

# WIND



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In the 1989 film *Field of Dreams*, we were introduced to Iowa farmer and family man Ray Kinsella. Influenced by a string of supernatural events, Ray risked financial ruin on the notion of building a baseball field in the middle of his crops.

Most folks in the community thought he was off his rocker. But his support system— his wife and daughter, a literary hero from his youth, and a whispery guiding voice — spoke louder than all the critics.

If you've seen the film or read W.P. Kinsella's *Shoeless Joe* (the book on which the film was based), then you know where the story goes from there.

But if we step out of the cinematic dreamscape, did you know that the baseball field built for the production on farmland in Dubuque County, Iowa, has had anything but a "dreamy" history since shooting wrapped in 1988?

Built on the intersection of two separately owned farms, the field was a popular tourist attraction for a period after the film's release, but was later plagued with landowner disputes, waning interest, and economic decline.

Currently, the property is owned by a company in the process of planning and building a multi-field youth baseball and softball complex — a project that has had its share of opposition.

That whole story hasn't played out yet. It's unknown if the park will truly preserve and advance the spirit of the book and film, which undeniably served as the genesis of the project.

It's not difficult to draw parallels from the film to the current state of the wind energy industry. We face an uncertain future. We're facing a financial hurdle. We have staunch opponents set on curbing our progress. And let's face it, there's even a little in-fighting from time to time.

But we also possess a strong purpose — our own whispery voice that cuts through the noise of distractions and detractors.

Like Ray, we're the only ones who can hear it; we're the ones charged with making that purpose a reality. It's telling us to "Go the distance."

Do we have what it takes?

Thanks for reading,



A stylized, handwritten signature in black ink, appearing to read 'Stephen Sisk'.

**Stephen Sisk, editor**  
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# EDITORIAL 2015

*inFOCUS topics in BOLD;  
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# DIRECTION

*Policy • Advocacy • Business • Finance • Legal • Environment • International*

## **GM ADDS WIND POWER TO CORPORATE RENEWABLES MIX**

*Auto maker to purchase 34 MW from upcoming Enel Green Energy project in Mexico*



Courtesy of General Motors

General Motors for the first time is procuring wind to power its manufacturing operations, enabling one of its Mexico facilities' electricity needs to be run mostly on renewable energy. This addition of 34 MW of wind power allows GM to achieve its corporate goal of renewable energy use four years early.

Construction of the wind farm begins in the second quarter of this year. When complete, more than 12 percent of GM's North American energy consumption will come from renewable energy sources, up from 9 percent. The company's current renewable energy use — comprised of solar, landfill gas and waste to energy — totals 104 MW against a

goal of 125 MW by 2020. The use of clean energy reduces greenhouse gas emissions and GM's impact on climate change.

Seventy-five percent of the energy coming from the wind turbines will power most of GM's Toluca Complex sitting on 104 acres, making it the company's largest user of renewable energy. The remaining capacity will



help power its Silao, San Luis Potosi and Ramos Arizpe complexes. The use of renewable energy helps these facilities avoid nearly 40,000 tons of carbon dioxide emissions annually.

“Our commitment to sustainable manufacturing processes is one way we serve and improve the communities in which we work and live,” said Jim DeLuca, GM executive vice president of Global Manufacturing. “Using more renewable energy to power our plants helps us reduce costs, minimize risk and leave a smaller carbon footprint.”

GM signed a power purchase agreement with Enel Green Power, which is developing and constructing a massive wind farm in Palo Alto, Mexico. The company’s use of 34 MW of energy is equivalent to the power produced by 17 wind turbines.

“Mexico is an ideal location for our first wind project,” said Rob Threlkeld, GM global manager of renewable energy. “Energy is fed to a national grid, making it easier to reduce or add energy capacity at a facility. There’s also a good business case as prices for traditional power are about a third greater than the United States.

“Once online, we’ll evaluate the project to better understand how we can expand the use of wind power.”

GM is a founding member of the Business Renewables Center, a collaborative platform launched earlier this month by the Rocky Mountain Institute. The center aims to accelerate corporate renewable energy procurement with a goal of nearly doubling U.S. capacity of wind and solar energy by 2025. It is part of a larger effort – the Corporate Renewables Partnership – that includes the World Wildlife Foundation, the World Resources Institute and the Business for Social Responsibility. The Renewable Energy Buyers’ Principles, of which GM is a signatory, set a framework for the partnership and guides the Business Renewables Center. ↗

— Source: General Motors



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# AWEA REPORT: WIND INTEGRATION BOOSTS GRID RELIABILITY

*Study addresses top wind reliability concerns using real-world examples*

Adding wind power can help the U.S. meet the Environmental Protection Agency's (EPA) Clean Power Plan by cutting carbon pollution while keeping the lights on. That's according to a report by the American Wind Energy Association that explains how wind energy is already making critical contributions to the reliable operation of the power system.

"Americans want energy security, clean air, and a more reliable energy system," said AWEA CEO Tom Kiernan. "Diversifying our energy mix with wind helps us achieve all of these goals at once."

The 15 most common questions about wind power and reliability are answered in AWEA's report, "Wind energy helps build a more reliable and balanced electricity portfolio," based on grid operators' real-world experience integrating wind power as well as dozens of studies conducted by grid operators examining how higher levels of wind use can be achieved.

As wind energy has grown to provide a larger share of our electricity mix, wind turbine technology has matured so that modern wind plants are able to provide the same grid reliability services as conventional generators. Changes in wind output are not a major issue for grid operators because all power plants are already backed up by all other power plants, and grid operators already deal with large fluctuations in electricity supply and demand. In fact, the gradual and predictable changes in wind power are also much easier for grid operators to address than the large-scale outages that can occur at conventional power plants.

"Based on grid operators' experience with reliably and cost-effectively integrating very large amounts of wind energy, wind can play a key role in meeting EPA's Clean Power Plan,"

said AWEA Senior Director of Research Michael Goggin.

Past real-world examples presented in the report help illustrate wind's role in keeping the lights on. Wind energy helped keep the lights on in Texas when fossil-fired power plants failed in the cold in February 2011, and more recently did so again across much of the U.S. during the "Polar Vortex" in early 2014.

Other highlights of the report include:

- Iowa and South Dakota reliably produce more than 25 percent of their electricity from wind power; nine states produce more than 12 percent and more than 4 percent in the U.S. overall.
- Technological advances have enabled U.S. wind farms to set generation records as a percent of demand over the past two years, all without reliability problems:
- At times more than 60 percent on Xcel Energy's Colorado power system;
- Nearly 40 percent of generation in ERCOT, the main Texas power system; and
- 33 percent in the Southwest Power Pool (area that covers all or parts of several states in the Southwest)
- The largest grid operator in the U.S., PJM, recently reported it could reach 30 percent of wind power while maintaining electricity reliability.
- Ireland, Spain, and Portugal obtaining around 20 percent of their electricity from wind on an annual basis, Denmark at nearly 35 percent, and Germany at 25 percent from wind and solar.
- More than a dozen wind integration studies by U.S. grid operators and others find wind energy can reliably supply at least 20-30 percent of U.S. electricity demands; some studies showing 40 percent.
- Wind power saved consumers \$1

billion over just two days across the Great Lakes and Mid-Atlantic states during the 2014 "Polar Vortex" event.

- The current U.S. wind fleet will reduce CO2 emissions by 150 million short tons per year, the equivalent of reducing power sector emissions by more than 5 percent, or 28 million cars worth of carbon emissions.
- There's enough wind power installed to provide electricity for the equivalent of 18 million American homes.

Last year, the EPA released its first-ever draft rules aimed at reducing carbon pollution at existing power plants. Continuing to add wind energy to the U.S. electricity mix can help comply with other parts of EPA's plan, lessening the requirements on other parts of the electric sector.

Policy certainty is needed so that the U.S. can continue rapidly scaling up wind power. The renewable energy Production Tax Credit has successfully helped the U.S. become the number one wind energy producer in the world. Congress must rapidly extend the PTC for the longest possible time to avoid pushing American wind power off a cliff. A loss of \$23 billion to our economy and nearly 30,000 well-paying jobs resulted the last time wind was left without policy stability.

Wind power's costs have dropped more than 50 percent over the past five years, thanks to the productivity and innovation that are driven by performance-based incentives like the renewable energy Production Tax Credit.

According to Wind Vision, a new Department of Energy report due for release in early 2015, wind could double from today's amount to reliably supply 10 percent of the nation's electricity demand by 2020, 20 percent by 2030 and 35 percent by 2050.

— Source: AWEA

# U.S. ADVANCES SUSTAINABILITY TREND IN 2014

## *Factbook reports boost in carbon reduction and clean energy investment*

The United States saw continued growth in renewable energy, natural gas and energy efficiency in 2014, according to the third annual Sustainable Energy in America Factbook. The Factbook shows that U.S. deployment of sustainable energy increased as prices continued to fall and that investment in U.S. clean energy grew at a higher rate.



Analysts at Bloomberg New Energy Finance who prepared the Factbook for the Business Council for Sustainable Energy found that “over the 2007–2014 period, U.S. carbon emissions from the energy sector dropped 9 percent, U.S. natural gas production rose 25 percent and total U.S. investment in clean energy (renewables and advanced grid, storage and electrified transport technologies) reached \$386 billion.”

“The 2015 Factbook clearly shows that America is on the path to a more sustainable energy sector,” said Lisa Jacobson, President of the Business Council for Sustainable Energy. “Our energy productivity is rising along with economic growth, while energy-intensive industries are onshoring production to the United States to take advantage of

low energy costs. All of this is happening as investment in clean energy continues to grow and as new natural gas infrastructure continues to come online. These are strong positive signs for America’s economy and environment.”

Key trends in sustainable energy growth noted in the 2015 Factbook include:

- The U.S. economy is becoming more energy productive, with “an outright decoupling between electricity growth and economic growth.” Between 1990 and 2007, electricity demand grew at an annual rate of 1.9 percent while, between 2007 and 2014, annualized electricity demand growth has been zero. Meanwhile, over those past seven years, the U.S. economy

has grown by 8 percent.

- The U.S. power sector is decarbonizing, with the contribution of renewable energy (including large hydropower projects) to U.S. electricity rising from 8.3 percent in 2007 to an estimated 12.9 percent in 2014, and production and consumption of natural gas hitting record highs in 2014. Since 2000, the Factbook shows, 93 percent of new power capacity built in the United States has come from natural gas and renewable energy.
- Investment in U.S. clean energy is up again. The U.S. clean energy sector has seen \$35–65 billion of investment each year since 2007, a significant increase over the annual investment of \$10.3 billion in 2004. Overall U.S. investment in clean energy totaled \$51.8 billion in 2014, a 7 percent increase from 2013 levels. The United States finished the year ranked second globally for new dollars invested in clean energy, behind China.

The Factbook also discusses the collapse of oil prices in 2014. While there is no explicit link between oil (which in the United States is used mostly for transport) and most sustainable energy technologies (which are used mostly in the power sector), the oil price shock has a profound global impact and may result in “second-order” effects that could impact U.S. sustainable energy, the Factbook noted.

