investment.”

As pointed out recently by David K. Burton and Binyomin Koff of law firm Mayer Brown, wind farms now must be placed in service before the July 1 sunset in order to still be eligible for the tax incentives. In turn, they said, with such a short deadline, “Oklahoma wind projects that are already in construction – and are relying on the tax credits – may not be able to be placed in operation in time to qualify.”

In response to the newly signed legislation, Burton says, “It is unfortunate that Oklahoma is giving up its position as a leading state for wind-friendly policies. The decision has already caused developers to not site projects in Oklahoma. Future generation of its citizens will regret not having those projects in their state, providing operations and maintenance jobs and paying property taxes to local governments and ground rents to landowners.”

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**Environment Minister Lauds Renewables**

The Alberta government’s efforts to encourage development of the province’s abundant wind energy resource and diversify its fossil fuel-dependent economy have captured the attention of investors, who see a long-term opportunity for growth in the market, according to Shannon Phillips, Alberta’s minister responsible for the Climate Change Office, speaking at the Canadian Wind Energy Association’s (CanWEA) Alberta Summit.

“Our government’s renewable energy program is part of a made-in-Alberta plan to create jobs, diversify our economy, attract investment and reduce carbon pollution. The strong interest shown by [the] industry ensures a highly competitive process that will allow us to achieve all of those goals at the lowest possible cost,” says Phillips.

The Canadian wind industry sees Alberta as an emerging market. Alberta has 1,479 MW of wind energy – the third-largest installed capacity among Canadian provinces. Wind currently supplies about 6% of the province’s electricity demand, and Alberta’s target of 30% renewable electricity by 2030 has made it the leading market for new wind energy development in Canada, according to CanWEA.

With billions of dollars of new investment expected to flow into the province as it adds 5,000 MW of new renewables to its grid over the next 14 years, delegates discussed opportunities for Alberta-based companies to generate new business by participating in the wind energy supply chain.
McAuliffe Takes Action On Emissions, Clean Energy

Gov. Terry McAuliffe, D-Va., has taken executive action to reduce carbon emissions across the state. Under the newly signed Executive Directive 11, the governor is instructing the state's Department of Environmental Quality (DEQ) to begin the process of establishing regulations in Virginia that will reduce carbon emissions from power plants.

"The threat of climate change is real, and we have a shared responsibility to confront it," says McAuliffe. "Once approved, this regulation will reduce carbon-dioxide emissions from the commonwealth’s power plants and give rise to the next generation of energy jobs. As the federal government abdicates its role on this important issue, it is critical for states to fill the void. Beginning today, Virginia will lead the way to cut carbon and lean in on the clean energy future."

The directive follows Executive Order 57, which required the state’s secretary of natural resources to convene a work group to study and recommend methods to reduce carbon emissions and build Virginia’s clean energy economy, according to an announcement from the governor’s office.

Further, the news release says, Executive Directive 11 is designed to ensure Virginia’s regulation is “trading-ready” and includes a structure that enforces carbon-reduction mechanisms.

According to the release, Virginia is already experiencing the effects of climate change in its coastal regions due to rising sea levels. In addition, the impacts extend far beyond the coast: Half of Virginia’s counties are facing an increased risk of water shortages by 2050 as a result of climate-related weather shifts.

“As a Virginia-headquartered company, Mars applauds Gov. McAuliffe’s new regulatory action to reduce carbon emissions and promote renewable energy and efficiency,” comments Kevin Rabinovitch, global director of sustainability for Mars. “At Mars, we believe climate change is real, and business and government need to work together to address it. This action by Gov. McAuliffe is timely and critical to achieve a clean and efficient energy transition.”

Since the beginning of the McAuliffe administration, the commonwealth has seen an increase from just 17 MW of solar installed to more than 1,800 MW of solar currently in service or under development, the release says. In addition, revenues in the clean energy sector have risen from $300 million to $1.5 billion between 2014 and 2016.

