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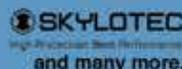
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EDITOR'S DESK

SEPTEMBER 2015

Greetings to all of our readers. Let me introduce myself. My name is Cherie Scott, the new managing editor of *Wind Systems* magazine. I'm excited to be a part of the editorial team and am looking forward to overseeing this forward-thinking publication.

My goal as the managing editor is to include valuable articles and papers written by our industry experts to inform you, our readers, on the latest and greatest developments in the wind industry.

Now, a little about myself. I worked in medical publishing for over ten years assisting physicians publish their manuscripts. I very much enjoyed that niche in journalism, and now I am happy to move in a different direction; wind power, wind farm development, turbines, safety, manufacturing and further development in the progress of where the U.S. stands in building both onshore and offshore sites.

One of my priorities for *Wind Systems* is to listen to our readers and encourage you to contact me about contributing articles (download our Media Kit from our website for more information) that are important to you and the wind power industry. Our September issue, based on offshore wind farm development, includes articles on drone-based data analytics, a crowdfunding campaign that involves a local population, and a wind power project, Block Island off the coast of Rhode Island that recently "dropped steel," the first step in the U.S.'s offshore wind farm development.

Thank you for reading our most recent issue. I look forward to hearing from you!



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ENERGY DEPARTMENT REPORTS HIGHLIGHT TRENDS OF GROWING U.S. WIND ENERGY INDUSTRY



Aegis Renewable Energy

In 2014, U.S. turbines in distributed applications reached a cumulative installed capacity of more than 906 MW, enough to power more than 168,000 average American homes.

According to two reports released in August by the Energy Department, the United States' wind energy industry continued growing at an impressive rate in 2014, further solidifying America's position as a global leader in wind energy. Wind power is a key component of the president's all-of-the-above energy strategy and Clean Power Plan to reduce climate-changing carbon pollution, diversify our energy economy, and boost America's economic competitiveness by bringing innovative technologies online. With rapidly increasing wind energy generation, fast-growing demand, and steadily decreasing wind energy prices — the lowest ever seen in the U.S. — the U.S. wind energy market remains strong.

“With declining costs and continued technological development, these reports demonstrate that wind power is a reliable source of clean, renewable energy for American homes and businesses,” said Energy Secretary Ernest Moniz. “Through continued investments and the help of stable policies, we're confident that wind power will keep playing a major role in creating jobs and shaping America's clean energy future.”

WIND TECHNOLOGIES MARKET REPORT

According to the 2014 Wind Technologies Market Report released by the Energy Department and its Lawrence Berkeley National Laboratory, total installed

wind power capacity in the U.S. grew at a rate of 8 percent in 2014 and now stands at nearly 66 GW, which ranks second in the world and meets 4.9 percent of end-use electricity demand in an average year. The U.S. was the global leader in total wind energy production in 2014. The report also finds that wind energy prices are at an all-time low and are competitive with wholesale power prices and traditional power sources across many areas of the U.S.

A new trend identified by the report shows utility-scale turbines with larger rotors designed for lower wind speeds have been increasingly deployed across the country in 2014. The findings also suggested that the success of the U.S. wind industry has had a ripple effect on the Amer-

ican economy, supporting 73,000 jobs related to development, siting, manufacturing, transportation, and other industries — an increase of 22,500 jobs from 2013 to 2014.

DISTRIBUTED WIND MARKET REPORT

In total, U.S. turbines in distributed applications reached a cumulative installed capacity of more than 906 MW — enough to power more than 168,000 average American homes — according to the 2014 Distributed Wind Market Report, also released recently by the Energy Department and its Pacific Northwest National Laboratory. This capacity comes from roughly 74,000 turbines installed across all 50 states, Puerto Rico, and the U.S. Virgin Islands. Compared with traditional, cen-

tralized power plants, distributed wind energy installations supply power directly to the local grid near homes, farms, businesses, and communities. Turbines used in these applications can range in size from a few hundred watts to multi-megawatts, and can help power remote, off-grid homes and farms as well as local schools and manufacturing facilities.

As shown in the report, America's distributed wind energy industry supports a growing domestic industrial base. U.S.-based small wind turbine manufacturers claimed another strong year of exports to countries across the globe, accounting for nearly 80 percent of U.S.-based manufacturers' sales. ↘

— Source: Department of Energy

AMERICAN WIND POWER CONTINUES TO RAMP UP IN 2015

With 1,661 MW of newly installed wind turbines coming online during the second quarter of 2015 and more than 13,600 MW under construction, American wind power continues to increase its contribution to the U.S. electric power grid. The approval in May of Florida's first purchase of wind energy from a wind project in Oklahoma added to the growing trend of southeastern states purchasing wind power, as did the recent announcement of the first utility-scale wind farm to be built in North Carolina.

Building on that momentum, Congress also took a step in the right direction when the U.S. Senate Finance Committee voted 23-3 to extend the primary federal tax incentives for growing renewable energy as part of a larger tax policy extension bill.

"With a near-record amount of wind capacity under construction, this looks to be a strong year for American wind power," said Tom Kiernan, CEO of the American Wind Energy Association (AWEA). "However, to create longer term stability for the industry, the full Senate and the House of Representatives must move quickly to extend the PTC and ITC. The overwhelming bipartisan vote by the Senate Finance Committee to extend the PTC and ITC is good news for the 73,000 Americans employed by the wind power industry."

The federal renewable energy Production Tax Credit (PTC), which has the option to be taken as an Investment Tax Credit (ITC) instead, is the primary federal tax incentive for wind energy. This incentive has helped drive more than \$100 billion in private investment in the U.S. since 2008 and has been instrumental in allowing the industry to lower costs by more than 50 percent in the last five years.

AWEA's Second Quarter 2015 Market Report released shows 1,994 MW were installed during the first half of 2015. While that figure more than doubles installations during the same time period last year, it is still well below the pace set in 2012 when the U.S. industry installed more than 2,900 MW in the first half of the year and eventually provided 42 percent of all new U.S. electric generating capacity at year's end.

Looking forward, more than 100 wind projects are under construction in 24 states, representing more than 13,600 MW of total wind capacity and over \$20 billion worth of private investment. The majority of new wind construction activity is in Texas with Oklahoma, Kansas, Iowa, and North Dakota also benefiting from large amounts of new investment.

"This was the strongest second quarter ever for wind, and we continue to see robust activity in the industry," said Hannah Hunt, research analyst for AWEA. "How-



ever, uncertainty around federal tax policy clouds the outlook for new growth and could result in the industry being forced off another cliff.”

There are now 67,870 MW of installed wind capacity in the U.S. and over 49,000 wind turbines online. Texas continues to lead the nation with over 15,000 MW of installed wind capacity, and California now has over 6,000 MW of installed capacity.

NEW TRENDS AS INDUSTRY GROWS

The Florida-based utility Gulf Power and the Arkansas Electric Cooperative Corp. signed power purchase agreements (PPA) for 180 MW and 108 MW of wind in the second quarter, respectively, building on the trend of Southeastern utilities choosing to purchase wind energy.

These announcements are paired with recent news in July that construction will begin on the first commercial-scale wind farm in North Carolina. At 208 MW, the announced project will be far larger than any other in the Southeast, and the first utility-scale project in the region since 2004. Once online, it will bring the total number of states with utility-scale wind projects to 40. Technological advances, primarily the use of taller wind turbine towers and longer blades to reach higher quality wind resources, are opening up all regions of the country to wind project development. The Southeast has long been a center of wind industry manufacturing, and these recent developments bring even more benefits to the region.

In total, utilities signed over 800 MW of new PPAs for wind power in the second quarter of 2015, building on the roughly 12,000 MW of power purchase agreements signed since the beginning of 2013.

Successful U.S. companies and other non-traditional purchasers are also increasingly turning to wind energy as a source of clean, stably priced energy. Amazon Web Services (AWS) will purchase the output of the recently announced North Carolina wind project. In announcing the agreement, Jerry Hunter, vice president of Infrastructure at Amazon, said that the company encourages policymakers to “extend the tax incentives” for renewable energy projects.

“This agreement, and those previously in place, puts AWS on track to surpass our goal of 40 percent renewable energy globally by the end of 2016,” Hunter said. “We’re far from being done. We’ll continue pursuing projects that deliver clean energy to the various energy grids that serve AWS data centers, we’ll continue working with our power providers to increase their renewable energy quotient, and we’ll continue to strongly encourage our partners in government to extend the tax incentives that make it more viable for renewable projects to get off the ground.”

The second quarter also saw the commissioning of two utility-scale wind projects with corporate purchaser investment. Both a 98-MW wind farm in Illinois owned by IKEA and a 211 MW Texas wind farm invested in by Mars, Inc., are now online and will be providing low-cost wind power to satisfy the companies’ high energy demands.

Facebook also made news in the second quarter when it announced its new data center in Texas would purchase the output of a 200-MW wind plant.

“[The data center] will be powered by 100-percent renewable energy thanks to the 200 MW of new wind energy we helped bring to the Texas grid as part of this deal,” Tom Furlong, vice president of Infrastructure for Facebook, said. “Thanks to our continued focus on efficiency and our investments in renewables in recent years, the carbon impact of one person’s use of Facebook for an entire year is the same as the carbon impact of a medium latte.”

Hewlett Packard also recently announced that it plans to power its Texas data centers with wind power, signing a 112-MW PPA for the energy output from a planned wind farm in the state.

These companies and traditional utilities have explained that they are attracted by wind energy’s unique lack of fuel cost, which builds a more balanced energy portfolio that protects against increases in the price of other fuels. ↯

—Source: AWEA

GERMANY BREAKS A RENEWABLE ENERGY RECORD

Europe's industrial powerhouse shows how other fossil-fuel nations can kick their coal habit

Germany's transition from coal- and oil-fired power to carbon-free electricity hit a new milestone on July 25 when solar, wind, and other sources of renewable energy met 78 percent of the day's energy demand.

That beat the old record of 74 percent made in May 2014, according to Craig Morris, a journalist who has covered Germany's energy scene for more than a decade.

Helping set the record was an unusual weather pattern that brought heavy winds where most of the nation's wind turbines are located. As the turbines generated more power, utilities ramped down coal- and gas-fired power plants.



Christian Charisius/Reuters

Germany gets much of its renewable energy from wind farms like this one in the North Sea.



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But Morris found the power mix a few days earlier even more encouraging. During the night of July 22, even with darkness reducing solar output to zero and no big winds in the forecast, renewables — wind, biomass, and hydropower — generated nearly 25 percent of Germany’s electricity.

Morris found the energy data for both dates using an online tool sponsored by the Germany-based Fraunhofer Institute for Solar Energy Systems.

Germany’s experience shows that solar and wind can keep the lights on in a highly industrialized nation, according to Osha Gray Davidson, author of *Clean Break*, a book about Germany’s transition to carbon-free energy.

“The key indicator is percentage of electricity produced by different sources — 28 percent of Ger-

many’s electricity comes from renewables annually, which is pretty amazing for a large industrialized country,” Davidson said.