“Against the backdrop of a surging economy and crumbling oil prices, major trends around decarbonization and improving energy productivity continued in the United States,”

said Michel Di Capua, head of Americas research for Bloomberg New Energy Finance. “Low-carbon energy technologies stand to benefit from key policies proposed in 2014, including the U.S. Environmental Protection Agency’s (EPA’s) proposed regulation for the power sector and an innovative new vision for the electricity market in New York State.”

The Factbook also shows renewable energy and energy efficiency making significant strides across several metrics in 2014, including:

- Renewables represent 205 GW of installed capacity across the country. Wind and solar are the fastest-growing technologies, having more than tripled since 2008. Hydropower remains the largest renewable energy source at 79 GW, with biomass, geothermal and waste-to-energy representing another 17 GW but limited in new build by a lack of long-term policy certainty.
- Wind and solar reaching grid parity in multiple regions. In 2014, wind developers secured power purchase agreements with utilities below the levelized cost of electricity for fossil-fired power and below the price of wholesale power in the Midwest, Southwest and Texas. Solar providers were also able to offer PPAs or leases to homeowners below the residential retail electricity price, reaching “socket parity,” while utility-scale solar plants in Texas and Utah secured PPAs at some of the lowest prices ever recorded globally (\$50–55 per MWh).
- The Pacific and New England regions made the

greatest strides in energy efficiency. The Southeast and Southwest regions, meanwhile, have the greatest opportunities to increase efficiency. Across the United States, commercial buildings have showed the greatest progress on energy efficiency over the last several years.

While the United States is clearly heading toward more use of sustainable energy, the Factbook did show deviations from the larger trend. These include an increase of coal’s share in U.S. electricity generation from 37 percent in 2012 to an estimated 39 percent in 2013 and 2014; an increase in carbon emissions from the U.S. energy sector of around 3 percent since 2012; and a slowdown in utilities’ and states’ adoption of energy efficiency.

The Factbook notes that policy will play a central role in determining where the U.S. energy mix heads in 2015 and beyond. State, federal and international policies – including the EPA’s Clean Power Plan regulation on existing power plants; the global climate negotiations scheduled in Paris this fall; and federal and state-level support for renewables, efficiency and natural gas development – will all help determine the speed with which the trend toward sustainable energy develops in 2015.

The full 2015 edition of the Sustainable Energy in America Factbook is available at [www.bcse.org/sustainableenergyfactbook.html](http://www.bcse.org/sustainableenergyfactbook.html). ↗

— Source: Bloomberg New Energy Finance

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## DWEA PRAISES USDA RURAL ENERGY DECISION

### *Final ruling simplifies application process, encourages distributed power*

The Distributed Wind Energy Association recently lauded the USDA’s recent announcement of a final rule for the Rural Energy for America Program (REAP). This rule-making process has been years in the making, and DWEA has been an active participant since the beginning. The core program is still providing grants and loan guarantees to rural small businesses, farmers and others in the agricultural community. However, positive adjustments have been made including a new simplified “three tiered” application process, more frequent

solicitations, and priority points for specific policy priorities such as the advancement of distributed wind power.

“The REAP program has always been a very good one, strongly supported on a bi-partisan basis to help expand development of rural America’s abundant renewable energy resources,” said Jennifer Jenkins, DWEA’s Executive Director. “Now it’s an even better program helping ensure distributed wind power’s continued role in bringing clean, affordable and homegrown electricity to rural America. I am pleased to see the efforts of the

USDA for it’s great work on the program.”

“This program helps farmers and rural businesses lower their operating costs and become more competitive by installing American-made small wind turbines,” said DWEA President, Mike Bergey. “Recent improvements to the program have made it more accessible to family farms and small businesses and we are very appreciative of the streamlining of the application process.”

— Source: Distributed Wind Energy Association

# BOEM ISSUES MASSACHUSETTS OFFSHORE LEASES

## RES Americas and Offshore MW named top bidders in lease auction

The Interior Department's Bureau of Ocean Energy Management (BOEM) recently held the nation's fourth competitive lease sale for renewable energy in federal waters offshore Massachusetts for potential wind energy development.

The auction consisted of two rounds before determining RES America Developments, Inc. and Offshore MW LLC as the provisional winners of Lease Area OCS-A 0500 (187,523 acres) and OCS-A 0501 (166,886 acres), respectively. Winning bids totaled \$448,171 in high bids. The total acreage of these two areas nearly doubles the amount of acreage leased for wind energy through competitive sales. Lease OCS-A 0502 (248,015 acres) and Lease OCS-A 0503 (140,554 acres) did not receive bids.

"Offshore wind along the Atlantic holds great potential to help power our nation with renewable energy while adding jobs to the economy," said Secretary of the Interior Sally Jewell. "We look forward to working with Governor Baker and his administration during this important time for offshore wind development."

According to an analysis prepared by the U.S. Department of Energy's National Renewable Energy Laboratory, if fully developed, the area leased could support approximately two gigawatts of commercial wind generation, enough electricity to power over 700,000 homes.

"We are pleased to see continued commercial interest in the offshore wind industry, as demonstrated by today's lease sale, particularly given the water depth of the wind energy area offshore Massachusetts. With provisional winners who are well established and have experience in developing wind energy facilities, we are optimistic about a strong renewable

energy future offshore Massachusetts," said BOEM Director Abigail Ross Hopper.

Prior to this most recent lease sale, BOEM has awarded five competitive wind energy leases off the Atlantic

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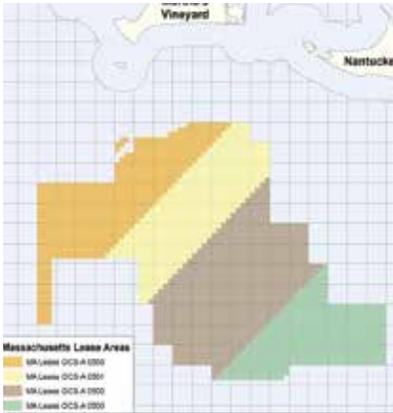
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coast: two offshore Massachusetts–Rhode Island, two offshore Maryland and another offshore Virginia.

The competitive lease sales have generated more than \$14.5 million in high bids for more than 700,000 acres in federal waters. BOEM expects to hold another competitive lease sale offshore New Jersey later this year.

The two leased areas are found within the Massachusetts Wind Energy Area, which starts about 12 nautical miles offshore Massachusetts. Each lease will have a preliminary term of one year, during which the lessee will submit a Site Assessment Plan to BOEM for approval. A Site Assessment Plan describes the activities (installation of meteorological towers and buoys) a lessee plans to perform for the assessment of the wind resources and ocean conditions of its commercial lease area.

If a Site Assessment Plan is approved, the lessee will then have up to five years in which to submit a Construction and Operations Plan (COP) to BOEM for approval. This plan provides detailed information for the construction and operation of a wind energy project on the lease.

After BOEM receives a COP from a lessee, BOEM will conduct an environmental review of that proposed project. Public input will be an important part of BOEM's review process. If the COP is approved, the lessee will have an operations term of 25 years. ↘

— Source: U.S. Department of the Interior

## SIEMENS, TENNET INAUGURATE OFFSHORE GRID CONNECTION

*HelWin1 system has capacity to supply more than 700,000 German households*



Siemens has now handed over HelWin1, the second North Sea grid connection in quick succession, to its client TenneT. The German-Dutch transmission system operator has now also put this grid connection into commercial operation. The offshore platform of the HelWin1 grid connection is located around 85 kilometers off the German coast – northwest of the island of Helgoland, after which the project was named. Up to 576 MW of clean electricity can now be transmitted with this grid connection — enough to supply more than 700,000 German households. The Nordsee Ost and Meerwind Süd/Ost wind farms are linked to HelWin1. At present, wind turbines with a total capacity of around 260 MW are linked to the grid connection, with new turbines being connected almost on a daily basis. The Meerwind Süd/Ost wind farm is made up of 80 Siemens 3.6MW wind turbines.

“This year we have completed the world’s first two large-category offshore grid connections equipped with efficient direct-current technology. We also intend to put the next two projects into commercial operation as planned within a few months,” stated Jan Mrosik, CEO of the Siemens Energy Management Division. “With the completion of HelWin1, TenneT now provides around 2,000 MW of transmission capacity in the German North Sea,” explained Lex Hartman, Member of the Board at TenneT TSO GmbH. TenneT is therefore in good time fulfilling nearly one third of the expansion targets of the German Federal Government of 6,500 MW by 2020.

Transmission system operator TenneT contracted the consortium consisting of Siemens and the Italian cable specialist Prysmian for the HelWin1 offshore grid connection in summer 2010. Siemens is now implementing five North Sea grid connection projects for TenneT: HelWin1 (576 MW) and HelWin2 (690 MW) off of Helgoland, BorWin2 (800 MW) and BorWin3 (900 MW) off of Borkum and SylWin1 (864 MW) off of Sylt. Two of these, BorWin2 and HelWin1, have already taken up normal operation.

The next two grid connections, Sylwin1 and HelWin2, are scheduled to take up commercial operation in the first half of 2015 as well. Siemens received its latest order for a grid connection in the North Sea, BorWin3, in a consortium with Petrofac in the spring of 2014. Commissioning of this fifth grid connection from Siemens is scheduled for 2019. The grid connections implemented by Siemens for TenneT will have a total transmission capacity of theoretically more than 3.8 gigawatts (GW), providing electricity from offshore wind power to supply around five million households.

Thanks to the Siemens high-voltage direct-current (HVDC) technology, transmission losses for each grid connection, including cable losses, are less than four percent. This Siemens HVDC technology is installed on the offshore platforms and in the land-based converter stations. The wind-based electricity is transmitted as alternating current to the converter platform, transformed into direct current and fed to the mainland via a subsea cable. The land-based station converts the direct current back into alternating current and feeds the electricity into the extra-high voltage grid. HVDC is the only efficient transmission solution for cable lengths of more than 80 kilometers.

The HVDC Plus technology used by Siemens is less complex and extremely compact, making it predestined for use in sea-based applications. In contrast to classic HVDC technology used in a vast majority of land links, systems equipped with HVDC Plus feature self-stabilization. As fluctuations in the grid must always be reckoned with for wind-based power generation, grid stability and reliability is enhanced considerably through the use of the Siemens HVDC Plus technology. ✎

— Source: Siemens

## APEX CLEAN ENERGY RECEIVES \$50M FINANCING SUPPORT FROM PRUDENTIAL



Apex Clean Energy, an independent renewable energy company, recently announced that it has secured \$50 million in financing from Prudential Capital Group. The proceeds of the financing will be utilized to advance Apex's project pipeline, including project development, acquisitions and general corporate purposes.

"We look forward to partnering with Apex. In addition to its strong management team and considerable pipeline, Apex has a compelling project development track record and the resources to expand its platform toward long-term ownership and operation," said Ric Abel, managing director with Prudential Capital Group.

Mark Goodwin, Apex Clean Energy President, added, "We are very pleased to be entering into this long-term relationship with Prudential Capital Group. As we continue to build out our renewable energy pipeline, this capital will support the investments required to push projects forward across our portfolio."

"We founded Apex in 2009, at a time when financial markets were in turmoil, with private investors who shared our commitment to clean energy. Since then, our investment thesis has not changed: the low cost of clean energy has been the key factor driving growth in the market. This is what has enabled our portfolio to deliver compelling returns and attract top-tier investors like Prudential Capital Group. We also see the intrinsic value of clean energy: our reserves are not subject to depletion, our fuel is delivered to our facilities at no cost, and our power plants do not produce emissions or consume water. The cultivation of energy sources with these attributes will enable a more sustainable energy future and deliver long-term value to our shareholders."