Recently, the Virginia DEQ approved a “permit by rule” (PBR) application for Rocky Forge Wind, a 75 MW wind project being developed by Apex Clean Energy in Botetourt County. According to Apex, it marked the first PBR approval for a wind farm in Virginia.
Wind power is on track to generate 10% of U.S. electricity by 2020. Analysts express greater uncertainty after that, when the impact of the production tax credit (PTC) will begin to tail off.

How will the market respond? The following trends will outline the PTC and keep creating demand for new turbines.

**Wind trends**

- **Falling costs.** Wind energy costs are down two-thirds in seven years and will keep falling. Analysts surveyed by the Lawrence Berkeley National Laboratory predicted a further 24% drop from 2014-2030.
- **Higher winds, longer blades.** Increased tower elevations make new areas cost-effective. Longer blades enable today’s turbines to perform closer to capacity.
- **Digitalization.** Big data and artificial intelligence are converging with storage to smooth intermittency and maximize output. Meters with two-way communications mean “we can now manage load points bidirectionally,” says incoming chair of the American Wind Energy Association (AWEA) Tristan Grimbert of EDF Renewables.
- **Repowering.** The U.S. Department of Energy’s Wind Vision study assumes turbines will be replaced at 25 years. New technology increases output, lowers maintenance and generates factory orders.
- **Offshore progress.** The five turbines off Block Island, R.I., will be joined by hundreds of others now on the drawing board. Costs will fall, and jobs and investments will follow. As part of the cost cutting, major oil and gas players are repurposing ships and other offshore assets.

**Market trends**

- **Non-utility demand.** Consumer preference for wind remains strong, driven by dollar signs. General Motors will soon use 100% wind power to make its biggest SUVs. Amazon Web Services brought utility-scale wind to North Carolina. Atlanta just committed to go 100% renewable.
- **Hedging.** Natural gas prices, historically volatile, have edged up. Even renewables critic Thomas Pyle of the Institute for Energy Research acknowledges it’s not in the national interest to overcommit to gas on the grid. Already, wind saves consumers billions a year by moderating gas price spikes; energy buyers will continue to hedge their bets.
- **Diversification.** Big fossil companies are entering wind energy to diversify. Shell is reportedly even investing in wind, partly because, in addition to putting electricity on the grid, it can power the electrolysis reactions that make hydrogen, a potential future transportation fuel.
- **Exports.** Renewable NRG of Vermont, for instance, has customers in 160 countries for its met towers and resource assessment gear. By next year, it’s hoping to bring to market ultrasonic deterrents to keep bats away from turbines.

**Policy trends**

- **State policies.** States continue to work on increasing their renewable energy standards, including California, Minnesota and Nevada. Assuming they withstand challenges, these state laws will continue to drive wind purchases after the national policy phases out.
- **Utility IRPs.** Utilities in 33 states must file integrated resource plans (IRPs) forecasting their sources of electricity for five to 20 years. Wind’s low cost and fixed price make it an essential part of many utilities’ long-term planning. Its growing track record for reliability and grid services has led some utility executives to call wind “the new baseload.”
- **Transmission build-out.** Administration leaders, as well as regional grid operators and the wind industry, are starting to push for upgraded grid infrastructure to overcome congestion and get all of this low-cost energy to market. Transmission pays for itself many times over in consumer savings, so the obstacles are mainly policies and regulations, not dollars. The expected infrastructure bill in Congress will be an opportunity.
- **U.S. factory jobs.** One of President Donald Trump’s top campaign promises was to keep U.S. factory jobs. The U.S. started 2017 with 25,000 jobs making parts for wind turbines at 500 factories and assembly plants. Navigant says that can grow by 8,000 factory jobs during Trump’s first term in office.
- **Bipartisan support.** Dozens of Republicans in both the House and the Senate are strong wind advocates because they see the economic benefits back home. By 2020, Navigant projects 147,000 American wind workers in all and another 101,000 spinoff jobs in surrounding communities. We’ll generate $85 billion in economic activity over this presidential administration, much of it in rural and Rust Belt areas — critical to the next election.

And that’s why I believe wind will keep working for America.  

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