According to Davidson, Germany is a model for the United States, “because manufacturing accounts for much more of the German economy than the American economy, and they have 80 million people — much larger than a country like Denmark, which gets more of its power from renewables but has a much smaller industrial base and has a population of five-and-a-half million people.”

The U.S. currently gets approximately 10 percent of its electricity from renewable sources, according to the U.S. Energy Information Administration. ↗

— Source: *TakePart*

OFFICIALS HIGHLIGHT NEED FOR STABLE POLICY TO CONTINUE GROWING WIND ENERGY



Department of Energy

Judith Gap Wind Farm

Secretary of Energy Ernest Moniz emphasized the need for stable policy for wind energy as the U.S. Department of Energy (DOE) released data showing that the cost of wind energy has fallen by nearly two-thirds over the last six years.

“With declining costs and con-

tinued technological development, these reports demonstrate that wind power is a reliable source of clean, renewable energy for American homes and businesses,” Moniz said in a release issued by the DOE about its 2014 Wind Technologies Market Report. “Through continued

investments and the help of stable policies, we’re confident that wind power will keep playing a major role in creating jobs and shaping America’s clean energy future.”

American wind power has become increasingly affordable due to the success of performance-based renewable energy tax incentives in driving U.S. manufacturing and American ingenuity. The cost of wind energy has fallen 65.5 percent since 2009 according to the DOE report, which also says the U.S. is the global leader in total wind energy production with enough to power the equivalent of 18 million average American homes.

“While this report is good news, extending the Production Tax Credit and Investment Tax Credit remains critical for keeping Americans at work, reducing the cost of wind energy, and continuing to scale up this homegrown resource through the end of this decade,” said Tom Kirnan, CEO of the American Wind Energy Association (AWEA). “Wind energy is increasingly cost-compet-

itive in several parts of the U.S., but we need stable, predictable policy to continue bringing this consumer benefit to every corner of the country. Policy stability will keep this American economic success story going.”

American wind power supports 73,000 direct jobs in 50 states with nearly 20,000 well-paid manufacturing jobs. Federal policy plays a critical role in the wind industry’s decisions to make long-term investments in U.S. manufacturing facilities, research and development, and worker training to create the modern American wind industry. An extension of the Production Tax Credit (PTC) and Investment Tax Credit (ITC) enables the private investment needed for American wind power to make the further gains in productivity needed to achieve cost competitiveness with more traditional sources of electricity. That would allow for American homes and businesses to have greater access to reliable, stably priced, non-polluting, and homegrown wind energy for decades to come.

However, near-term uncertainty about the PTC and ITC puts those investments and the gains they have achieved at risk. The U.S. wind industry lost nearly 30,000 well-paying jobs the last time Congress did not provide wind power with policy stability, pushing the industry off an economic cliff and causing wind installations to drop 92 percent the following year.

According to the DOE’s recent Wind Vision report, growing wind energy to 20 percent of the U.S. electricity mix could create 380,000 jobs. Wind Vision also says wind could support 600,000 jobs by supplying 35 percent by 2050, which would result in cumulative savings on consumer electric bills of \$149 billion. ↴

— Source: AWEA

NREL REPORT EXAMINES ENERGY USE IN CITIES AND PROPOSES NEXT STEPS FOR ENERGY INNOVATION

What U.S. cities are doing to reduce their energy use is outlined in a new report from the Energy Department’s National Renewable Energy Laboratory (NREL) that sets the stage for broader discussion and analysis. Given increasing urbanization and their large energy footprint, cities are a prime focal point for establishing a clean energy future.

The report, “City-Level Energy Decision Making: Data Use in Energy Planning, Implementation, and Evaluation in U.S. Cities,” analyzes and presents information learned from a sample of 20 cities across the United States from Los Angeles to Boston, including a diverse sample of population size, utility type, region, annual greenhouse gas reduction targets, vehicle use, and median household income.

“City-level practitioners are doing inspiring energy-related work and are hungry for resources and tools to help them,” NREL lead author Alexandra Aznar said. “This paper provides a snapshot of the kinds of energy-related actions cities are taking as well as the challenges they face. The results confirm the need for many of the tools the Cities Leading through Energy Analysis and Planning (Cities-LEAP) project is developing.”

The report compares climate, sustainability, and energy plans to better understand how cities are taking energy-related actions and measuring their impacts. Some common energy-related goals focus on reducing city-wide carbon emissions, improving energy efficiency across sectors, increasing renewable energy, and increasing biking and walking.

The publication also evaluates the relationship between city goals, actions, metrics, and data and provides suggestions for cities to make the best use of the energy planning tools available. Next steps for cities are outlined, including how cities can set more strategic energy goals, prioritize actions, and lead clean energy innovation. Along with reinforcing the need for clean energy planning and evaluation, recommendations include:

- Tailoring energy-related actions and goals to city characteristics, including socioeconomics, geography, and built environment
- Understanding the cost-effectiveness of specific actions
- Integrating energy considerations into all planning processes (capital improvement plans, comprehensive plans, etc.)

This report is part of the Cities-LEAP project, which aims to deliver energy data and analysis that enables cities to make clean energy decisions using strategic energy analysis. It was funded by the Energy Department’s Office of Energy Efficiency and Renewable Energy. ↴

—Source: NREL

OFFSHORE

IS THE TIDE FINALLY TURNING FOR OFFSHORE WIND IN THE UNITED STATES?

By Jim Wrathall, Van Hilderbrand, Jeffrey Karp, and Morgan Gerard

For more than a decade, offshore wind has been viewed as the next big thing in the U.S. energy mix. In Europe, billions of euros have been invested in 82 offshore wind farms — 10.4 GW of capacity, according to the European Wind Energy Association (EWEA) — roughly equivalent to the power production of 10 large nuclear power plants. Meanwhile, the United States market stalled completely, mired in regulatory uncertainties, litigation, and lack of financing.

However, with the start of construction of the Block Island Wind Farm off the coast of Rhode Island this summer, the sector may finally be emerging. U.S. offshore wind resources are abundant, stronger, and blow more consistently than land-based wind resources, with an estimated 4,200 GW of developable offshore wind potential. Substantial development work already has been undertaken. As of late 2014, the U.S. Department of Energy (DOE) reported 14 offshore wind projects in advanced stages of development in the U.S. with over 4.9 GW of capacity.

U.S. offshore wind resources offer large economic benefits. According to the DOE, deploying 54 GW of U.S. offshore wind power could reduce the cost of electricity in the U.S. by \$7.68 billion a year — equivalent to \$100 per year for a family of four. As seen

in Europe, offshore wind supply chain and construction activities will generate thousands of new jobs, infrastructure development, and related economic growth.

Offshore wind continues to face difficult regulatory and political hurdles in the U.S., including a maze of permitting and environmental laws and requirements. Opposition to offshore wind that is well-coordinated and amply financed by fossil fuel interests focuses on so-called “visual pollution” and harm to birds in seeking to block offshore projects at every level.

These obstacles have been evident in the struggles of the 130-turbine Cape Wind project in the Nantucket Sound off the coast of Massachusetts, which remains in limbo after more than a decade of planning, regulatory proceedings, and litigation. Other proposed projects off the coasts of New Jersey and Delaware have stalled in the face of similar obstacles.

When compared to Europe, U.S. developers also face major financial challenges, including higher costs of building offshore wind farms; the expense of transmission equipment for connecting them to the onshore grid; lack of governmental incentives and policy support; insufficient coordination among state, local, and federal agencies; and the resulting

absence of debt financing necessary to fund the large required capital investments.

However, there are several reasons to believe the sector has reached an inflection point in 2015. Macro energy supply, economic considerations, and climate-related concerns support development of U.S. offshore wind projects (now more than ever), particularly in the New





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England and mid-Atlantic regions. Traditional coal-burning power plants are rapidly being retired, and they're not being replaced. Offshore wind is one of the few resources offering the necessary scale to fill the coming void. Wind energy is also becoming far less costly, given technology improvements, and is increasingly supported by federal and state policies addressing climate change.

Can the U.S. offshore wind market finally turn the corner? Recent developments suggest that it could.

U.S. OFFSHORE WIND BREAKS GROUND

A great deal of attention has been focused on the first commercial-scale offshore wind project to commence construction — the 30-MW Block Island Wind Farm

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off the coast of Rhode Island. Deepwater Wind, the project developer, estimates the project will generate over 100,000 MWh of energy annually. The project is expected to begin producing energy in late 2016.

Also, in late July, the Bureau of Ocean Energy Management (BOEM) approved DONG Energy's acquisition of a 25-year commercial wind lease area in federal waters 55 miles off the coast of Massachusetts from RES Americas. The project could accommodate more than 1 GW of installed capacity. DONG Energy's entry into the U.S. market is significant. Majority-owned by the Danish government, DONG is a heavy-weight in European waters with about one-third of the offshore installations there. Earlier this year, DONG received an equity investment from Goldman Sachs,

reportedly giving Goldman an 18 percent stake in the company. Goldman has been a leader in innovative project finance and public-private partnerships in other sectors. There is little doubt that it will pursue a comprehensive U.S. strategy to support its investment in offshore wind.

Beyond these recent developments, several broader market and regulatory features are evolving to support U.S. offshore wind, including those listed here.

IMPROVED TURBINE SIZE, PERFORMANCE, AND RELIABILITY

The massive investments in Europe have driven major technology improvements. Turbine size and power output have substantially increased. For example, earlier this year, Siemens announced a new prototype turbine that in-

creased capacity from 6 to 7 MW, using new magnet-based generator technology that eliminates gearing, and reengineered converter and transformer technologies, improving output by more than 10 percent. The Siemens system is optimized for reactive power compensation, contributing grid stability functions that are vitally important in regions such as New England and the mid-Atlantic.

Also, the Danish wind giant Vestas has deployed an 8-MW turbine as part of a joint venture with Mitsubishi Heavy Industries. In May, Vestas announced that a prototype set a new benchmark for power production, generating 192,000 kWh in a 24-hour period — enough to power approximately 13,500 Danish households. As recently as 2014, industry consultants were projecting that average turbine sizes would re-



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main around 5 MW for pending U.S. projects. If the larger and better-performing European turbines can be rapidly deployed, that alone can be a game changer for the U.S.

PERMIT STREAMLINING

The Cape Wind project was expected to lead the way in opening the U.S. offshore wind markets. However, the project is stalled for the moment, entirely due to economic issues, as the off-takers withdrew from their power purchase agreements. Prior to that point, the project did successfully resolve regulatory and legal uncertainties, including securing all federal and state permits. Cape Wind shows the benefits of centralized federal agency jurisdiction and streamlined permitting under the provisions of the Energy Policy Act of 2005 that

established permitting authority in the BOEM.

The Block Island project has clearly benefited from lessons learned by Cape Wind. Just two years after lease approvals, Deep-water Wind already has “steel in the water” as a result of collaborative efforts of state regulators and BOEM. The federal agency timely awarded a right-of-way grant for an 8-nautical-mile-long, 200-foot wide corridor in federal waters on the outer continental shelf for transmission to connect the wind farm to the mainland.