— Source: Apex Clean Energy

## SGURRENERGY OPENS OPERATIONS HUB IN SAN FRANCISCO

SgurrEnergy has kicked off 2015 with the launch of a new office in San Francisco, California.

The Wood Group company's growth follows the recent expansion into Austin, Texas in October 2014,

and complements SgurrEnergy's existing North American offices, located in Vancouver, Canada and Portland, Maine.

With over 5.8GW, California has the second highest installed wind

capacity in the USA. Solar power is an area of significant growth in the state, with more than 8.5GW installed to date. With many operational assets across the wind and solar industries, SgurrEnergy's presence in California will provide a hub from which to provide its optimization and repowering consultancy expertise.

Staff numbers have more than doubled to over 200, as part of a three-year expansion plan announced by SgurrEnergy in 2012. Geographical expansion has been a particular goal and new offices have been launched in key renewables markets including Norway in 2012, Germany in 2013 and South Africa and Texas in 2014. SgurrEnergy now operates from 13 international offices spanning Europe, North and South America, Africa and Asia.

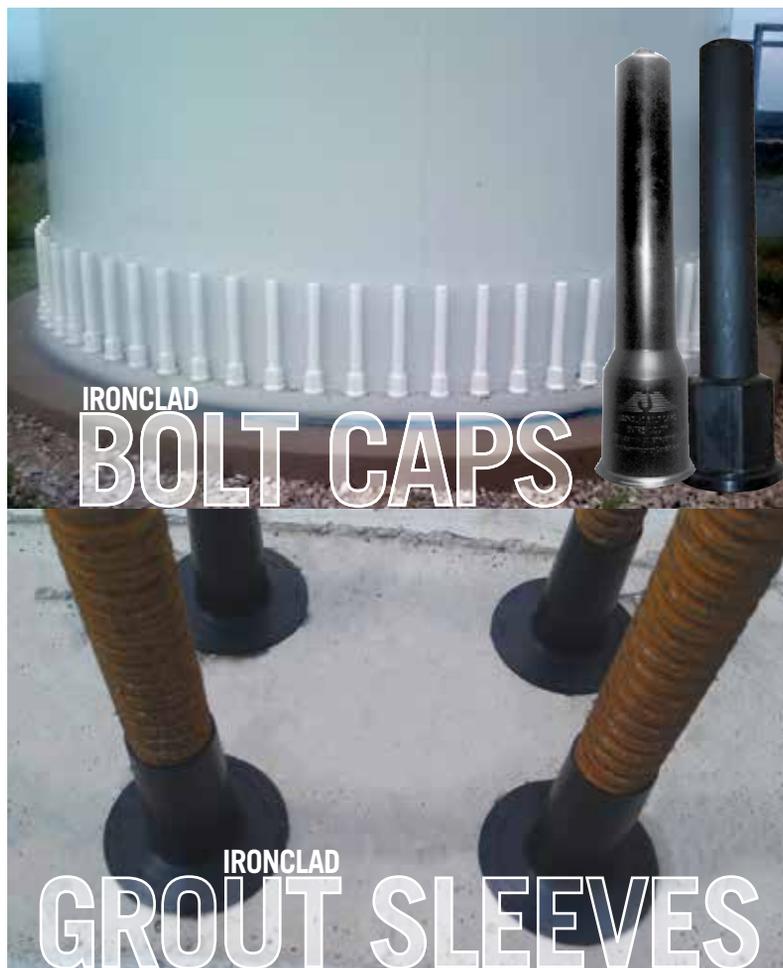
Director of North American business development, Gareth Brown, said: "California is a hub of renewable energy, with excellent wind and solar resource. SgurrEnergy has rich and established capabilities to define the feasibility and operating conditions of these renewable energy conditions, as well as optimization of existing developments.

"Basing ourselves in San Francisco gives SgurrEnergy the opportunity to provide a local market presence to support our existing clients on new project developments, and those already in operation in this growing market."

There is enough solar energy installed in California to power 1,897,300 homes, ranking it 1st nationally. The state is also home to over 12,000 wind turbines and 148 operational wind projects, which gives the potential to power more than 1.2 million homes.

SgurrEnergy has worked extensively in North America, particularly California, with multiple wind and solar assignments in the Altamont Pass, Solano Pass, San Geronia Pass and Techachapi Pass. ↗

— Source: SgurrEnergy



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Empowering Energy Producers™

## TURBINE COMPONENT SAFETY COMPLIANCE

*A guide to avoiding costly missteps in component safety certification*

*Intertek Group*

As wind energy continues to grow, the increase in the annual number of wind turbine installations will draw more manufacturers of wind turbines and components into the U.S. and Canadian markets. However, before a manufacturer can take advantage of this growing opportunity they need to be familiar with the regulatory requirements pertaining to these markets.

As background, before a WTG can begin operating it must comply with national, state/province and local electrical codes. The person responsible to make this determination is an Authority Having Jurisdiction (AHJ). In the case of WTGs the AHJ is an electrical inspector.

An AHJ can call upon the National or local Codes or Standards as they relate to the WTG as the basis for denying approval to begin operating the unit. If an AHJ challenges a WTG's compliance to Code the manufacturer is required to make the necessary equipment or installation corrections to satisfy the AHJ's local code requirements. This must be satisfied before the WTG can begin operating. These corrections often require extensive equipment modifications which can result in costly delays. By understanding of the regulatory

issues related to WTGs manufacturers can avoid many potential AHJ objections and unnecessary costly delays.

The purpose of this paper is to provide the manufacturers of WTGs and their components, and WTG customers and investors with information on how to avoid time consuming and costly pitfalls, and improve the overall WTG product safety certification process. This paper contains information on the regulatory issues related to WTGs and provides advance planning tactics to reduce the likelihood of an AHJ objection. What's more, the paper includes best practices to achieve AHJ approval in the event of an AHJ challenge. These methods are based on Intertek's broad experience with power generation equipment and evaluation of over 1,000 WTGs in North America alone.

### **KEY DEFINITIONS FROM NFPA 70, THE U.S. NATIONAL ELECTRIC CODE, ARTICLE 100**

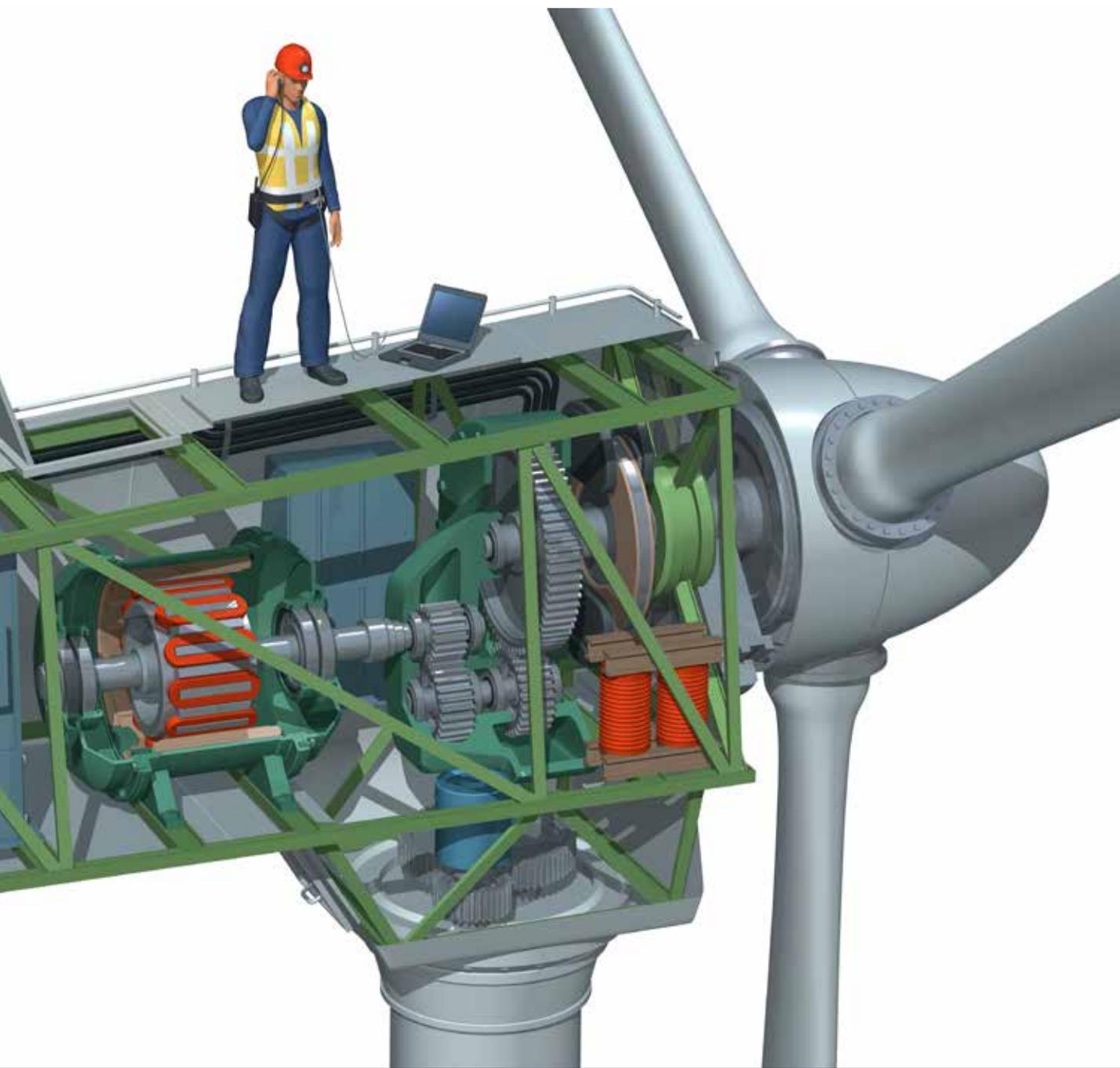
**Approved** — Acceptable to the authority having jurisdiction.

**Authority Having Jurisdiction (AHJ)** — An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving

equipment, materials, an installation, or a procedure.

**Labeled** — Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production





of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

**Listed** — Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with

evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

#### ALSO IN THIS SECTION:

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Eickhoff Corporation

**32 Conversation:**  
Brian Winter  
Encoder Product Manager  
Nidec Avtron Automation

### THE REGULATORY ENVIRONMENT FOR WTGS

Electrical product safety regulations are based on compliance with the National Electric Code (NEC) in the U.S. and the Canadian Electric Code (CEC) in Canada. The most common means to demonstrate compliance to code is for a manufacturer to have their product “Listed.” A Listing is demonstrated by a certification mark such as the ETL, UL or CSA Marks from a third party testing organization such as Intertek, Underwriters Laboratories or CSA, respectively. Such third party testing organizations are called Nationally Recognized Testing Laboratories (NRTL), which are accredited by the U.S. Occupational Safety and Health Administration (OSHA), in the U.S. In Canada, these are called Certification Organizations (CO) and are accredited by the Standards Council of Canada (SCC).

The regulatory issues pertaining to WTG are highly complex for the following reasons:

- There is not an agreed upon standard covering the electrical safety certification of WTGs. Without an agreed upon electrical safety standard it is difficult for third party testing organizations to provide a Listing that is certain to be accepted by the AHJ.
- Since there is not an agreed upon standard covering the electrical safety of WTGs, interpretation regarding specific WTG requirements can vary from state to state and between the U.S. and Canada.
- WTGs are highly complex power generation units containing several thousand components. An AHJ can refuse to commission the entire WTG because of any single component that the AHJ does not consider to be compliant to relevant Code.
- A WTG is not considered a “complete product” until it is assembled at the installation site. Therefore, the Listing must be based on an evaluation of the entire WTG as an assembled entity in the field. The Listing can not be based on factory evaluation as is the case with most electrical equipment.

Because there is no agreed upon standard a WTG can be evaluated to, manufacturers are working with their NRTL / CO to obtain Field Evaluated Labels for their WTGs. A Field Evaluated Label is acquired when an NRTL / CO examines an installed product to ensure that minimum safety requirements have been met. In the U.S. this is typically called a Field Evaluation, and in Canada, a Canadian Special Electrical Inspection (in accordance with standard, CAN/CSA SPE-1000- 99). In the case of WTGs the NRTL /CO will consult with the AHJ to identify the certification issues and will propose an evaluation plan to address those issues. When the NRTL/CO is confident the WTG meets with the AHJ’s requirements a Field Evaluated Label is provided. Field Evaluations are site-specific, although the data gained on the components may be utilized to qualify future units.

### THIRD PARTY CERTIFICATION REQUIREMENTS

*Can manufacturers sell products in the U.S. and Canada without third party certifications?*

Compliance to the National Electric Code in the U.S. and the Canadian Electric Code in Canada requires equipment to be Listed by a Nationally Recognized Testing Laboratory (NRTL) in the US, or a

Certification Organization (CO) and in Canada. While the CE Marking scheme in Europe can be applied based on self declaration, certification for the U.S. and Canadian markets requires third party certification. Without third party certification an electrical inspector can deny approval for a WTG to begin operation based on National or local Codes or Standards. To date, such challenges have arisen based on lack of compliance with specific sections of the US National Electric Code (NEC – Standard NFPA 70) and the Canadian Electric Code (CAN/CSA C22.2 No. 0). Until the AHJ is satisfied that their regulatory requirements have been met, the installed turbines may not begin operating.

In evaluating the components in a WTG AHJs rely on a third party Listings. When evaluating the entire WTG AHJs work with an NRTL /CO to agree on the requirements for the NRTL /CO to apply a Field Evaluated Label.

### COMPONENT LISTINGS

*How difficult is it to obtain a Listing?*

In order to achieve a Field Evaluated Label for a WTG, each component must be examined for compliance with the most applicable National standard. The suppliers of each component will need to have their products tested and Listed. Further, as part of the Listing process each supplier will be subject to continuing factory audits as long as they continue to mark their product under the Listing program.

Due to the increasing global demand for wind energy and the supply chain constraints, many component manufacturers are producing at or near capacity to meet current demand. Since the manufacturers’ current certi-

fications enable them to sell in numerous markets, many component manufacturers may be hesitant to go through the Listing process. Furthermore, the time-frame for a Listing evaluation can run from weeks to months. While the certification of cables, control panels, break systems, and wind anemometers can happen quickly, generator and motor manufacturers may not receive results for up to two years on the suitability of their Electrical Insulation System (EIS) to ANSI/UL 1446, a prerequisite to Listing the generator or motor as a whole.

For WTG manufactures eager to capitalize on the growing U.S. and Canadian markets it is important to plan early. The amount of time it takes to have a product Listed can vary greatly between testing organization. Because of the large number and complexity of the components in a WTG it is important for manufacturers to develop a comprehensive supply chain strategy.

***A WTG and its components are not listed yet. What needs to be done?***

The first step in assessing the scope of your regulatory challenges is to work with an NRTL /CO to conduct a compliance evaluation. The result will be an engineering findings report detailing the items that must be addressed in order to qualify for a Field Evaluation Label.

A desktop examination of your design will identify which components are already Listed. Items that are not listed are at risk of initiating an AHJ challenge for that component or the electrical system as a whole. With this report in hand, you can identify those items that should be replaced with Listed alternatives and those items that can get List-

ed by their suppliers. Beginning with items requiring longer lead times for Listing (e.g. Generators) and prioritizing those items typically reviewed by AHJs (e.g. field installed cables, control panels), the NRTL /CO can help you develop a “compliance plan.” For some items, like a light fixture, the easiest solution is to simply replace the item with a Listed equivalent part. However, for an item like the generator, this may be difficult or even impossible based on the availability of currently Listed products.

Next, the NRTL / CO will help ensure that the Listed components are being installed in accordance with the manufacturers’ instructions, and that they’re being used within their ratings.

This early engagement of an NRTL /CO will identify compliance-related risks and help you to avoid costly delays.

***What if something needs to be changed in order to qualify for a Field Label?***

It is better to identify potential problems early when it is still possible to fix them at the factory rather than when the installation is “complete.” Product retrofits performed in the field become more difficult and more expensive to execute. Many minor modifications can be quickly identified by the inspecting agency engineer and quickly addressed in manufacturing; e.g. adding additional cable supports or warning labels.

***What if the AHJ never grants approval, because of some flaw in the design or component selection?***

In our experience with more than 1,000 large wind turbines, we have never seen this happen. However, significant field

retrofits have been required on some designs at a limited number of sites. So far, to the best of our knowledge, every unit evaluated under this program has been eventually authorized for labeling and accepted by the AHJ for use.

**INTERTEK**

Intertek, a NRTL and CO, has developed a unique program that supports manufacturers and AHJs by providing engineering evaluations on installed equipment in order to determine compliance with specific National Codes and Standards, for both the U.S. and Canada. Intertek has Field Evaluated and Labeled over 1,000 large wind turbine generators in the U.S. and Canada. The evaluation techniques employed have been validated by AHJs across North America, resulting in some authorities specifically advising WTG manufacturers to consult with Intertek if they’re challenged under the State or Provincial regulations. With our proven experience in efficiently evaluating both the system and component designs to U.S., Canadian, and other International standards, and the desire to support a reasonable and cost-considerate solution acceptable to all involved parties, Intertek stands alone in our ability to guide WTG manufacturers to success for all their U.S. and Canadian projects.

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***For more information*** about Intertek, including answers to technical questions or quotes, contact Intertek at [icenter@intertek.com](mailto:icenter@intertek.com) or (800) 967-5352. This paper was developed with contributions from Intertek’s Energy Services Engineering team and Intertek Corporate Liason Joe Welch.

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## OEMs



### VESTAS WINS 33 MW ORDER FROM OX2 IN SWEDEN

Vestas has received a firm and unconditional order for 10 V126-3.3 MW turbines for the Maevaara 2 wind power plant. The order also includes the first Vestas De-icing System for the V126-3.3 MW.

The order was placed by Nordic renewable energy developer OX2. The wind power plant will be in northern Sweden. This project is the second in Sweden to utilise the V126-3.3 MW turbine model. Turbine delivery is planned to begin in the second quarter of 2016 with installation during second and third quarter of 2016.

The contract includes supply, installation and commissioning of 10 V126-3.3 MW turbines, along with a VestasOnline® Business SCADA solution and a 15-year full-scope service agreement (AOM 5000), which was signed with Allianz Cap-

ital Partners, the Allianz Group's in-house investment division for alternative investments. Allianz, with a combined generation capacity of more than 1,200 MW, is one of the world's largest financial investors in renewable energy and has recently purchased the Maevaara 2 wind power plant from OX2.

"We're very pleased to be installing Vestas V126-3.3MW turbines at the extension to the Maevaara project and look forward to working closely with Vestas to ensure optimal through-life operational performance," states David Jones, Head of Renewable Energy at Allianz Capital Partners.

"The new V126-3.3 MW with de-icing is a good match for the Nordic environment and ensures that the site is utilised in an optimal way," says Paul Stormoen, CEO of OX2

Wind. "We are very pleased with our long-term relationship with Vestas and are looking forward to work together on this project."

"Sweden is an increasingly important renewable energy market. Vestas' ability to offer leading technology solutions such as the V126-3.3 MW and the Vestas De-icing System provides our customers there with a competitive value proposition for generating more energy on low wind sites," says Klaus Steen Mortensen, President of Vestas Northern Europe. "Vestas is very pleased to continue our successful partnership with OX2 and Allianz Capital Partners realizing this wind energy project."

Today, Vestas has delivered about 1,500 wind turbines totalling more than 2,400 MW to Sweden.

— Source: Vestas



Courtesy of GE

## **TURKISH DEVELOPER TO DEBUT GE TURBINE MODEL**

### *İÇDAS places 60 MW order of 3.2-103 for BIGA RES project*

GE recently announced it will supply energy developer İÇDAS with 19 brilliant GE 3.2-103 wind turbines for the BIGA RES wind farm, located near the town of Canakkale in northwestern Turkey.

The 60 MW wind farm will feature GE's most powerful wind turbine—the 3.2-103—and will be the first units of this type installed anywhere in the world.

The BIGA RES wind farm will contribute to the Turkish government's goals of reaching 20 GW of wind energy and 30 percent of primary energy supplied from renewable sources by the year 2023. According to the Turkish Wind Association, the country had 3,424 MW of wind energy capacity installed as of the first half of 2014.

"We are pleased to collaborate with GE on this new wind farm that will help to provide Turkey with renewable energy and assists with meeting the country's goals," said General Manager Bülend Engin. "GE's proven wind turbine technology and experience in power generation is a great fit for İÇDAS, and we

are excited both for our customers and Turkey."

With an 85-meter hub height designed to harness Turkey's medium to strong wind conditions with low shear, GE's 3.2-103 can provide strong power while being able to meet tip height requirements found frequently across Europe.

"Wind energy is a natural fit for Turkey and its citizens," said Mete Maltepe, national commercial executive for Turkey with GE's Power and Water business. "At GE, we are proud to contribute to the country's efforts to meet its renewable energy targets."

As a brilliant turbine, the 3.2-103 utilizes the power of the Industrial Internet to help manage the variability of wind for smooth, predictable power. By analyzing tens of thousands of data points every second, the 3.2-103 can wield advanced forecasting algorithms while communicating seamlessly with neighboring turbines, service technicians and operators.

— Source: GE



## GAMESA RECEIVES 260 MW OF ORDERS FROM INDIA

Gamesa continues to grow in India, a strategic market in which it has firmly established itself as one of the leading turbine makers, having recently signed two new agreements for the supply of an aggregate 260 MW.

The first order, from Indian developer and independent power producer (IPP) Greenko, encompasses the supply, installation and commissioning of 80 of the company's G97-2.0 MW turbines (160 MW). More specifically, Gamesa will install 30 turbines at Jaisalmer region, in the state of Rajasthan, and another 50 at Basavanabagewadi, in Karnataka. The turbines are slated for delivery during the first quarter of this year

and the wind farms are expected to be commissioned by June 2015. The company will also operate and maintain all 80 turbines in the long term.

This contract is included in a new framework agreement to commission 300 MW wind power projects in India, signed by Gamesa and Greenko. The second phase of 140 MW is expected to be secured during the second quarter of the year, in different wind farms located in the states of Karnataka and Andhra Pradesh.