IMPROVING REGULATORY AND POLITICAL CLIMATE

The Obama Administration continues to support offshore wind. The DOE has promulgated a national plan calling for deployment of 10 GW of offshore wind capacity by 2020 and 54 GW by 2030.

DOE’s Offshore Wind Innovation and Demonstration Initiative has several pilot projects designed to demonstrate offshore wind power technology advancements. BOEM also has implemented a streamlined integrated siting and permitting program called “Smart from the Start,” which has been a major aspect of the acceleration in project review times.

U.S. federal climate policy is generating further support. On August 10, the U.S. Environmental Protection Agency (EPA) announced final regulations implementing the Clean Power Plan (CPP), mandating states to achieve a 32-percent reduction from 2005 carbon emission levels from existing power plants by 2030. Many of the New England and mid-Atlantic states are viewing offshore wind as a key compliance measure. CPP requirements

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also can be met through state and regional trading programs, which are expected to generate new forms of bankable credits, thus providing further financial support for investments in offshore wind.

The broader political dynamic for offshore wind remains uncertain. There is some chance federal tax incentives will continue with the Production Tax Credit (PTC) extender bill passing the Senate Finance Committee on July 21. On August 12, Senators Tom Carper (D-Del.) and Susan Collins (R-Maine) reintroduced the Incentivizing Offshore Wind Power Act creating a tax credit for the first 3,000-MW offshore wind facilities placed into service. While the bill has little chance of being passed on its own, there is some potential that it could be rolled into comprehensive energy or tax reform legislation in the full Senate this fall. However, prospects for PTC extension or enactment of an Offshore Wind Investment Tax Credit this year will be tempered by the strong ideological opposition by Republicans controlling both the House and the Senate.

State level programs and incentives may be even more critical in providing revenue certainty to make projects viable and attractive to the equity and debt investors. States such as Massachusetts, New York, Rhode Island, Maine, Maryland, New Jersey, and Virginia are continuing to consider policies providing revenue certainty and financial support. Such incentives may include Offshore Renewable Energy Certificate (OREC) programs, centralized procurement processes and supply chain initiatives, targeted infrastructure development legislation, and programs providing financial support for private sector debt finance of new offshore projects.

For example, the Maryland Offshore Wind Energy Act of 2013 cre-

ated an OREC system and mandated that if an offshore wind project is constructed, Maryland utilities will be required to procure up to 2.5 percent of their portfolio from offshore wind energy as early as 2017. A key political concern for these programs is ensuring ratepayer protection. The Maryland bill capped increased charges that could be passed along by the state's utilities at an additional \$1.50 per month on ratepayers' electricity bills.

In March, the New York State Energy Research and Development Authority (NYSERDA) released a report concluding that with full support for offshore wind, the state can see price cuts of more than half by 2020, resulting from the use of larger turbines and cost reductions achieved by economies of scale. The Long Island-New York City Offshore Wind Collaborative is working on a utility-scale project to be located about 15 miles off the Rockaways on Nassau County's southern shore.

In Massachusetts, proposed legislation would enable offshore wind projects to access investment-grade financing, as it would require local utilities to conduct four joint solicitations for offshore wind beginning October 1, 2016, and to enter into 20- to 30-year contracts with developers, provided the terms and prices of the responses are "commercially reasonable." These ensured long-term contracts would increase security of payback for lenders.

States also may be able to do more to support project debt through public infrastructure finance. For example, New York's Green Bank has received over \$360 million in funding for renewable energy projects. As the Natural Resources Defense Council noted in a recent white paper, "It would be a powerful market precedent if the New York Collaborative — LIPA, NYPA, and Con Ed — were able to bundle New

York Green Bank anchor financing together with lease and power purchase agreements and then competitively bid the entire package. This combination of revenue certainty, site control, and anchor financing would likely produce very competitive bids and low costs of delivered energy." Major private sector participants such as Goldman Sachs will likely bring other innovative approaches to bear in supporting long-term wind project financing.

ADDITIONAL LEASES

The availability of lease sites — a crucial factor for successful project development — also appears to be trending upward. BOEM, in conjunction with several coastal state governments, is poised to reopen the procurement process for additional leases in New York and New Jersey, while stakeholders presently are being engaged in North Carolina and South Carolina. Acquiring projects in mid-development also is an option, although proposed lease assignments are subject to approval by BOEM.

IMPORTANCE OF A DEVELOPED SUPPLY CHAIN

The success of offshore wind in Europe illustrates the importance of achieving critical mass in developing infrastructure and distribution to drive down costs. Here in the U.S., a number of states and organizations are working on this front. According to Liz Burdock, the executive director of the Business Network for Offshore Wind, "State offshore wind policies are really economic development policies. Denmark started with 10 offshore wind turbines; now more than 56,000 people are employed in the Danish wind industry. States must work together to build a pipeline of projects, which will incentivize the scale required to reduce costs

and decrease risk so companies can make the necessary long-term investments required. Many U.S. companies are evaluating how they can pivot into the offshore wind supply chain. As the U.S. market emerges, the Business Network will help companies develop innovative technologies and processes and export to the €180 billion global offshore wind industry. It is important that we enhance U.S. business expertise and build out the supply chain now; otherwise, when commercial-scale U.S. projects go to construction, the work will be done by European firms.”

PROGRESS IN OFFSHORE WIND ENERGY TRANSMISSION CAPACITY

Historically, U.S. offshore wind projects have been constrained by the lack of transmission capacity, requiring them to provide and finance their own infrastructure for transmission of wind energy to onshore uses. Progress is being made on the build out of the Atlantic Wind Connection, an undersea high-voltage transmission line that would provide a backbone to connect offshore projects extending from New York to Virginia. The first phase is scheduled to begin construction in 2016.

MATURING ONSHORE U.S. WIND MARKETS

Onshore wind energy has turned a corner in the U.S., reaching major milestones for market penetration, reduced costs, and job creation. The DOE recently reported that wind prices have hit an all-time low, with average levelized long-term prices at approximately 2.5 cents/kWh for projects contracted in 2014. Wind has comprised 33 percent of all new U.S. electric capacity additions since 2007, according to the DOE. With the maturation of the onshore

sector, it can be expected that political support for nascent offshore projects will grow as well.

AVAILABILITY OF FINANCING

Obtaining financing for large offshore wind projects is a challenge. Banks and equity investors are wary of new technologies and the risks perceived to be associated with offshore wind energy. Yet the landscape appears to be shifting on the financing front as well. The Block Island project secured \$290 million in debt and equity financing earlier this year. Given the relative speed with which the Block Island regulatory approvals were obtained, regulatory risks may become less of a concern for investors.

A 68-turbine project is being planned by US Wind, Inc., off the coast of Ocean City, Maryland, capable of generating 500 MW of electricity. To cover the project’s nearly \$2.3 billion cost, the company plans to pursue a mix of financing mechanisms including substantial OREC financing to be repaid after the turbines are constructed and operating. Another project from the same developer as Block Island, Deepwater Wind, is Deepwater ONE, also in the Rhode Island Sound. This planned 150-200 turbine project will be capable of generating from 900 to 1,200 MW. Success in obtaining financing for these larger projects will be a key barometer indicating real progress.

CONCLUSION

Major deployment of offshore wind in the U.S. will require further progress in many of the areas discussed here. Given the economic, energy supply, and climate imperatives, however, there appears to be strong momentum building toward the long-awaited breakthrough in U.S. offshore wind capital investment and project development. ↘

ABOUT SULLIVAN & WORCESTER, LLP

Sullivan & Worcester is a leading corporate law firm providing counsel to domestic and international clients ranging from Fortune 500 companies to emerging businesses. With more than 185 attorneys in Boston, New York, Washington, D.C., and London, the firm offers a full range of corporate legal services. It’s Energy Finance Practice Group represents clients in energy project development and finance transactions; acquisitions, sales and licensing projects; and energy and climate policy matters. The firm works as partners with its clients, providing legal support through the lens of its deep understanding of energy finance and the unprecedented change underway in the energy industry, to bring positive solutions and real value to its investments and businesses.

Members of the Energy Finance Practice have substantial experience in onshore and offshore wind energy matters. Representative matters include: represented the Conservation Law Foundation in support of the Cape Wind offshore wind project off the coast of Massachusetts, including in federal court litigation, administrative, and regulatory matters; served as North American counsel for a major vertically integrated renewable energy company, advising on offshore wind joint venture structuring, debt and equity investments, and regulatory matters; advised developers with respect to proposed offshore wind projects off the coast of New Jersey; represented an infrastructure development, management, and operations company building out a portfolio of wind power generation assets; performed due diligence supporting the purchase of a controlling interest in a 450-MW portfolio of three wind projects by the infrastructure fund of a major U.S. bank; and represented a leading European bank as lender to a nearly 400-MW wind generating facility in Texas.

For more information, go to <http://www.sandw.com/practices-area-Energy.html> or visit the firm’s blog, the Energy Finance Report, at <http://www.energyfinancereport.com>.

HISTORIC MILESTONE FOR AMERICA'S FIRST OFFSHORE WIND FARM

Block Island Wind Farm completes and installs first of five steel foundation jackets



In a historic moment for the American offshore wind industry, the Block Island Wind Farm has reached its “steel in the water” milestone with the installation of the first wind farm foundation component.

Deepwater Wind’s offshore foundation installation contractor set the first, 400-ton steel jacket on the sea floor on Sunday, July 26, at the wind farm site, roughly 3 miles off the Block Island coast. A joint venture between Weeks Marine and Manson Construction is serving as Deepwater Wind’s offshore foundation installation contractor.

Deepwater Wind’s leaders were joined on July 27 by Rhode Island Governor Gina M. Raimondo, U.S. Secretary of the Interior Sally Jewell, U.S. Bureau of Ocean Energy Management Director Abigail Ross Hopper, the state’s congressional delegation, and more than a hundred other elected officials, leaders of national environmental advocacy organizations,

federal and state regulators, Block Islanders, and project supporters to celebrate the milestone during a ferry tour of the offshore construction site.

“We know the world is watching closely what we do here, and we’re incredibly proud to be at the forefront of a new American clean-tech industry launching right here in the Ocean State,” said CEO Jeffrey Grybowski. “This moment has been years in the making – and it’s just the start of something very big.”

This first of five foundation installations kicks off a busy construction period for the 30-MW Block Island Wind Farm. During the roughly eight-week construction period this summer, more than a dozen construction and transport barges, tugboats, crew ships and monitoring vessels will be active at the offshore construction site. ↴

— Source: Deepwater Wind

SECRETARY JEWELL AND DIRECTOR HOPPER LAUD CONSTRUCTION OF NATION'S FIRST OFFSHORE WIND FARM

As part of President Obama's Climate Action Plan to create American jobs, develop clean energy sources, and cut carbon pollution, U.S. Secretary of the Interior Sally Jewell and Bureau of Ocean Energy Management (BOEM) Director Abigail Ross Hopper joined Rhode Island Governor Gina M. Raimondo, the state's congressional delegation, and representatives of Deepwater Wind — the project developers — in celebrating America's first commercial scale offshore wind farm.