The second order, meanwhile, placed by Indian developer CLP India, covers the turn-key construction of a 100-MW wind farm at Chandgarh, in the state

of Madhya Pradesh. The company, which will handle all of the infrastructure needed to install and operate the complex, will install 50 G97-2.0 MW turbines and also service them in the long term. The turbines are due for delivery during the first half of this year and the wind farm will be commissioned in December 2015.

Both the 80 turbines which Gamesa will install for Greenko and the 50 it will install for CLP will be its G97-2.0 MW Class S make, with a tower height of 104 metres, a new model specifically designed for low wind speed sites in the Indian market.

These two new contracts put Gamesa's 2014 Indian order intake at

850 MW. From January to September, India accounted for 27% of the MW sold by the company.

"These new order wins reinforce our leadership position in India, a rapidly-growing market, and evidence the stock placed by customers in Gamesa's technology and experience", according to Ramesh Kymal, Gamesa's Chairman and Managing Director in India.

In recent years, India has emerged as one of the most promising wind power markets: installed capacity is expected to increase from close to 22,000 MW today to 36,000 MW by the end of 2018, driven by huge pent-up demand for electricity, according to sector consultancy BTM.

Gamesa's presence in India - as technology provider and wind farm developer - dates back to 2009. In the last five years, Gamesa has emerged as the number-one turbine OEM by market share (20% in 2013), according to BTM data. To date, Gamesa has installed over 1,700 MW and services close to 1,400 MW under O&M agreements. In addition, in its capacity as wind farm developer, it has developed over 1,000 MW.

— Source: Gamesa



## SIEMENS TO SUPPLY THREE PROJECTS IN SOUTH AFRICA

Siemens has secured a large wind power contract in South Africa with an order for 157 wind turbines for three projects in the South Africa province of Northern Cape. The 2.3 MW Siemens G2 platform turbines will be installed at the wind power plants Khobab, Loeriesfontein 2 and Noupoot. The customer, a consortium led by Mainstream Renewable Power, had just commissioned Jeffrey's Bay Wind Farm in the middle of last year — also partnering with Siemens Wind Power. The new contract includes a service and maintenance agreement for a period of 10 years.

The three wind power plants

have a combined generation capacity of 360 MW. The 140 MW Khobab wind farm and the 140 MW Loeriesfontein 2 wind farm, are both located in the Namakwa District Municipality, and the 80 MW Noupoot wind farm is located in Umsobomvu Local Municipality, 400 kilometers north of Port Elizabeth. All projects will be equipped with the Siemens SWT-2.3-108 wind turbine with a rotor diameter of 108 meters and towers with a hub height of 99.5 meters. Turbine installation will start in August 2015. Commissioning of the three projects is scheduled from early 2016 to the end of 2017. The towers

will be sourced primarily in South Africa.

“We are pleased to be working as a partner again in major projects with Mainstream Renewable Power,” said Markus Tacke, CEO of the Siemens Division Wind Power and Renewables. “This order also clearly demonstrates that, with its Renewable Energy Independent Power Producer Procurement Programme (REIPPP), South Africa is on a successful path for achieving the governments stated goal of installing 3,725 megawatts of renewable energy capacity.”

— Source: Siemens

## VESTAS REPORTS STRONG 2014 UNDER NEW STRATEGIC PLAN

2014 was the first year in the implementation of Vestas' new strategic plan, Profitable Growth for Vestas, and it proved to be a year of strong performance. Compared to 2013, general performance substantially improved due to a successful execution of the strategic plan combined with a continued focus on the parameters which were at the centre of the previous turnaround plan. Wind turbine order intake increased by 10 percent in 2014 and the service order backlog increased as well, providing continued evidence of Vestas' strong position in the market.

For full year 2014, revenue amounted to EUR 6.9bn, EBIT margin before special items was 8.1 percent, total investments was EUR 285m, and the free cash flow amounted to EUR 841m. This was all in line with the latest expectations of revenue of EUR

6.4bn-7.0bn, EBIT margin before special items of 7-8 percent, total investments of approx EUR 250m, and free cash flow around EUR 850m. The activity level and earnings of the period were a result of stable execution throughout the year.

The wind turbine order intake increased from 5,964 MW in 2013 to 6,544 MW in 2014 and the value of the service order backlog increased by EUR 0.3bn to EUR 7.0bn, despite the carve-out of the offshore service order backlog during the year.

For 2015, Vestas expects revenue to amount to minimum EUR 6.5bn with an EBIT margin before special items of minimum 7 per cent, total investments of approx EUR 300m, and a free cash flow of minimum EUR 400m.

As a result of the strong performance during the year, Vestas' capital structure targets have been met and, as per the dividend policy of

the company, the Board of Directors recommends to the Annual General Meeting that a dividend of DKK 3.90 per share, equivalent to 29.5 per cent of the net profit for the year, be distributed to the shareholders.

"I'm pleased to see that Vestas' financial performance continues to improve, with solid results on all key financial and operational parameters. One year on, the "Profitable Growth for Vestas" strategy is very much on track. Vestas' strong results are creating value for our shareholders, as illustrated by the Board's recommendation to distribute a dividend for the first time since 2002," says Anders Runevad, Group President & CEO. He continues: "I also want to commend the Vestas employees for their tremendous efforts, leading to the strong results we present today."

— Source: Vestas

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## NORDEX AWARDED FIRST CONTRACT FOR N131/3000 IN FINLAND

Launched last year, Nordex's N131/3000 wind turbine is attracting growing demand outside Germany as well: Thus, Finnish asset management company Taaleritehdas has ordered the first models from this series. Accordingly, Nordex will be enlarging the "Mylykangas" wind farm with the addition of a further three turbines, namely two N131/3000 turbines and one N117/2400 turbine. The contract also includes premium service for a period of 12 years.

Installation work is to commence in the autumn following the completion of the current construction phase for 19 N117/2400 turbines. The wind farm is located in the north of Finland close to the town of Ii. In view of the prevailing cold conditions, the N131/3000 rotors

will be fitted with an anti-icing system. Moreover, the turbines are designed to make the most of the local wind conditions and will achieve an above-average capacity factor of more than 40 percent.

"The low noise level of 104.5 dB and the high efficiency of the 3-MW turbine prompted us to enlarge the wind farm swiftly. Quiet turbines with large rotor offer a major advantage in Finland in particular," says Taamir Fared, Director of Renewable Energy Business at Taaleritehdas Private Equity Funds. Nordex has already installed or is currently installing three wind farms with a capacity of almost 90 MW for this customer.

— Source: Nordex

## OEMs - NORTH AMERICA

### VESTAS TO SUPPLY 298 MW FOR KINGFISHER WIND IN OKLAHOMA

Vestas has received from First Reserve a firm and unconditional order for 149 V100-2.0 MW turbines to be installed at the 298 MW Kingfisher Wind project in Oklahoma.

First Reserve, the largest global private equity and infrastructure investment firm exclusively focused on energy, has agreed to acquire the construction-ready 298-MW Kingfisher Wind power generation project from Apex Clean Energy. When complete, Kingfisher is expected to be one of the two largest single-phase wind projects in Oklahoma.

Apex developed the Kingfisher Wind project, will manage construction, and will serve as asset manager during facility operation. Previously, Vestas supplied 49 V100-2.0 MW turbines to Apex for the Hoopston Wind project in Illinois, which was subsequently acquired by IKEA.

The Kingfisher Wind project enjoys a strong, consistent wind resource. The project is scheduled to be completed in 2015.

The project's wind turbine order comprises



supply and commissioning as well as a 10-year Active Output Management (AOM 5000) service agreement.

AOM 5000 includes an energy-based availability guarantee ensuring that turbines are operational when the wind is blowing.

"We are excited to secure our first agreement with First Reserve for the Kingfisher project," said Chris Brown, president of Vestas' sales and service division in the United States and Canada. "Driven by high reliability and steadily

decreasing cost of energy, wind offers an attractive investment opportunity. The participation by a diversified energy investor such as First Reserve is a sign that our industry is mature and evolving."

Mark Florian, Managing Director and Head of Infrastructure Funds for First Reserve, commented "First Reserve is pleased to be making one of the initial investments in its second energy infrastructure fund. Kingfisher Wind represents the opportunity to diversify the

portfolio of our energy infrastructure program with experienced and reliable counterparties such as Vestas."

"This transaction highlights Apex's broad capabilities to deliver turn-key clean energy solutions for our financial partners," said Mark Goodwin, Apex Clean Energy President. "Apex is excited to continue its involvement in managing all aspects of Kingfisher Wind, from development through asset management."

— Source: Vestas



## PATTERN CHOOSES SIEMENS FOR 200 MW PROJECT IN TEXAS

Siemens recently secured order from Pattern Energy Group to supply and install 87 wind turbines for the Logan's Gap Wind project in Texas. The 200 MW project, located in Comanche County, will create enough clean energy to power 50,000 homes in Texas annually. The SWT-2.3-108 wind turbines to be supplied have a power rating of 2.3 MW. Installation of the wind turbines at the Logan's Gap project

is scheduled to begin this year, with the start of operations expected for autumn. A service and maintenance agreement was also signed to help ensure the turbines operate at optimal levels.

Logan's Gap, located near the Dallas-Fort Worth area, is the fourth wind project in Texas owned by Pattern Energy Group. The energy provided by these turbines is part of more than 1,200 turbines which Siemens has already installed in

this state. Logan's Gap represents the 12th project between Siemens and Pattern Development in the U.S., Canada, Puerto Rico and South America. The nacelles for the project will be assembled at Siemens facility in Hutchinson, Kansas. The blades, with a length of 53 meters will be manufactured at the Siemens blade facility in Fort Madison, Iowa.

"We are proud that Siemens is partnering with

Pattern Development on this project, continuing our success with wind power projects across the Americas," said Markus Tacke, CEO of Siemens Wind Power and Renewables Division. "Pattern Development is an important and trusted customer with a proven ability to deliver clean, renewable energy, and we greatly value our continued partnership with them."

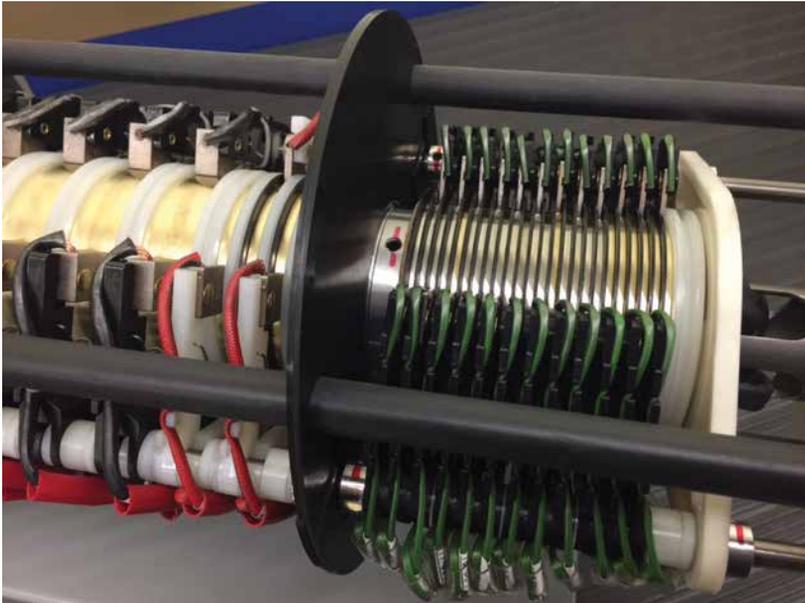
— Source: Siemens

# SLIP RINGS: SMALL COMPONENTS WITH A BIG IMPACT

*Initial product selection affects long-term costs*

By: Kyle Riegel

United Equipment Accessories



When engineering a new wind turbine, it's a design process that relies on thousands of different components working seamlessly together. While the focus may get drawn toward bigger components like motors and blades, it's the small components that can make or break a system.