"Interior is proud to be a partner in this historic milestone for offshore renewable energy," Jewell said. "Deepwater Wind and Rhode Island officials have demonstrated what can be accomplished through a forward-looking vision and good working partnerships. Block Island Wind Farm will not only

tap into the enormous power of the Atlantic's coastal winds to provide reliable, affordable, and clean energy to Rhode Islanders, but will also serve as a beacon for America's sustainable energy future."

"As the Nation's pioneering offshore commercial wind farm, the lessons learned from the Block Island project about facility design, fabrication, and installation will inform future projects to be developed on the Outer Continental Shelf," Hopper said. "This is an exciting development for Block Island and also demonstrates the way forward for wind energy in federal waters off America's coasts."

Also participating in the celebration were Rhode Island's U.S. Senators Jack Reed and Sheldon Whitehouse and U.S. Representatives Jim Langevin and

David Cicilline; Deepwater Wind's CEO Jeffrey Grybowski; members of the state General Assembly; representatives of the U.S. Army Corps of Engineers; and members of the environmental community. The celebration included a boat tour of the project site to provide a close look at the turbine foundation work underway.

Deepwater Wind is constructing a five-turbine, 30-MW wind farm in state waters about 3 nautical miles southeast of Block Island. At 589 feet above sea level, the turbines will be among the tallest in the world. The project, scheduled to be online in 2016, is expected to power about 17,000 homes. The facility will provide electricity directly from the wind farm to Block Island. Because the island uses only 1 MW of power in the off-season

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and 4 MW in the summer peak season, the remaining 90 percent of the energy produced during the off-season will be sent to other state customers via a 25-mile bi-directional submerged transmission cable between Block Island and the Rhode Island mainland.

Eight miles of the transmission line cross federal waters. After determining that there was no overlapping competitive interest in the proposed right-of-way area on the Outer Continental Shelf and conducting an environmental review, BOEM issued a right-of-way grant to Deepwater Wind Block Island Transmission System, LLC, in 2014.

The wind farm will produce more than 100 million kWh of clean energy annually, and Deepwater Wind will sell the electricity through a Power Purchase Agreement to National Grid, a Rhode Island utility. Project developers estimate the wind farm will reduce electric costs by 40 percent for the average ratepayer on Block Island, which currently relies on expensive diesel-powered generators. With the transmission line, Block Island has no need for backup diesel generators, as it can purchase electricity from National Grid once the cable is laid.

Because the project will be sited in state waters, the U.S. Army Corps of Engineers was the lead federal agency

for analyzing the potential environmental effects of the project under the National Environmental Policy Act (NEPA). In addition to issuing the right-of-way grant, BOEM was a cooperating agency in the NEPA analysis and associated consultations led by the Corps.

To date, BOEM has awarded nine commercial wind energy leases off the Atlantic coast: two noncompetitively issued leases (one for the proposed Cape Wind project in Nantucket Sound offshore Massachusetts and one offshore Delaware) and seven competitively issued leases (two offshore Rhode Island-Massachusetts, two offshore Massachusetts, two offshore Maryland, and one offshore Virginia). The competitive lease sales generated about \$14.5 million in winning bids for more than 700,000 acres in federal waters. BOEM is expected to hold an additional competitive auction for a Wind Energy Areas offshore New Jersey later this year.

Spurring responsible development of offshore wind energy is part of a series of Obama administration actions to increase renewable energy both offshore and onshore by improving coordination with state, local, and federal partners. Since 2009, the DOI has approved 56 wind, solar, and geothermal utility-scale projects on public

or tribal lands, including associated transmission corridors and infrastructure to connect to established power grids. When built, these projects could provide about 14,600 MW — enough energy to power nearly 4.9 million homes and support more than 24,000 construction and operations jobs.

The success of the Block Island project was enabled by the strong support of state and local leaders who developed early policies for the planning and proper siting of the wind farm as part of the state's overall renewables goals and marine spatial planning efforts. Beginning with Governor Donald Carcieri and continuing with Governor Lincoln Chafee, and now-Governor Gina M. Raimondo, Rhode Island's top officials have all supported offshore wind and the development of the Block Island Wind Farm. Rhode Island's Congressional delegation also supported federal tax and permitting policies important for this project and industry. Deepwater Wind worked closely with federal and state agencies and local environmental groups in developing a groundbreaking set of construction rules to minimize any impacts on marine mammals.

Maps and additional information on this project are available on DOI's website. ↵

— Source DOI

COASTAL CAROLINA SCIENTISTS WORK ON WIND ENERGY STUDIES

Coastal Carolina University (CCU) scientists deploy the instrumentation buoy at the McManus Reef off North Myrtle Beach

CCU's School of Coastal and Marine System Science (CMSS) is deploying its meteorological and oceanographic instrumentation buoy to support long-term student research at the McManus Reef off North Myrtle Beach. The buoy system will also be part of broader experiments continuing the school's work on evaluating the potential for wind energy development off South Carolina's coast.

The CMSS faculty, staff, and students deployed the instrument system to feed near real-time measurements

that will support wind energy studies for validation of CCU's interactively coupled ocean, wave, and atmospheric modeling system. The system will also feed into the National Weather Service's weather modeling system.

CCU, the University of South Carolina, and the South Carolina Institute of Archaeology and Anthropology received \$1.5 million in federal and state grant money to use the school's geophysical mapping



system to characterize areas that wind developers should embrace or avoid off the coast.

According to Paul Gayes, the director of the school and the lead technical investigator, the project will use continuous geophysical mapping of certain portions of the ocean floor to determine what wildlife habitats and cultural resources are just off the coast.

The Coastal Explorer, CCU's 54-foot aluminum research vessel, is assisting in deployment of the buoys and transportation to help with the complex operation.

The buoy at Ron McManus Reef and a second instrument system installed off Frying Pan Shoals

Light Tower — 25 miles offshore of Cape Fear — was deployed from the National Oceanic and Atmospheric Administration (NOAA) ship, the Nancy Foster, during a cooperative fishery habitat survey conducted by NOAA and CCU scientists. The cruise is supporting two coastal marine and wetlands studies (CMWS) master's degree projects and aiding in the improvement of mapping of critical habitat in the region. ↴

— Source: Coastal Carolina University

SIEMENS TO BUILD WIND POWER PLANT IN CUXHAVEN, GERMANY

Siemens has invested roughly €200 million (approximately \$221 million) to build its first production facility for offshore wind turbine components in Germany. The factory will manufacture nacelles for the company's next-generation wind turbines. These wind turbines are designed for use at sea and have a capacity of 7 MW. The new factory in Cuxhaven will be one of Siemens' most significant new production facilities in Germany in recent years and will create up to 1,000 new jobs. The

groundbreaking is scheduled to take place later this year with production of the first components to begin in mid-2017.

"The decision to build a new production facility in Cuxhaven represents a clear commitment to Germany as a business location," said Joe Kaeser, president and CEO of Siemens AG. "The new Siemens factory will employ up to 1,000 skilled employees. The expansion of offshore wind power capacity in Germany and Europe represents an enormous oppor-

tunity for northern Germany and Siemens."

The planned production facility will have a surface area of 170,000 square meters and will be located directly at the edge of Cuxhaven's well-developed harbor, allowing heavy components to be loaded directly onto transportation vessels, thereby avoiding expensive ground transportation. The new factory will handle the final assembly of generators, hubs, and nacelle back-ends, which are all connected to form complete



nacelles — the core of offshore wind turbines. While evaluating the new manufacturing location, the company also intensively examined the possibilities for investing in existing locations that are being impacted by structural transformations

“We’re looking forward to building at this factory the most efficient and reliable ‘made-in-Germany’ wind turbines,” said Markus Tacke, CEO of Siemens’ Wind Power and Renewables Division. “We invest where we see opportunities for growth, and

Germany and Northern Europe are dynamic growth markets for us. The new factory will also make an important contribution toward helping us reach our goal of making wind power competitive.”

A recently published study by the Renewable UK industry association shows that the costs of offshore wind power have declined by 11 percent over the last five years alone.

In addition to the new facility in Cuxhaven, Siemens is also currently constructing a plant for rotor blades in Hull, United Kingdom, for 6- and 7-MW class wind turbines.

This plant is also scheduled to be fully operational in 2017. Germany is the most significant market for offshore wind power after the U.K.

Siemens is the market leader in the offshore wind power industry. To date, the company has sold around 3,100 wind turbines and installed at sea more than 1,470 turbines with a total capacity of 4.7 GW. Siemens is also a leader in offshore grid connections and offshore service. ↘

— Source: Siemens

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CWIND SECURES O&M VESSEL CONTRACT AT LONDON ARRAY OFFSHORE WIND FARM



London Array

London Array Operational

CWind, a leading provider of integrated services to the wind industry, has announced that it has been awarded a contract for the supply of two crew transfer vessels to the London Array offshore wind farm (OWF) supporting operation and maintenance (O&M) activities.

London Array OWF is located 20 km off the Kent coast in the outer Thames Estuary. Both workboats, the CWind Alliance and CWind Artimus, will be operating from Ramsgate in Kent. CWind Alliance is familiar with the site and in 2013 received a recognition by Siemens for its outstanding vessel performance on site. During its first stint at the project, CWind Alliance completed 6,000 hours of service. CWind Alliance delivered an impressive 363 days of operation on the London Array OWF in 2012.

The O&M contract at London Array OWF is the first assignment

for CWind Artimus after being named at Seawork 2015 last June. The 22-m crew boat powered by IPS is capable of carrying up to 30t payload or 24,000 liters of fuel, expanding cargo capacities and nautical range.

“We’re very pleased to return to London Array and support their O&M activities,” said Bruce Clements, business development manager at CWind. “We are delighted to have won this contract following a challenging competitive tender process and we look forward to working with London Array Ltd and its partners over the coming years. This contract award is further recognition of our innovative vessel solutions providing our customers in O&M with a winning combination.” ↵

— Source: CWind

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HIGH-QUALITY REPAIR STATIONS VS. UP-TOWER REPAIR

By Kainon Irons and Keith Plantier



Figure 1: LGE Pitch Ram Facility

In the wind industry, it is well-known that a downed tower results in major financial losses. The question arises: how can turbines get up and running as quickly as possible for as long as possible? When system components fail due to hydraulic rams, yaw drives, and accumulators, for example, choices then become very limited. You are then left with the decision to purchase new units or obtain refurbished or repaired units. Two major pitfalls of buying new units are long lead times that are encountered and the logistical challenges of receiving new units that are manufactured nowhere near wind farms. For instance, wind farms in the U.S. that have turbines manufactured overseas are forced to absorb the cost of obtaining new components from the manufactur-

ers. The high costs of shipping and long wait times have caused wind farms to start looking for regional solutions closer to home. These factors have paved the way for the repair industry. By purchasing refurbished units, the logistical challenges associated with buying new units are eliminated. However, the quality of repair is then called into question. When buying new becomes unfeasible or too expensive, what is the best course of action when deciding which route to take with repaired units?

QUICK FIX OR QUALITY FIX?

Due to the difficulties and costs associated with buying new units, companies that are refurbishing units have found a niche in the wind industry. There is a demand

from wind farms with downed turbines to seek out this route because of the economic advantages of decreasing the costs related to shipping and long lead times. Repaired units have received a mixed reputation due to the sources of repair. Something important for customers to consider when looking at refurbished units is the fine line between the quick fix and the quality fix. There are benefits and drawbacks to consider when looking at each. Up-tower repair companies have stepped into the role of the quick fix. Independent, regional repair facilities, such as Lighthouse Global Energy (LGE), have opted for the quality fix. The greatest benefit of up-tower repair is how quickly it's completed.

This is the quickest way to get the turbine running again, but will the repair last? From the perspective of LGE, the long-lasting repair is more important than the short-term fix, even if the turnaround time takes slightly longer. LGE has taken the time to do the little things right, and it is this attention to detail that leads to long-lasting, high-quality repairs. Furthermore, LGE is strategically located in Abilene, Texas, where wind energy plays a predominant role in the region. A dedicated repair facility is able to focus in and provide areas solely devoted to a particular job, which in turn, allows for specialized fixtures and tools to be fabricated that make the job easier and more efficient, as shown in Figure 1.

This increases workplace safety and allows for consistent practices to be implemented that reduce the risk of damaging components. LGE has extensive knowledge in quality procedures related to ISO 9001. This enables the technicians at LGE to leverage the quality associated with ISO 9001 and address repairs quickly. However, without knowledgeable technicians, quality and speed are

pursued in vain. In comparison of the two repair styles, up-tower repairs are primarily focused with speed, and independent facility repairs are primarily focused on quality. This doesn't mean that one can't produce quality and the other can't produce quickly; it just demonstrates each type's specialty.

THE DIRT ON BUYING USED

Contamination proves to be the leading cause of problems with many turbine components, especially in hydraulic systems. Hydraulic cylinders (or pitch rams) serve as a good example to consider when looking at the two repair philosophies. How does an independent repair company such as LGE approach the solution when compared to an up-tower solution? When a cylinder goes down, contamination is attributed as the primary mode of failure in hydraulic systems due to the effects of dirty oil [1]. Dirty hydraulic fluid not only damages cylinders, it can also damage other major components, such as pumps and valves, as shown in Figure 2.

Turbine hydraulic systems are not exempt from this plague, especially in the windswept plains and farmlands of West Texas. When looking at the repair of a hydraulic cylinder, it is essential to be as clean as possible in order to protect components from dirt and other foreign particles that can wreak havoc on rods, seals, and barrels. This becomes problematic for the up-tower solution. If systems are failing due to contamination up-tower, then an up-tower repair will be done in a contaminated environment. This results in repairs that don't last long, and wind farms quickly fall back to the same predicament as before. Whereas an independent facility devoted to these types of repairs is able to provide a sterilized environment and practice better cleaning techniques

to carry out an effective, long-lasting repair. One improvement LGE has utilized recently is through the use of bellows made of a tougher material with a zip-up design for easier installment in order to protect rods more effectively in dirty environments, as shown in Figure 3.

This allows for the problem to be combated before it occurs. Contamination is important to consider not only in hydraulic systems, but also in gear drives and where oil and moving parts are implemented.

TESTING THE REPAIR

Testing refurbished units to conditions experienced in the field is a proven way to know if repairs are good or bad. Whether it is a leak check in a hydraulic system or a torque test in a yaw drive, the information gathered from testing is essential to developing the best repair solution. It is through this process of testing and R&D that the best repair solutions are developed.

"The reason we have been able to get the customer base we have is because of our high-quality testing procedures and our ability to accommodate customer delivery schedules," said Ruben Guerrero, LGE's business development manager.

LGE has devoted a lot of time and money into engineering and research for making the best possible tests to simulate the complex conditions experienced in the turbines.

Whether it is looking at the surge in forces components experienced during a windstorm or using computer software to analyze the effects of forces on various components, these factors come into play when developing good tests. This type of attention to detail ensures that long-lasting results will be provided for customers who want turbines to work effectively for as long as possible. If repairs are being done up-tower, the only way to test the



Figure 2: Representative sample of contaminated oil found during disassembly of a pitch ram

unit is to install it. The result of a failed test means that the turbine is again rendered idle. Operating with one bad component in a system puts unnecessary strain on other components that depend on each other, possibly causing a domino failure effect, particularly in the pitch system where a bad pitch ram can lead to pump or motor failure. This is where getting it right the first time becomes especially important, and pre-tested repairs are able to provide the best chance of doing just that.

CONCLUSION

There is a demand for refurbished and repaired turbine components because of the economic and logistical challenges of buying new. The two main avenues of repair that have emerged are up-tower and dedicated regional repair facilities. These two avenues



Figure 3: Zippered bellows for ease of installation in the field and adequate protection from the environment

of repair are able to address the ever-growing need to reduce the cost and minimize the need to transport units over long distances. The main benefit of the up-tower repair is the speed and immediate locality of the repair. The drawbacks are the loss of quality with working in a contaminated area and the inability to carry out effective tests up-tower. A dedicated repair facility can produce higher quality products that last longer in the field, but it will

more than likely take a little longer for the turnaround. The ability to mitigate contamination and test products before installment prove to be big players for quality in the repair arena.

For more information, go to www.lgnrg.com. ↵

REFERENCE

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HUVR LAUNCHES WITH \$2 MILLION FUNDING; FAA APPROVED DRONE-BASED DATA ANALYTICS COMPANY

HUVRData, LLC, the drone-based data analytics company, officially launched and announced \$2 million in funding from angel investment organizations that include the Central Texas Angel Network (CTAN), Houston Angel Network (HAN), and the Texas HALO Fund, a sidecar angel fund sponsored by HAN. In the past one-and-a-half years, HUVR has built out its technology, secured full FAA approval for its commercial drone applications, and established its value to first target markets of wind, solar, oil and gas, and precision agriculture.

“The response to HUVR to date has truly been astonishing,” said co-founder and CEO Bob Baughman. “Our wind farm inspection packages provide wind farm owners actionable data that can save significant operating expenses and provide this in a way that is much more efficient and cost effective than conventional methods. The investor response was so positive that we raised more than we planned to enable more investors to be involved with HUVR now, which will allow us to expand even more aggressively.”

HUVR delivers valuable data analytics using drone-based inspections and cloud-based services. It was among the first companies to obtain FAA authorization to fly drones for industrial applications. The company has already engaged customers in the wind industry and will expand to oil and gas, solar, and precision agriculture.

As one of the industry’s first business applications of drones, and with HUVR’s unique cloud and data analytics focus, it attracted interest from many investors, including those who were a part of the initial \$2 million raised from CTAN, HAN, and the Texas HALO Fund,

“HUVR combines the vision and technology valuable to the Houston-based oil and gas industry,” said Bill Hughes, deal lead for the HAN. “HUVR’s impact can span the Gulf Coast and beyond. Investors saw the clear value HUVR can deliver in multiple segments of the energy industry.”

Also, according to Gene Betts, CTAN board member and deal lead, Austin is rapidly earning its place as a clean tech hub.

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“We see a lot of very interesting businesses at CTAN, and HUVR stands out as one of the first movers in a truly new space run by experienced founders with excellent track records,” Betts said. “They have already demonstrated their capabilities in the wind farm area and are set to launch and expand their services through this raise.”

HUVR is focused on working with wind farm owners and repair companies to perform regular and ongoing turbine assessments of entire wind farms, identifying and diagnosing damage from cracks, lightening strikes, and more. HUVR’s methods are at least four times faster than current manual methods and are much safer. HUVR’s unique cloud-based delivery

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Today, traditional labor-intensive inspection methods allow for approximately 30 percent of a fleet of turbines to be inspected annually. Now, an entire wind farm can be monitored frequently and thoroughly with problems spotted immediately. This provides a revolutionary new operations and maintenance method that wind farms can now take advantage of to reduce costs and keep the turbines turning. ↵

— Source: HUVRData, LLC

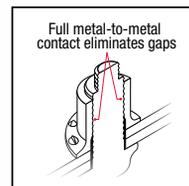
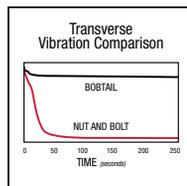


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Could you give us a general overview of the Complete Wind Corporation?

Complete Wind Corporation (CWC) has a depth of hands-on knowledge that originates from the manufacturing of wind turbine rotor blades. The CWC team has leveraged that knowledge to make the transition to a provider of rotor blade technical and field services. Being incorporated in Canada and the United States allows CWC to offer consistency in services to owners and operators with cross-border assets. Collectively, CWC has inspected over 6,500 rotor blades ranging in size from 24 meters to more than 50 meters, comprising multiple rotor blade manufacturers and rotor blade designs.

I am the president of CWC and have more than 20 years of experi-

ence in the rotor blade industry. My wind career began as a manufacturing engineer with Canada's first large rotor blade manufacturer. CWC was founded in 2010.

Tell us about the services your company offers the wind industry.

CWC exclusively serves wind farm owners and operators, providing a comprehensive range of rotor blade services with specific focuses on:

- Rotor blade inspections; at factory, incoming at site, end of warranty, and post warranty — all as part of a comprehensive long-term inspection and maintenance program
- Remediation and composite repairs, both on- and off-turbine
- Quality assurance of in-field repairs as a third-party representative for owners and operators
- Audits of rotor blade manufacturing facilities
- Rotor blade damage and failure analysis
- In situ dynamic rotor balancing and vibration analysis

The CWC safety program is reinforced by years of experience both on- and off-turbine and recognizes the respective governing Canadian and American occupational health and safety legislation.

What can people gain from doing business with Complete Wind? What does your company offer that makes it stand apart from your competition?

Owners and operators can use CWC's knowledge and experience on rotor blades to their benefit to supplement their own engineering and technical groups on an as-needed basis. It allows the owners and operators to bring in a level of expertise it may not have available in-house. CWC does not offer its services to the OEMs in order to avoid conflict of interest as a representative of owners and operators. The ability of the CWC team to draw on its own rotor blade manufacturing experience and to stay current in today's advancing technologies in rotor blade manufacturing allows the company to serve a unique market.

What steps can be taken with new blades to lower future maintenance costs?

It is recommended that owners and operators become involved at the start of a wind project by performing a manufacturing audit at the factory as the blades are built. Gaining an understanding of the level of quality at the factory will prove beneficial. One way to do that is to follow the factory visit with thorough incoming inspections to fix problems before

the rotor is assembled and raised. It is far more economical to repair blades on the ground than on-tower after installation. The incoming inspections establish a baseline for owners and operators to make comparisons on future inspection findings as a part of an ongoing maintenance plan.

Does geographic location have any impact on inspection and maintenance schedules?

Yes, there are many things to consider, including peak wind seasons and if the wind farm sees a high frequency of lightning storms throughout the summer months. Planning inspections around the project's local climate will allow for the most value. Inspection frequencies can be increased or decreased as data is collected over the life of the wind farm and as the owners and operators gain insight to common defects and

rates of propagation. As an example, some owners and operators are using lightning strike data collected around the wind farm to perform targeted inspections following the passing of severe weather. These same owners and operators maintain regular inspection intervals, but the targeted inspections allow for early detection of lightning damage, and effective maintenance planning, should repair priorities need to be reallocated.