Take for example the slip ring assembly — known also as an electric rotary union — for pitch control systems. In the big picture of a turbine, it's a small component. But its importance is all but miniscule. If your slip ring shuts down, your turbine shuts down.

So even though in the scheme of things a slip ring seems small, it's a big deal. It's important to choose a slip ring that's custom designed for your turbine and built to last.

When looking at the effectiveness of a wind turbine slip ring, we take into consideration a variety of factors, including maintenance frequency, maintenance downtime, and power transfer.

## MAINTENANCE

More maintenance means more time and more money. If you have to replace slip ring brushes every 50 million revolutions, you'll be stuck in a never-ending loop of slip ring maintenance.

However, the latest innovations allow for slip ring assemblies to go up to 200 million revolutions before brush replacement. UEA uses highly engineered copper graphite and silver graphite materials specifically designed for the rotational speeds, power usage and duty cycles for a turbine pitch control system to ensure maximum life potential. Can you imagine only having to replace your brushes every 10 years? That's a huge savings in parts and labor.

## DOWNTIME

UEA's slip ring design allows for only a single brush to be replaced—not the entire assembly. Other designs require entire sets of brushes to be replaced at one time. This can lead to an inefficient use of time spent replacing working brushes and material costs. Brush

replacement on UEA slip rings takes about five minutes per brush, which gets turbines back up and running faster.

When your downtime is reduced, your productivity and profit increase.

## EFFICIENCY

Slip rings have a reputation for power loss and limited capacity. That mindset is an outdated one. Today's slip rings can transfer higher wattage with decreasing power loss. For example, UEA slip rings have handled over 55 kW for pitch control motor use with circuits rated up to 100 amps and 690 VAC — all with a power factor (efficiency) of more than 99.5 percent.

Wattage transfer capacity and power loss are affected by a lot of factors, which is why custom designed slip rings are recommended for wind turbine applications to ensure proper capacity and function.

All things considered, relatively small slip rings are a big deal.

The same concept can be applied across the board to other components that are small in size but have big importance. While some parts often cost less up front, but lead to more expense in the long run — more maintenance, more downtime, more hassle, which add up to more money.

## Eickhoff Corporation

*What began as a German mining foundry 150 years ago has expanded its reach to North America as a supplier of wind turbine gearboxes. Here, we'll see how Eickhoff serves its customers in the wind power industry in the U.S. and Canada while remaining a medium-sized family-owned business.*

By Anna Claire Conrad

Take more than 150 years of history, throw in a wide demographic reach spanning 10 countries on five continents, add a medium-sized family-owned company, and what do you get?

It's hard to believe a company like that exists today—where they're able to combine big-company assets with the customer service appeal of a family business—but there is one that encompasses all of these characteristics.

Eickhoff Corporation is that company, and it has established a name for itself among its top competitors.

"Eickhoff Group is still considered a small company," said Steve Koscelnik, Eickhoff sales manager of gearbox services for North America. "Although competing companies have a wide breadth of product avenues to pursue, and despite their budgetary allowances to enter markets, Eickhoff is extremely innovative and very competitive within the wind market."

Eickhoff's history began in 1864 when Johann Heinrich Carl Eickhoff founded the company as a small foundry in Bochum, Germany. It was built to supply the mining industry with wheels for mining trolleys.

However, in 1990—a long way from its roots in the mining industry—Eickhoff, like many industries at the time, set its eyes on the skies and started to manufacture gearboxes specifically engineered for wind turbines.

Almost 20 years later, early in 2009, Eickhoff began producing a large



series of gear components while also assembling gearboxes for wind turbine gearboxes at the Eickhoff Wind Power GmbH facility, which, at the time, was a new, modern machining plant near Dresden, Germany.

Today, the German parent company has subsidiaries all over the world, stretching from South Africa and Australia to Pittsburgh, Pennsylvania, where Koscelnik's facility is located.

"We are one of the many service centers for Eickhoff Group, and we, Eickhoff Corporation, represent them here in the United States," Koscelnik said. "We handle the services, repairs, and field work for the Americas."

Since they are operating out of a 35,000-square-foot facility at the Pittsburgh location with seven technicians in the field and at the facility

along with eight administrative staff members, Koscelnik said they don't have much room for keeping projects in house, but that's not slowing them down.

"Our services and projects completed in the facility quickly have to either move to our storage location or go directly to our customers," Koscelnik said.

According to Koscelnik, Eickhoff Corporation primarily serves the wind power industry in Canada and the U.S. with very little of its operations reaching South America. Full engineering support is provided by Eickhoff in Bochum, Germany, which has been supplying wind turbine gearboxes to this industry for approximately 20 years.

"We perform full gearbox repairs and rebuilds at our Pittsburgh facilities, encompassing the inspection of the damaged gearbox, issuing of new and repairable parts, and commissioning a fully reassembled and load-tested gearbox within the parameters of our customer's orders," Koscelnik said. "Our staff also splits their time between our facility and the services they provide in the field. From exchanging shafts and bearings to performing visual and vibration inspections, Eickhoff technicians are well-versed in performing the tasks needed to solve gearbox issues uptower."

According to Koscelnik, once a gearbox reaches the Pittsburgh facility, it will be completely disassembled. All of the components and gear stages of the gearbox will be inspected and measurements will be taken. From there, the gearbox will be completely cleaned, refurbished, and reassembled. Once the reassembled gearbox has passed a series of tests—including a no-load, full-speed on-site function test with full load testing up to 3 MW available at a contractor's test stand—the unit is ready to be returned to the customers. This repair process has been approved by GE.

While the Eickhoff Corporation



has the capabilities and reach of a larger company, it also provides the customer service many companies seek out in the wind power industry.

"Eickhoff's quality is second to none," Koscelnik said. "The size of our company allows for more flexibility in answering and responding to customer inquiries in a more timely manner, whether it's their need to having a gearbox inspected in the field, or a more lengthy process of finding a root-cause analysis of a gearbox failure. I think that because we don't have as many departments or doors for a project to go through, our response time and flexibility is what a customer is looking for, especially in an industry of rapid change and technological advances that are happening on a daily basis.

"If a customer has a need, we always try to respond quickly so their daily operations don't suffer. As a service hub for Eickhoff gearboxes, we will do everything in our power to relieve them of their issues and concerns."

Koscelnik also said that while Eickhoff may not be the first name to come to people's minds when looking for wind turbine gearbox repair or reconstruction, it should be.

"We offer as much as any of our competitors," Koscelnik said. "We can perform any uptower, gear-

box inspection—whether it's with a visual boroscope inspection or vibration monitoring. Eickhoff has experienced technicians can not only perform the inspections, but they also have the knowledge needed to focus on a gearbox concern and evaluate what is occurring within a customer's product."

"From that point, we can change out and work on a number of the areas of a gearbox, including the high-speed shaft, bearings, intermediate-stage gears, cable tube exchanges, etc.. Also, replacements of external parts can be done by either the site or us. That includes oil coolers, oil pumps, external motors and drive."

According to Koscelnik, Eickhoff Corporation is looking for new and improved ways to keep gearboxes in the sky while completing repairs and installations.

"With our primary customers, we're trying to improve product life and perform as much uptower work as possible," Koscelnik said. "We're trying to come out with new technologies and capacities of performing more repairs uptower. We're trying to alleviate the need to bring gearboxes down-tower. Coming up with such solutions—that is definitely one of Eickhoff's focuses right now." ♪

## Brian Winter

Encoder Product Manager  
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### Could you tell our readers about Nidec Avtron's encoders for the wind energy industry?

Nidec Avtron manufactures a full line of encoders, including incremental and magnetic encoders, incremental and absolute. Our encoders are used on several applications in wind turbines, including the slip ring, blade pitch, and generator controls.

### What are some important trends regarding encoders for the wind industry?

The biggest trend we see in the wind market is the end-user push for higher reliability and uptime. OEMs struggle with the cost balance between long-term reliability and the need to keep equipment costs down. End-users don't have that balance: they own the equipment, they want it to last forever, and they want zero downtime. So end-users are retrofitting OEM equipment, solving longer-term reliability problems. And end-users are becoming more forceful with the wind turbine

manufacturers, pushing higher-reliability components to solve pain points.

Another big trend is diagnostics. Formerly, 99 percent of all the encoders sold in the wind industry used to be "black boxes" — you couldn't tell if they were working. This led to a lot of unnecessary part swapping. Is it the encoder failing? The coupling? The wiring? The drive or PLC input card? No one could tell. So Nidec Avtron has added diagnostics and a few competitors have tried to follow. Predictive diagnostics are key knowing that the device is working well, or if it is drifting toward a bad condition. With this knowledge, you save a huge amount of in-tower time. You don't replace working encoders, and you can replace units that could fail, before they actually fail. You get to replace things on scheduled maintenance time, not by the encoder failing and causing downtime on your turbines.

You also want your diagnostics simply — a relay contact and visible LED output so the technician can tell at a glance if the encoder is working well or needs replacement. Some people tried sophisticated diagnostics where you had to hook up a laptop, communicate with the encoder — it's just not practical. Climb a 70 meter-tower, climb out on top, go forward down into the front nose assembly, and then you realize, hey, this isn't a place where I want to try to lug a laptop and some specialized cable. I just want to know if the encoder is good now, or is it threatening to fail? An LED does

that, and a remote contact does that from the ground before you climb the tower.

### How long has Nidec Avtron been serving the wind energy industry?

We've been selling to the wind energy market for over ten years. We sell globally, to OEMs and end users in Asia, Europe, and North America. We only sell components into the wind turbines themselves — we don't supply anything for the ground-based equipment/converters.

### Please talk briefly about the support and service that Nidec Avtron offers its customers and end users.

Service and support are critical because wind turbines run 24/7/365. So our free technical support is available 24/7/365. The caller talks to real engineers, not a telephone call center. We back all Avtron encoders with long no-hassle warranties because we know they can withstand the wind turbine conditions. We have field service engineers that can fly to your location, diagnose problems and help with long-term solutions. They know encoders.

### What is it that is unique about Nidec Avtron and its encoders that stands out to customers.

Nidec Avtron has over 40 years experience designing encoders for heavy-duty markets. Many encoder OEMs showed up to the wind business with their machine-tool grade encoders and assumed all would work out fine, but it didn't. Machine tool encoders get good treatment — they don't have heavy vibration, they

don't see constant temperature swings, they don't have magnetic fields and brakes. Literally, some competitors have a specification on how many millimeters of dust are allowed on the housing, and how clean the environment has to be when you wire them! Nidec Avtron had experience in steel mills, paper mills, marine cranes, oil drilling and more, all of which taught us how to build ultra-rugged encoders that you can hit, you can stand on, you can expose to temperature, rain and all kinds of conditions.