What specific elements have the most negative impact on blades?

There are varying levels of quality in the different blade manufacturers, so CWC witnesses a wide range of defects. However, some of the most prominent wear and damage is found in regions that see frequent rain and severe lightning storms or are located near sandy soil. Ice damage is more relevant in colder climates.

With President Obama and the EPA supporting the Clean Power Plan, the U.S. is at a point in its history where wind power could be a major source of energy. Where do you think the wind industry is headed?

Toward improved technology. Having the benefit of being in the industry for more than 20 years, I have been able to watch the industry evolve and grow. As the turbine manufacturers continue to develop larger turbines with higher power output, consideration must be given to replacing older technology onshore through the repowering process. This would follow the European model. Offshore has the potential to support even larger turbine models, but ongoing maintenance will create new challenges for service providers. ✎

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SIEMENS WINS 100-MW ONSHORE WIND ORDER IN AUSTRALIA



The Hornsdale wind project, located in the Australian Capital Territory (ACT), will consist of 32 Siemens SWT-3.2-113 direct drive wind turbines.

Siemens and Neoen Australia have signed a contract for the Hornsdale Wind Farm project located in the state of South Australia. Consisting of 32 Siemens direct drive wind turbines, this project will provide clean energy for more than 70,000 households. The agreement includes a long-term service contract. Neoen Australia is investing \$250 million (approximately \$184 million U.S.) in the project, which will make a major contribution to the Australian Capital Territory (ACT) government's target of 90-percent renewable energy by 2020. The project is underpinned by a 20-year contract to supply green energy to the ACT at a fixed price of 9.2 Australian Cents kWh.

After commissioning, the Hornsdale wind power plant is expected to produce over 400 GWh per year — an amount of energy equivalent to a fifth of the territory's annual electricity consumption. At the signing ceremony, ACT Environment Minister Simon Corbell said, "As one of the winners of our first wind auction, Hornsdale plays a critical role in helping the ACT to achieve its 90 percent renewable target."

"We are delighted that Neoen entrusted Siemens to support the region around Canberra with our environment friendly technology," said Thomas Richerich, CEO of Onshore at Siemens Wind Power and Renewables Division. "At the Hornsdale Wind Farm,

we have three factors of success combined — Neoen’s international expertise, Australia’s natural resources, and the efficiency of our cutting-edge direct drive technology.”

This project will support the Renewable Energy Center of Excellence at the Canberra Institute of Technology by creating opportunities for employment, training, and investment in both the ACT and South Australia. It will also provide benefits to the Horns-

dale community for the life of the project. Construction is expected to begin immediately. Siemens will provide the full turnkey project solution, including 32 wind turbines with associated civil and electrical infrastructure. Siemens will also maintain the wind farm for Neoen on a long-term maintenance contract signed simultaneously with the EPC contract. ↘

— Source: Siemens

NORDEX INSTALLS 140 MW IN THE FIRST HALF OF 2015

Halfway through its anniversary year, Nordex SE has achieved a market share in Germany of 11.8 percent. This means that in terms of installed turbines the manufacturer is again in the double-digit range in its home market for the first time since 2001 (just under 12 percent in the year as a whole).

While, the sector is generally quiet when it comes to installations compared to 2014, the Hamburg manufacturer has maintained last year’s level in absolute terms. According to the German Machinery and Plant Manufacturing Association (VDMA), the total wind energy capacity installed overall in Germany in the first half of 2015 stands at nearly 1,200 MW (443 wind turbine generators). Of that amount, 140 MW are accounted for by Nordex turbines.

With a nominal output of 2.4 MW, most of the turbines fall below the average of just under 2.7 MW calculated by the VDMA. Nordex has achieved its large share of 11.8 percent due to the number and spread of installed turbines. In total, the manufacturer installed 57 turbines in Germany in the first half of the year. According to the number of the totally installed turbines, Nordex achieved a share of 12.9 percent.

With 51 turbines, the N117/2400 — the low-wind machine from the Gamma series — is still the

top seller in the Nordex product portfolio. One of the largest orders to be implemented is a large-scale product in Chransdorf, Brandenburg, at an IEC-3 site where Nordex set up 20 Gamma turbines. To complete the wind farm, Nordex will install four more N117/2400 on this site.

Nordex installed the first N131/3000, the follow-up model to the N117/2400 from its Delta

series, in Janneby, Schleswig-Holstein. The results of measuring tests show that the noise level of the N131/3000 is sometimes even lower than projected.

Installations in the first half of the year account for a little less than one third of the volume planned by Nordex for the year as a whole. ↘

— Source: Nordex

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PROFILE

Moog Components Group

Since 1951, Moog Components Group has been a supplier of the world's leading high-performance and reliability slip rings. Since 2008, they have established themselves as a leader in the wind industry, too.

By Anna Claire Howard

More than 60 years ago, Moog Components Group, originally called Electro-Tec, was started by two brothers George and James Pandapas in Blacksburg, Virginia. This first plant manufactured miniature slip ring assemblies.

In 1953, the two brothers decided to go their separate ways and pursue different avenues. This led James to found Poly-Scientific where he and his team engineered the plating technologies that would eventually lead them to develop high-performance slip rings.

The company has grown dramatically since its humble beginnings in the basement of a building in downtown Blacksburg. What began with some slip rings and a few conductors has evolved into a leading supplier in motion control, air moving, electronics and fiber optics, addressing critical performance applications and expanding into multiple industries, including aircraft, defense, medical, industrial, and marine and wind energy. Moog Inc. is a worldwide designer, manufacturer, and integrator of precision control components and systems. Moog's high-performance systems control military and commercial aircraft, satellites and space vehicles, launch vehicles, missiles, automated industrial machinery, wind energy, marine, and medical equipment.



“The motor technology we’re into now has made us into a motion control company, meaning anything that has to rotate, be driven, and controlled, or power data that has to be transferred across a rotary interface,” said Steve Black, the senior business development manager at Moog Components Group.

Because Moog is an engineering-driven company, it offers the wind market the highest level of reliability and performance that’s out there in the slip ring world, according to Black.

“I would say that we have, without question, the best technologists and materials labs in the world within

our facilities,” Black said. “We know sliding contacts better than anybody else in the world, and that’s what we use to develop the products.”

However, with that high level of quality comes a high cost. And according to Black, the price is what initially turned OEMs in the wind energy market away from doing business with them.

“We’re not the cheapest option out there, and we never intended to be,” Black said. “What we provide and what we focus on is the highest level of performance. Where things are critical and where it’s important that you have the high-performance products, that’s where we’re strong. It’s

what we do every day, and it's what led us into the wind business."

Prior to 2008, Moog set its sights on the pitch control slip ring business within the growing wind industry. However, it has never been a low-cost supplier, and the OEMs that were cost-focused on the parts going in their turbines couldn't agree to pay Moog's higher prices.

That's when Black and his team at Moog Components Group decided it was time to take their slip ring products directly to the owners and operators.

"We knew that they were going to have a high focus on the maintenance of the turbines and lowering maintenance costs would be a high level of concern for them," Black said. "We developed our product, came up with our initial design concept, and took it out and started talking to wind site technicians. I would like to be able to say that it was my idea, but it just so happened that those were the guys who wanted to talk to us. They were the ones who were dealing with it more than anyone else, every day."

Wind turbines require reliable transmission of power and data signals from the nacelle to the control system for the rotary blades. Moog's slip rings provide the performance and quality needed in demanding environments. While the cost up front may be high, they eliminate costly downtime by using fiber brushes and robust mechanical components in the slip ring design, ultimately allowing their customers to save on long-term costs.

According to Black, he and his team at Moog Components Group felt pulled toward the wind industry because they knew that the slip rings could be better.

"We knew that we had a better technology, and we knew that we could reduce the maintenance requirements," Black said. "We also knew that we could reduce the down-

times that turbine technicians saw because of nuisance issues with pitch control slip rings. We had a proven reliable technology that we had been building for years that could make things better for the owners and operators."

However, in any business case where you're looking to do something better, the potential volume to support it must be out there. That's when Moog started looking at what was going on in the wind industry with the current install base and with the growth potential within the wind market.

"We saw a great business case to make a big impact with a product in the aftermarket and to start building the reputation for performance and reliability that we knew the wind owners and operators would be demanding," Black said. "We looked at it in a twofold approach in that we'd get the units out there and then get the technology proven and accepted. We would use that as a strong base to re-engage the OEM market."

When Moog Components Group was able to get those audiences and show the wind technicians what they had to offer in terms of its pitch control slip ring technology, they were able to get the feedback they needed to create slip rings with the highest level of performance and reliability.

"We made modifications, changed our design, and did things to improve the interface for the technicians to do the installations," Black said. "That's how our product was developed — with the guys who were working on them every day. Even today, I don't think there's any parallel to what we offer turbine technicians in terms of reliability and performance."

"We started shipping the product in 2009. We have thousands of the products out in the field now, and the performance has just been exceptional."

As a supplier of an aftermarket product for GE Renewable Energy, Moog is working with all of the major operators of GE turbines. In addition to its pitch control slip rings, Moog has also made a name for itself with its fiber brush technology, which dates back to the early 1980s when Moog developed its fiber brush for NASA's satellite applications.

Satellites had two primary challenges with a solar ray drive that must continuously point at the sun: the requirement for lubrication and the significant amount of wear debris generated in the process. Moog developed the fiber brush to eliminate both of those problems and to improve the operation of satellites.

"Obviously, a service call to space can be extremely expensive," Black said. "That was the genesis for the fiber brush design we use. Since that product release in 1991, our fiber brush technology has become a significant part of our product line."

According to Black, the wind industry doesn't show any signs of abating, and with a company like Moog and its slip ring technology inside of the turbines, the blades are set to keep spinning.

"From watching it all these years, I believe it's getting stronger and stronger every year," Black said. "It's exciting to see that the productivity of the wind sites now and, with GE as an example, the different iterations they've come out with and the improvements with software, performance, and blade sizes and what they're doing to access the lower wind areas. It's been interesting watching the technology grow and develop in the years I've been involved. Overall, I think the wind industry business is a tremendous asset to our economy, and we at Moog are proud to be involved in such a growing industry."

For more information, go to www.moog.com. ↗

CONSTRUCTION

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SUNEDISON CLOSES \$390 MILLION OF FINANCING FOR 300 MW WIND FARM IN TEXAS



SunEdison, Inc.

SunEdison, Inc., the world's largest renewable energy development company, recently announced that it has closed financing and begun construction on one of its largest wind farms to date, the 300-MW South Plains II wind farm in Floyd County, Texas.

The wind farm is expected to generate approximately 1,200 GWh of energy each year, enough to power more than 90,000 Texas homes and avoid the emission of two billion pounds of carbon dioxide. "The South Plains II wind power facility will have a positive economic impact for the people of Texas," said Paul Gaynor, SunEdison's executive vice president of Americas and EMEA. "This is expected to become one of SunEdison's largest wind projects, creating about 300 construction jobs and ensuring that

thousands of Texans have access to clean, cost-effective electricity."

Citi provided the construction loan facilities for the project, and BHE Renewables, a subsidiary of Berkshire Hathaway Energy, in partnership with Citi, will invest in the tax equity.

"Our company has been a leader in wind project development and ownership," said Tom Budler, president of BHE Wind, a division of BHE Renewables. "As we look for new ways to be involved in developing renewable generation, we see tremendous opportunity to move the industry forward through investment in the tax equity market."

The project is being built by Mortenson Construction, one of the nation's top wind farm builders. The

wind turbines are being supplied by Vestas.

“We are delighted to be partnering with SunEdison on this wind farm and contributing to the growth of the renewable energy industry in Texas,” said Tim Maag, Mortenson’s Wind Energy Group vice president and general manager.

Hewlett-Packard plans to purchase 112 MW of the wind farm’s capacity to power 100 percent of its Texas-based data centers as part of the company’s sustainable cloud initiative. The remaining 188 MW capacity will be sold to an affiliate of Citi. Construction is targeted for completion in 2016. The wind farm is on the Call Right Projects List for

TerraForm Power, Inc. TerraForm Power anticipates acquiring the project once complete.

Operation and maintenance of the wind power plants will be performed by SunEdison Services, which provides global asset management, monitoring, and reporting services. ↘

— Source: SunEdison, Inc.

WIND FARM PLANTS TO BE BUILT IN NORTHERN PERU

The Energy and Mines Ministry granted a temporary concession to the enterprise Countourglobal Peru, which will conduct feasibility studies for Piura region-based Almirante Grau and Cupisnique II wind farms.

The Energy and Mines Ministry indicated the future Almirante Grau wind farm’s capacity will be nearly 76 MW and based in the La Brea and Pariñas district belonging to the Talara provincia (Piura region).

Likewise, the future Cupisnique II power plant’s capacity will be 148 MW. It will be located in the San Pedro de Lloc district in the Pacasmayo province (La Libertad region).

The corporation will be granted a 24-month period to conduct both project’s corresponding studies.

Per the regulation, the grantee is forced to conduct studies in compliance with the technical and safety rules, preserving the environment and safeguarding the cultural heritage of the nation. ↘

— Source: Reve Wind Energy and Electric Vehicle Review



Reve Wind Energy and Electric Vehicle Review

GROUNDBREAKING AT NORTH CAROLINA'S FIRST INDUSTRIAL-SCALE WIND FARM



Matthew Staver - Iberdrola Renewables

For the first time, wind power is lifting off in North Carolina. Governor Pat McCrory joined business and community leaders in Elizabeth City to break ground on North Carolina's first industrial-scale wind power project.

Spanning farm fields in Pasquotank and Perquimans counties, the Amazon Wind Farm U.S. East, powered by Iberdrola Renewables at Desert Wind, would be the first utility-scale wind farm in North Carolina and one of the first in the southeastern United States. The proposed facility, if fully built out, could deploy 150 wind turbines that would generate 300 MW of power at full capacity and provide millions of dollars in tax and landowner revenue for de-

acades. The first phase — a 208-MW project — will feature 104 wind turbines.

"The Amazon Wind Farm takes a significant step toward diversifying North Carolina's energy resources," Gov. McCrory said. "Bringing onshore wind production to North Carolina is part of my 'all-of-the-above' energy strategy. By diversifying our energy resources, we can provide affordable, reliable, and secure sources of energy that are environmentally clean and safe."

"Breaking ground on North Carolina's first wind farm is a perfect demonstration that getting to a competitive, clean energy future takes a team effort," said Frank Burkhartsmeier, Iberdrola Renewables' U.S. CEO. "A wind farm of

this scale and complexity wouldn't be possible without Gov. McCrory's leadership, the community's support, and an exciting collaboration with Amazon Web Services."

Rising among the corn, soybean, and wheat fields near Elizabeth City and Hertford, the project is expected to generate a windfall for the local community. The total of landowner payments and taxes for the first phase of the project will inject more than \$1.1 million into the local economy each year. About 250 construction jobs will support the 18-month building period, and 10 permanent jobs will be based at the wind farm when it is in full operation, anticipated for the fourth quarter of 2016.

"This project will deliver substantial and long-term local economic benefits," said Wayne Harris, economic developer for the Elizabeth City and Pasquotank County Economic Development Commission. "Not only will it be the first wind farm in the state, it will be the largest taxpayer in each of the counties where it gets built and puts money into the pockets of local working families."

Iberdrola Renewables, LLC is a subsidiary of Iberdrola USA and the U.S. renewable energy division of parent company Iberdrola, S.A., an energy pioneer with the largest renewable asset base of any company in the world. Iberdrola Renewables, LLC is headquartered in Portland, Ore., and has more than \$10 billion of operating assets totaling more than 6,000 MW of owned and controlled wind and solar generation in the U.S. ↵

— Source: Iberdrola Renewables

TRI GLOBAL ENERGY CONTINUES TO LEAD TEXAS IN WIND ENERGY



Tri Global Energy, a Dallas-based utility-scale renewable energy company, continues as the leading developer of wind energy projects in Texas, according to the second quarter 2015 Market Report from the American Wind Energy Association (AWEA).

With over 2,400 MW of wind generation projects currently under construction in the state, TGE's wind projects represent about a third of all wind power projects currently being developed in Texas and nearly 18 percent of all wind projects nationally.

"All signs point to the continued strong growth in demand for renewable energy, and we are ag-

gressively working to expand our participation in the market for wind energy," said John Billingsley, chairman and CEO of TGE.

"We're also encouraged by the initial moves in Congress to extend the production tax credit and investment tax credit, which help put renewable energy projects on a more equal footing with fossil fuels," Billingsley said.

Currently, there are more than 100 wind projects under construction in 24 states representing more than 13,600 MW of capacity. Texas leads the nation in wind project construction, followed by Oklahoma, Kansas, Iowa, and North Dakota, according to AWEA's Market Report.

TGE is a utility-scale renewable energy company with wind projects in Texas and New Mexico covering approximately 1,000 square miles of land. Founded in 2009, the company's goal is to develop clean energy at an affordable cost through the development of wind and solar projects and to directly benefit the communities, which provide the power. Through its proprietary "Wind Force Plan" business model, TGE allows landowners and communities to partner with and share ownership in wind energy projects. ↯

— Source: Tri Global Energy

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WANT A TAX CREDIT FOR A SMALL WIND SYSTEM? BE SURE IT'S CERTIFIED

By Patrick Gilman, Wind Market Acceleration and Deployment Lead, Wind Program, Department of Energy



Bergey Windpower Co., Inc.; NREL 13830

A small wind turbine can produce enough energy to cover the electricity costs of the average American home.

Small wind electric systems are one of the most cost-effective, home-based renewable energy systems for your home with zero emissions and pollution. If you decide small wind is right for you, you will need to ensure that your wind turbines are tested and certified for safety, function, performance, and durability.

WHY TURBINES ARE CERTIFIED

If you are considering a small wind energy system, certification can give you greater confidence in the performance and safety of the system you install. Adoption of distributed wind systems has been hindered by untested technologies and unverified claims about turbine performance.

Certification and quality assurance requirements can help promote solid products and can be adopted by local planning officials, utilities, banks, state energy offices, and federal agencies to ensure consumer protection and industry credibility.

HOW TURBINES ARE CERTIFIED

As part of the effort to ensure quality, standards providing a set of design and engineering criteria to verify and assess performance are used to test wind turbines at facilities that provide site, equipment, and technical expertise. The Energy Department's world-class National Wind Technology Center and its regional test

Applicant	Turbine	Certifier	Rated Annual Energy ¹ @ 5 m/s	Rated Sound Level ²	Certified Power Rating ³ @ 11 m/s
Bergey Windpower Co.	Excel 10	SWCC	13,800 kWh	42.9 dB(A)	8.9 kW
Bergey Windpower Co.	Excel 6	SWCC	9,920 kWh	47.2 dB(A)	5.5 kW
Eveready Diversified Products (Pty) Ltd.	Kestrel e400nb	SWCC	3,930 kWh	55.6 dB(A)	2.5 kW
Kingspan Environmental	KW6	SWCC	8,950 kWh	43.1 dB(A)	5.2 kW
Osiris Technologies	Osiris 10	Intertek	23,700 kWh	49.4 dB(A)	9.8 kW
Sonkyo Energy	Windspot 3.5	Intertek	4,820 kWh	39.1 dB(A)	3.2 kW
Sumec Hardware & Tools Co., LTD	PWB01-30-48	Intertek	2,920 kWh	41.1 dB(A)	1.2 kW
Sumec Hardware & Tools Co., LTD	PWA03-44-250	Intertek	6,400 kWh	40.9 dB(A)	3.2 kW
Sumec Hardware & Tools Co., LTD	PWB02-40-48	Intertek	4,660 kWh	36.9 dB(A)	1.7 kW
Sumec Hardware & Tools Co., LTD	PWA05-50-280	Intertek	9,240 kWh	42.0 dB(A)	5.0 kW
Xzeres Wind Corporation	442SR	SWCC	16,700 kWh	48.5 dB(A)	10.4 kW
Xzeres Wind Corporation	Skystream 3.7	SWCC	3,420 kWh	41.2 dB(A)	2.1 kW

Courtesy of IREC

centers, for example, are facilities that test and evaluate small wind turbines. An accredited third party, such as the Small Wind Certification Council or Intertek, then verifies test results and provides certificates to manufacturers.

Qualifying manufacturers are required to show that their wind turbines meet the requirements of the American Wind Energy Association (AWEA) or the International Electrotechnical Commission (IEC).

TAX CREDIT FOR CERTIFIED WIND TURBINES

In January of this year, the U.S. Internal Revenue Service introduced new performance and quality requirements for small wind — a nameplate capacity of up to 100 kW. To qualify for the 30 percent federal Investment Tax Credit (ITC), you must install a fully certified wind turbine.

HOW TO QUALIFY FOR THE TAX CREDIT

The new requirements go into effect for small wind energy properties on the following dates:

Effective Feb. 2, 2015:

- The most commonly installed turbines at homes — wind turbines with a rotor-swept area of 200 m² or less — that have been acquired or placed in service on or after Feb. 2, 2015, are subject to the requirements.

Effective Dec. 31, 2015:

- Larger wind turbines with a rotor-swept area of 200 m² or more that are acquired or placed in service on or after Dec. 31, 2015, are subject to the requirements at that time to qualify for the ITC.

There are currently 13 fully certified small wind turbine models. The En-

ergy Department is committed to increasing the number of certified small and medium wind turbine designs to 40 by 2020. To help make this happen, the Wind Program supports a Competitiveness Improvement Project (CIP) that helps U.S. manufacturers of small- and medium-sized turbines achieve certification and lower their cost of energy — building U.S. leadership in distributed wind markets.

To learn more about turbine certification in the U.S. market, check out this chart of certified small wind turbines maintained by the Interstate Renewable Energy Council (IREC). More information can be found on the DOE’s website or at IREC’s website where you can learn more about small wind and how it can benefit you and your community. ↴

— Source: U.S. DOE

RENEWABLE NRG SYSTEMS LAUNCHES USER INTERFACE

Designed for vibration analysts and technicians alike, updates include improved fleet views, reporting, and alarm features

Renewable NRG Systems (RNRG), a designer and manufacturer of decision support tools for the global renewable energy industry, has completely redesigned its software interface for the TurbinePhD® wind turbine condition

monitoring system (CMS). TurbinePhD is the only CMS in the wind industry that is engineered for use by wind plant operators at multiple levels of their organization, from technicians to data analysts.