As I mentioned before, we back those ultra-rugged encoders with 24 hour support worldwide. Some encoder vendors are only open 4 days a week, and no other vendor offers 24-hour support.

Nidec Avtron can also assist onsite. We can perform an assessment of the encoders at a site (or an OEM), and advise you on solving present problems, avoiding future problems, ensuring spare parts, etc. Encoders are electro-mechanical devices, so we try to understand the full application electrically and mechanically before we advise customers. Our field engineers have decades of experience with encoders so they can give specific advice.

Nidec Avtron has designed our encoders to replace other brands. So you can remove a light-duty model, and drop our unit right into the machine with no mechanical modifications.

We also have the ability build an encoder, 24 hours a day. We can call in a work crew and build your encoder any day, any time. So if your turbine is down, and you just used your last spare on another repair, we can get an encoder built, get it shipped via air, and get you back up and running. We've even had customers fly or drive to our factory in the middle of the night and pick up encoders to get back running again!

**Please talk about the importance of encoders withstanding the often-harsh conditions of wind industry applications**

Encoders are the forgotten device. When they work, no one knows what an encoder is, where it is in the tower, or what it does. But encoders are 100 percent required for operation of the turbine. If your encoders don't work 24/7/365, your blades won't pitch, your generator won't sync with the line, and you are losing valuable generation hours.

In particular, frequent temperature cycling and magnetic fields cause a lot of competitive encoders to fail. Parts can easily get dropped inside the turbine or nose cone area, giving high shocks. We've specifically designed our units to withstand these conditions. ↘

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Kristen Graf (WoWE Staff)



Spring 2014 WoWE Board Meeting

(Back Row L-R): Trudy Forsyth, Karen Conover,  
Jan Blomstrann, Michelle Montague, Jennifer Martin,  
and Julia Dalger (Front Row L-R): Kristen Graf,  
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# MAINTENANCE

Operations • Service & Repair • Inspection • Safety • Equipment • Condition Monitoring • Lubrication

## GCUBE TARGETS TURBINE GEARBOX FAILURES IN REPORT

O&M segment of wind energy expected to reach \$19 billion by 2020



Specialist renewable energy underwriter GCube Underwriting Limited has published an in-depth report, entitled *Grinding Gearboxes*, analyzing gearbox failure by addressing root cause, financial impact and proactive steps to mitigate the frequency and severity of downtime.

As the central component of the drive system, the gearbox has always been a critical interface and constitutes 13 percent of the overall value of the typical on-shore wind turbine. Nonetheless, the current financial climate has led several major gearbox manufacturers to reconsider the manufacturing process from first principles, from forging to final inspection.

This rethink has contributed to market pressures that have seen some companies face insolvency, which, in turn, has presented a major issue for operators seeking repairs and component replacements following the end of the warranty period.

With approximately 175,000 geared turbines in operation in 86 countries worldwide, there are around 1,200 incidents of gearbox failure reported each year — one failure per 145 turbines per year — commonly ranging between \$200,000 and \$300,000 in insurance claims, in

some unique cases exceeding \$500,000.

It is therefore crucial that asset managers take proactive, preventative steps to ensure that this financial and operational risk is managed appropriately.

Following on from *Breaking Blades*, the *Grinding Gearboxes* report forms part of a series entitled *Global Trends in Wind Turbine Downtime Events*. It seeks not only to quantify the inherent risk and financial impact of gearbox failure, but also to promote knowledge sharing among GCube insureds and supporting insurance brokers with a view to minimising that impact.

The report utilizes GCube's extensive claims database to categorise all known root causes of gearbox failure, ranging from manufacturing defect and cracking of bearing coatings to abnormal blade loads and ineffective lubrication.

It then draws on the expert insight of leading gearbox manufacturer ZF,

specialist consultancy Romax, and wind energy claims specialists Renewable Energy Loss Adjusters (RELA) in three in-depth interviews that explore best practice for gearbox maintenance, analysis and repair.

*Grinding Gearboxes* demonstrates the challenges gearbox failures pose for wind farm operators around the world and promotes industry collaboration to minimise balance sheet losses across the board.

"While GCube recognizes that gearbox incidents are, in some ways, unavoidable and will continue to occur, we must empower our insureds to use our data to raise greater awareness among their asset managers and project teams about the wider macro trends affecting their peer group," said Jatin Sharma, GCube's Head of Business Development and co-author of the report.

"Such trends identify risk, as well as opportunities, which complement the experiences of asset managers and their operating fleet, particularly in newer, more remote geographic markets such as Chile and South Africa or as ageing assets enter the post-warranty phase of their lifecycle in Europe, the United States and Australia."

— Source: GCube Insurance Services

## WASHINGTON UTILITY EXTENDS 429 MW SERVICE CONTRACT WITH VESTAS



Vestas has signed a 10-year extension agreement to service the Whiskey Ridge, Wild Horse and Hopkins Ridge wind projects. Located in central Washington, these facilities feature 214 V80-1.8 and 22 V80-2.0 MW turbines. Since their inception, Vestas has serviced all three sites, which later were incorporated into a Master Service Agreement. The new agreement extends Vestas' commitment to the projects through 2025.

A Washington state utility, Puget Sound Energy is the second-largest utility owner of wind power in the U.S., and the Pacific Northwest's largest utility producer of renewable energy.

Embodying Vestas' more flexible approach to service solutions, the extended service agreement, which covers all three sites, includes a

time-based availability guarantee that supports optimal turbine utilisation and productivity. This comprehensive service package includes scheduled preventive maintenance, diagnostic services and unscheduled maintenance, and full component coverage for maximum performance.

"PSE is excited to continue our excellent partnership with Vestas," said John Mannetti, PSE's Director of Wind Resources and Asset Management. "They've serviced these sites from the beginning of our wind program, and we're glad they'll be continuing to work with us as our assets progress through their lifecycle."

"Extending this service contract speaks to the strong partnership between Vestas and Puget Sound Energy. Since 2005, we have provided world-class service for their fleet of Vestas wind turbines," said Chris Brown, president of Vestas' sales and service division in the United States and Canada. "We are proud that Puget Sound Energy continues to trust our dedicated service team to deliver a portfolio management strategy that ensures the greatest long-term optimisation and return on investment for their assets."

— Source: Vestas

## EDF RENEWABLE SERVICES EXTENDS KANSAS O&M CONTRACT

EDF Renewable Services, a provider of renewable O&M Services, has announced that Kansas City Power & Light Company (KCP&L) has extended an operations and maintenance agreement for the Spearville Wind Project (100.5 MW) and Spearville II Wind Project (48 MW) located in Kansas totaling 148.5 megawatts (MW) of General Electric (GE) turbines.

"EDF Renewable Services signed its first O&M agreement with KCP&L back in September 2006. We appreciate that they have trusted us to provide O&M services for the past 9 years. KCP&L is a valued customer that is committed to providing affordable clean wind energy to its ratepayers," said Larry Barr, Executive Vice President of EDF Renewable Services. "The turbines at Spearville are part of the GE fleet we manage encompassing more than 3,000 turbines for 4,800 MW."

Under terms of the Agreement, remote services will be performed by the company's NERC registered Operations Control Center (OCC). The OCC provides an efficient, reliable, and secure operating platform, while benefiting



from the centralization of SCADA functions and consolidation of multiple vendor environments to provide a common operating view. With enhanced service offerings with strategic partnerships, EDF RS brings auxiliary engineering and SCADA solutions to its customers.

— Source: EDF Renewable Services

## PARTICIPANTS SET FOR 2016 COLLEGIATE WIND COMPETITION

*Twelve colleges chosen to compete in challenge at WINDPOWER 2016*



The Energy Department has announced the twelve collegiate teams that have been selected to participate in the Department's second Collegiate Wind Competition. The Collegiate Wind Competition challenges teams of undergraduate students to design and build a model wind turbine based on market research and siting considerations, develop a business plan to market their products, and test their turbines against a set of rigorous performance criteria. Bringing together the next generation of wind energy pioneers with today's industry leaders, the 2016 Collegiate Wind Competition will take place at the annual American Wind Energy Association (AWEA) WINDPOWER Conference and Exhibition in New Orleans, Louisiana, from May 23 to 26, 2016.

The Collegiate Wind Competition combines the expertise of students from a variety of engineering, business, communications, and social science programs, and challenges them to utilize their individual skills to develop state-of-the-art wind energy solutions as a team. Intertwining academic coursework with tangible, hands-on learning, the Collegiate Wind Competition provides valuable real-world experience as students prepare to enter the workforce.

Five new schools have been selected along with seven returning teams from the 2014 competition. The twelve colleges and universities that have been selected to participate in the 2016 Collegiate Wind Competition are:

1. Boise State University (Idaho)
2. The California Maritime Academy
3. California State University, Chico
4. Kansas State University
5. Northern Arizona University
6. The Pennsylvania State University
7. Universidad del Turabo (Puerto Rico)
8. University of Alaska Fairbanks
9. University of Maryland
10. University of Massachusetts Amherst
11. University of Massachusetts Lowell
12. University of Wisconsin Madison

Hailing from across the United States, from Alaska to Puerto Rico, each team brings diverse experiences and unique perspectives to the competition. The Energy Department held the inaugural Collegiate Wind Competition in 2014 at the AWEA WINDPOWER Conference and Exhibition in Las Vegas, Nevada, where over 150 students from ten institutions helped lay the groundwork for what has become the country's prominent undergraduate-level wind energy competition.

— Source: U.S. Department of Energy

## **DUKE ENERGY RENEWABLE SERVICES DESIGNATED A TOP QUALITY O&M PROVIDER**

Duke Energy Renewable Services is a top quality operations and maintenance (O&M) provider highly capable of performing all O&M service activities for wind and solar energy clients, according to the largest independent technical advisor on renewable energy in the world.

DNV GL recently completed an independent assessment of Duke Energy Renewable Services, covering 10 key areas ranging from availability and production performance to company financial resources.

The DNV GL technical advisor visited wind sites and offices, conducted customer interviews, interviewed Duke Energy staff and technicians and evaluated operations data. In each case, the company scored in the high capability range.

“We are always excited to find ways to improve our service offerings,” said Jeff Wehner, vice president of Duke Energy Renewable Services. “This assessment helped us do just that, and it also confirmed that Duke Energy Renewable Services is a top-tier service provider in the wind industry.”

“It is our hope that asset owners, lenders and other vested parties have access to comprehensive information about O&M service providers and self-operators to support business decisions as industry best practices continue to evolve,” said Kevin Smith, head of Asset Management and Operating Services for DNV GL.

Duke Energy Renewable Services, an organization originating from Duke Energy’s 2012 acquisition of Minnesota-based Outland Energy Services, has experience operating nearly 4 GW of wind assets.

— Source: *Duke Energy  
Renewable Services*

## **SHERMCO ANNOUNCES PROMOTIONS OF THREE STAFF MEMBERS**

Shermco recently announced three executive promotions.

Former vice president of Production for the Engineering Services Division Pat Beisert was promoted to president of Shermco U.S. Beisert will be responsible for all operations in U.S. including production, sales and support staff. Beisert has 28 years in the electrical maintenance industry, and has been with Shermco since 2001.