AUTOMATED DIAGNOSIS

TurbinePhD’s powerful automated analysis classifies the health of all turbine drivetrain components so users don’t have to be vibration experts to get actionable information. Improved alert management allows users to handle all alerts in one place and track who acknowledges and clears issues. Charts and data can also be easily exported for deeper analysis.

FLEET HEALTH AT A GLANCE

The TurbinePhD user interface is completely web-based so users can access all of their turbine health data anywhere with an Internet connection. The fleet view allows operators to assess the health of all wind farms at a glance, and graphical health alerts clearly highlight those that need attention. At the wind farm level, users can see which turbines have new alerts or view and download charts of the most critical faults on the farm.

TurbinePhD is backed by RNRG’s two-year warranty and lifetime technical support. ↪

— Source: Renewable NRG Systems



Renewable NRG Systems

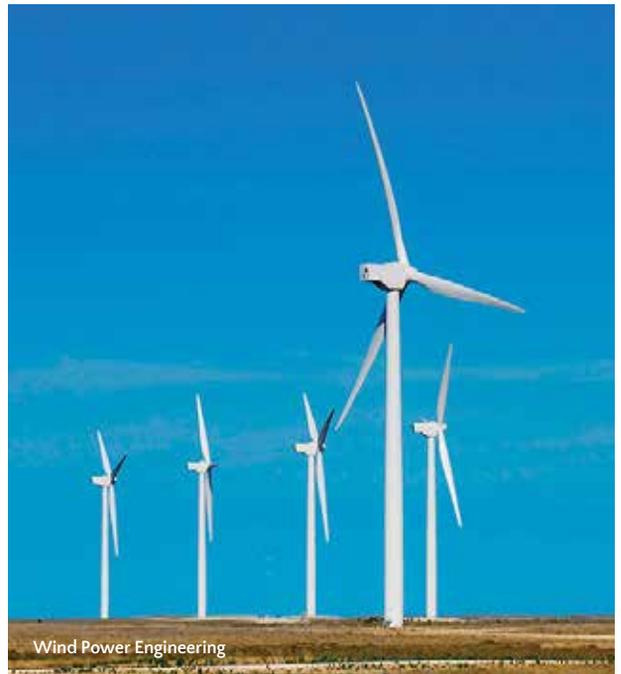
PATTERN ENERGY ACQUIRES REMAINING CAPACITY IN 283-MW GULF WIND POWER FACILITY

Pattern Energy Group Inc. recently announced that it has completed the acquisition of the remaining 170 MW ownership interests in the 283-MW Gulf Wind power facility in Kenedy County, Texas, from Pattern Energy Group LP and MetLife Capital LP.

“We now own 100 percent of Gulf Wind, which is located in a unique site on the Gulf Coast where the winds blow strongest at the times of Texas’ peak demand and pricing,” said Mike Garland, president and CEO of Pattern Energy. “The acquisition of the Gulf Wind equity interests and recapitalization of the project debt provides us with increased cash flow and complete control of the facility. The acquisition of the Gulf Wind interests, along with our recently announced dividend increase, demonstrate our commitment to increasing value for our shareholders.”

The Gulf Wind facility consists of 118 wind turbines and has the capacity to generate 283 MW of energy, the power equivalent to the annual energy usage of approximately 80,000 Texas homes. ↪

— Source: Pattern Energy Group



Wind Power Engineering

D.C. SETS EXAMPLE WITH MAJOR WIND ENERGY PURCHASE, SAVING \$45 MILLION

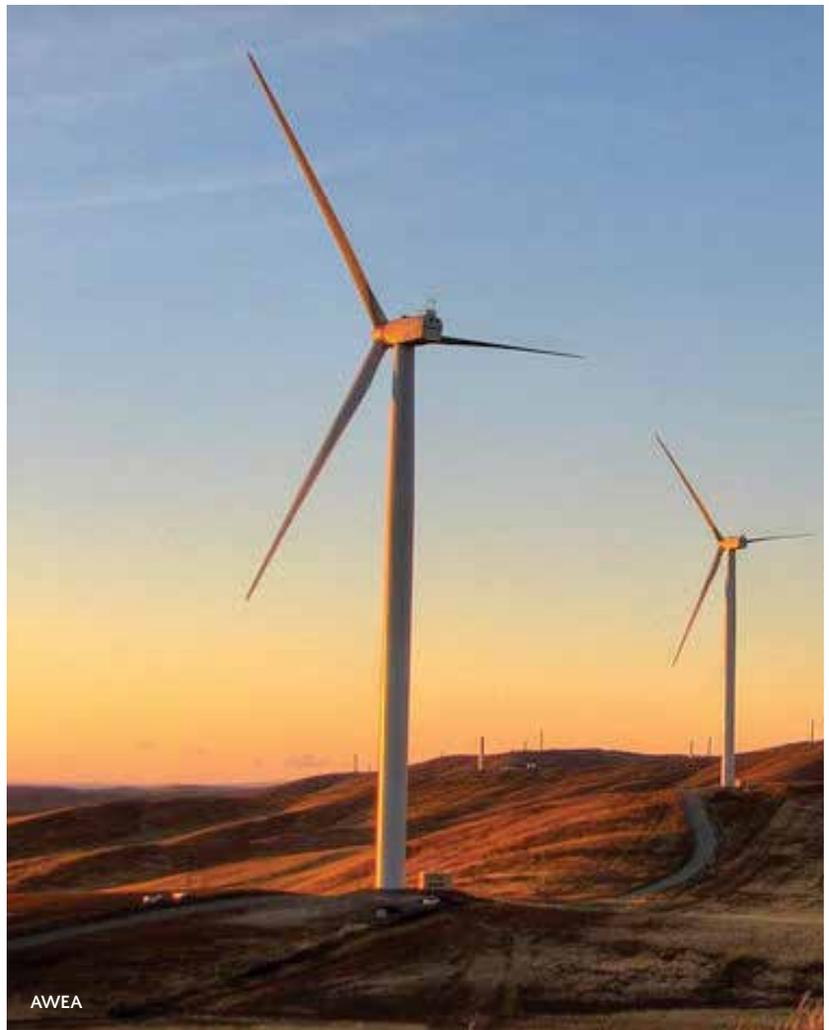
While Congress continues to debate extending the renewable energy Production Tax Credit and Investment Tax Credit, the nation's capital city just endorsed wind power in a big way. On August 12, Washington, D.C., Mayor Muriel Bowser announced a new power purchase agreement (PPA) for wind energy from an Iberdrola Renewables wind farm in southwestern Pennsylvania.

Wind power will supply the District of Columbia's government buildings with 35 percent of their electricity, all while saving \$45 million for D.C. taxpayers over the next 20 years. Mayor Bowser stated in a press release that the purchase was to "boost our economy and create cleaner air for current and future generations":

"The District of Columbia will continue to lead the nation in the fight against climate change. We are supporting green building, promoting energy and water efficiency, and fostering renewable energy. This wind agreement exemplifies how my administration will use energy policy to boost our economy and create cleaner air for current and future generations."

The agreement, which is the largest purchase of wind energy by a U.S. city to-date, has already come into effect as of August 1.

In this case, the D.C. government, not residents, is the recipient of wind energy. In other parts of the country, wind energy is lowering consumers' electricity bills. The Midwest utility system operator, MISO, has noted that wind power "ultimately helps keep prices low for our customers," and a Synapse Energy Economics report found that doubling the use of wind energy in the PJM Interconnection (which



includes Washington, D.C.) would save consumers close to \$7 billion per year.

Though D.C. is one of the first major American cities to directly purchase wind energy, it joins other municipalities like Georgetown, Texas, (not to be confused with the D.C. neighborhood). Earlier this year, the City of Georgetown opted to be powered entirely by renewable energy, primarily because low-cost wind and solar energy will bring savings. Other cities have chosen to buy Renewable Energy Credits,

which help to green the electricity supply, but don't guarantee a long-term, stable price for electricity.

The District's PPA is yet another example of major non-utility businesses and organizations buying wind energy because it saves money, provides long-term price certainty, and emits no carbon pollution. Other notable non-utility purchasers of wind power who have been in the news lately include Amazon, Facebook, and Hewlett Packard. ↴

— Source: AWEA



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EDF ENERGIES NOUVELLES' FIRST CROWDFUNDING CAMPAIGN A SUCCESS



The 10 future wind turbines of the EDF Energies project are situated in the East of France. The ground studies of this wind farm have been crowdfunded by 198 people for €135,000 (roughly \$150,000), half of this amount coming from neighbors.

The first crowdfunding campaign launched in France by EDF Energies Nouvelles has exceeded its initial fundraising target by 35 percent. The aim was to involve the local population in Vosges and the Lower Rhine in the development of the Bois de Belfays wind farm project.

The campaign ran from June 15 through July 16 on Lendosphere, a web platform dedicated to sustainable development projects. With an initial target of €100,000 (roughly \$111,000), a total of €135,000 (roughly \$150,000) was lent due to strong support from the inhabitants of the six municipalities of the Vosges mountain — Châtas, Grandrupt, La Grande Fosse, Saint-Stail, Ban-de-Sapt, and Saâles.

This support is demonstrated by the results of the campaign with 198 lenders in total, 40 percent of whom live in the Vosges and Bas-Rhin department, accounting for 50 percent of the total lending. Local investment

came from a range of lenders from 18 to 83 years old. The amounts raised will be used to fund pre-construction studies for the Bois de Belfays wind farm, which will consist of 10 wind turbines of 2 MW each. Construction is due to begin in 2016.

This crowdfunding campaign, launched to meet the expectations of local mayors, is a first in France for EDF Energies Nouvelles. Emmanuel Jaclot, Deputy CEO – Strategy, M&A and France at EDF Energies Nouvelles, said, “We are delighted with the success of this first crowdfunding campaign in France, which reflects people’s confidence in our wind farm projects. We hope that the campaign will pave the way for other innovative initiatives of this kind allowing the local population to take part in our projects.”

According to Laure Verhaeghe, co-founder of Lendosphere, EDF Energies Nouvelles is the first major French operator to have carried out

a crowdfunding campaign for a wind power project.

“The campaign has been a complete success,” Verhaeghe said. “It is the largest campaign to date in terms of the amounts raised for an accredited crowdfunding platform. This status, which came into effect on October 1, 2014, enables individuals to lend money to companies via Internet platforms such as Lendosphere, the only site dedicated entirely to projects that contribute to ecological transition.”

Lendosphere is the first crowd-lending platform dedicated to sustainable development projects. On Lendosphere, individuals can lend directly and with interest to the projects they support. Since it was launched in December 2014, more than €850,000 (roughly \$941,702) has already been invested by individuals in renewable energy projects. ↵

— Source: EDF Energies Nouvelles



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