“Shermco has more than doubled in size in the past year. With our continued growth through business development and acquisition, a reorganization was in order to accommodate expanding needs of our company and client base. Pat has been with the company many years and knows every aspect of our industry. Couple that with his business acumen, he was the natural pick to run our U.S. operations,” said Ron Widup, Shermco CEO.

Additionally, Paul Idziak has been promoted to vice president of the Machine Services Division. Formerly the group’s general manager, Idziak is responsible for overseeing the company’s Machine Services Division, which provides clients with superior electric motor and generator repair, rotating machinery field services, new equipment distribution, and engineering consultative services.

With a strong knowledge of both electrical systems and management skills, Idziak is responsible for more than 150 employees and over \$40 million in revenue. He has experience in all aspects of sales, operations, finance, accounting, quality control, and Lean/5S. He continues to grow as an influential person in renewable energy, oil and gas, defense, and electric utilities market segments in the area of electrical machinery and system maintenance. Idziak holds a BS in Industrial Distribution from Texas A&M and an MBA from the Cox School of Business at SMU.

Idziak started with Shermco as an account manager in 2009 and has been promoted five times in the past six years.

“Paul has already proven his ability to lead our Machine Services Division. We are proud to promote him to vice president in recognition of his success in this important and growing area of our business,” Widup said.

Rounding out the roster of promotions, Shermco corporate sales manager Mike Hancock will head up the national sales team for the company through his promotion to vice president of Sales for Shermco U.S.

In his new role, Hancock will lead Shermco’s professional sales force of account managers and sales engineers with emphasis on providing world-class electrical service offerings. The sales team in total consists of more than 80 sales professionals that serve the U.S. from multiple service centers located throughout the central states. Hancock has more than 22 years of experience in commercial and industrial electrical maintenance and repair. He joined Shermco in 2010.

Hancock’s professional affiliations include: Member of IEEE, NFPA99 Voting member on the Correlating Committee, Registered Professional Engineer for the State of Texas since June 2003, NETA IV Certified Technician.

“Mike Hancock has done a fine job in developing new opportunities and markets for Shermco, and I’m happy to promote him to Vice President of Sales,” Widup said.

— Source: *Shermco*

# CONSTRUCTION

BOP/EPC • Project Status • Siting • Equipment • Project Due Diligence • Services

## MIDAMERICAN'S WIND IX PROJECT IN IOWA GAINS STATE APPROVAL



Photo by Liz Zabel / Iowa Energy Center

The Iowa Utilities Board recently issued an Order on Rehearing approving MidAmerican Energy Company's proposed Wind IX Iowa electric generation project of up to 162 MW.

The board has long been supportive of renewable energy as part of Iowa's generation mix. As the Board notes in the order, wind projects have many benefits and the Board appreciates the economic benefits wind development brings to the state, but they also have some risks. While the Board has and will continue to encourage such projects, the projects must provide benefits to customers that are commensurate with the risk that customers will be bearing.

The Board's order affirms its January 20 decision approving a

settlement with modifications for advance ratemaking principles. That order included an annual \$2 million energy adjustment clause (EAC) credit to MidAmerican electric customers as an advance ratemaking principle tied to construction of the proposed project. The Board noted, "Without such a principle, the risks and rewards of Wind IX are skewed too much towards MidAmerican for the Settlement Agreement to be reasonable and in the public interest."

On January 22, MidAmerican Energy filed a petition for limited reconsideration asking that the Board not require MidAmerican to pay the annual \$2 million credit to its electric customers. The board stated in today's order that it "views the settlement agreement as a whole, and determined that this settlement

agreement was not reasonable or in the public interest without the modifications contained in the final order, including the EAC credit."

In its January 20 Decision Order, the Board included a settlement modification providing that once 50 MW of the proposed wind project is in operation, an additional \$2 million in annual benefits would flow to MidAmerican's electric customers until the next MidAmerican rate case proceeding is decided by the Board.

MidAmerican will have 30 days from the date of today's decision order to notify the Board whether it accepts the ratemaking principles awarded. If accepted, the ratemaking principles would be effective for the regulated life of the facilities. ✎

— Source: Iowa Utilities Board

## CRANE TRAINING PROGRAM TARGETS RIGGING FUNDAMENTALS



As part of its effort to educate crane industry professionals, Konecranes offers a rigging fundamentals course through its New Berlin, Wisconsin-based Konecranes Training Institute. The program, which seeks to reduce crane injuries, is a key element in the portfolio of equipment and expertise with which Konecranes supports its customers.

“Many crane accidents are caused by poor or improper rigging practices,” said Jim Lang, general manager of the

Konecranes Training Institute. “One of the key items we learned from our Crane Accident study covering 10 years’ worth of overhead crane accidents was that 59 percent of the time when a load dropped this was due to a rigging issue. This very common deficiency is what we address in our Rigging Fundamentals course.”

Details revealed by the study are available in a short video produced by Konecranes Training Institute and available on YouTube by searching for the “LiftingBusinesses” channel. It’s estimated that up to 70 percent of the overhead crane accidents may have been prevented through proper training.

According to Lang, the Rigging Fundamentals course from the Konecranes Training Institute teaches workers how to safely rig loads for different lifting conditions. For example, a 5,000-pound load rigged for a low headroom lift close to the ceiling could potentially require chains rated at 25,000 pounds or greater rather than 5,000 pounds depending on the angle between the hook and the load. Acute angles may multiply lifting stresses by more than five times the actual weight of the load. ↵

— Source: Konecranes

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- Together these 109 turbines generate approximately 200 megawatts which will power 59,000 homes.
- Oklahoma is a Right-To-Work state and is a profitable place to manufacture wind turbines and components

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# STANDARDS & CERTIFICATION

*Regulatory issues • Turbine type certification • Safety standards • Wind farm certification*

## IRS ISSUES CERTIFICATION RULE FOR SMALL TURBINES

*Models up to 100 kW must be certified to qualify for tax credit*



The U.S. Internal Revenue Service in January issued Notice 2015-4 providing new performance and quality standards that require certification of small wind turbines — defined as having a nameplate capacity of up to 100 kW — in order to qualify for the 30 percent federal Investment Tax Credit (ITC).

“Distributed wind power for homes, farms, and small business

is generating clean, affordable and homegrown electricity across all 50 states and as the market grows, it’s of critical importance to ensure high quality products make it to market” said Jennifer Jenkins, Executive Director of the Distributed Wind Energy Association. “These certification requirements provide performance and quality assurance for consumers, government

agencies and the industry, and help to ensure the successful implementation of distributed wind projects domestically.”

“The new certification requirement addresses the small, but persistent segment at the fringe of the industry that make wild assertions on efficiency, performance, and their special ability to work on buildings or very short towers.

Now, in order to qualify for the federal tax credits, they will have to prove these claims to third-party experts. That will be very challenging or impossible for unproven designs with exaggerated performance, but will not pose a major barrier for the industry leaders”, added Jenkins.

Effective for small wind turbines acquired or placed in service after January 26, 2015, the guidance requires that qualifying small wind manufacturers provide certification to either: (1) American Wind Energy Association Small Wind Turbine Performance and Safety Standard 9.1-2009 (AWEA); or (2) International Electrotechnical Commission 61400-1, 61400-12, and 61400-11 (IEC). The certification must be issued by an

eligible certifier, which is defined as a third party, that is accredited by the American Association for Laboratory Accreditation or other similar accreditation body. Documentation establishing that the turbine meets the new requirements must be provided to taxpayers in order to claim the credit.

“As an industry, we have been working for many years to strengthen the credibility and reliability of our products,” Jenkins continued. “I’m proud to note that our membership has been leading the way on this front, actively pursuing certification since 2010 and poised to comply with these new standards.” ↴

— Source: *Distributed Wind Energy Association*



## ACCIONA RECEIVES GL2010 TYPE CERTIFICATION FOR 3 MW MODEL

To comply with the highest quality and safety standards, Acciona Windpower has chosen DNV GL to upgrade certification of its 3 MW wind turbine model AW116/3000 from DNV GL’s “Guideline for the Certification of Wind Turbines” edition 2003 to edition 2010 (GL2010). This guideline is based on the latest knowledge about turbine design requirements. The award of a DNV GL type certificate under the GL2010 guideline demonstrates Acciona’s constant commitment to high quality products.

“Certified technologies according to our GL2010 guideline will provide a competitive advantage to Acciona and will strengthen its position in projects where high technical standards are required,” Kim Mørk, Executive Vice President for Renewables Certification at DNV GL explains. The Type Certificate confirms that the wind turbine complies with latest requirements regarding design assessment, imple-

mentation of the design requirements in production and erection, evaluation of quality management and prototype testing.

“Having this updated certification to the latest version of DNV GL’s guideline demonstrates Acciona Windpower’s commitment to be at the forefront of product design and certification which is valued by our customers in the marketplace,” says Scott Baron, Global Product Line Director of Acciona Windpower.

To date, Acciona Windpower has received firm orders to supply over 2,000 MW of AW3000 wind turbines to wind farms in the USA, Canada, Brazil, Mexico, Spain, Poland, Chile and South Africa. The 3 MW wind turbines have four rotor diameter configurations – 100, 116, 125, and 132 meters – with tower height ranges from 84 to 137.5 meters. ↴

— Source: *Acciona*

# CENTERBRIDGE TAPS TÜV RHEINLAND TO ADVISE ON SENVION SALE



TÜV Rheinland provided American investor Centerbridge Partners LP important consultancy support and technical due diligence prior to its purchase of German wind-energy facilities manufacturer Senvion from the Indian Suzlon Group. TÜV Rheinland concluded the technical due diligence inspection within a period of one month.

TÜV Rheinland successfully carries out due diligence in many different industries on behalf of investors, banks and insurance companies in order to provide risk assessment from a technological viewpoint and secure transactions. Technical due diligence includes the evaluation of products, plans and future prospects in terms of technological aspects. Specific industry market and competitive situations are also considered. Furthermore, technical due diligence provided by TÜV Rheinland examines the effects of quality management, measures risk and reliability and evaluates production facilities at various locations.

Senvion SE is one of the leading international manufacturers of onshore and offshore wind turbines. All across the globe, the engineering company is developing, constructing and distributing wind turbines. The power ratings of our turbines range from 1.8 up to 6.15 MW with rotor diameters between 82 and 152 meters. Furthermore Senvion provides clients with

project-specific solutions in the areas of wind farm engineering, service and maintenance, transport and installation as well as foundation. With more than 3,400 employees worldwide Senvion can draw on the profound experience of having constructed and installed over 5,800 wind turbines.

A private investment company with offices in New York and London, Centerbridge Partners LP focuses on private equity and credit investments.

TÜV Rheinland offers a wide range of services for manufacturers, operators, investors and insurance companies in the wind energy industry. The company assists clients all over the world by providing expert assessments and measurements, performing risk and damage analysis, and certifying wind turbines and wind power projects. TÜV Rheinland is accredited by the Germany's National Accreditation Body (DAkkS) for the type and component certification of onshore and offshore wind turbines in compliance with national and international standards. ✎

— Source: TÜV Rheinland

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## NREL LAUNCHES CLEAN ENERGY INCUBATOR NETWORK

*Initiative to provide support for start-ups and technology development*

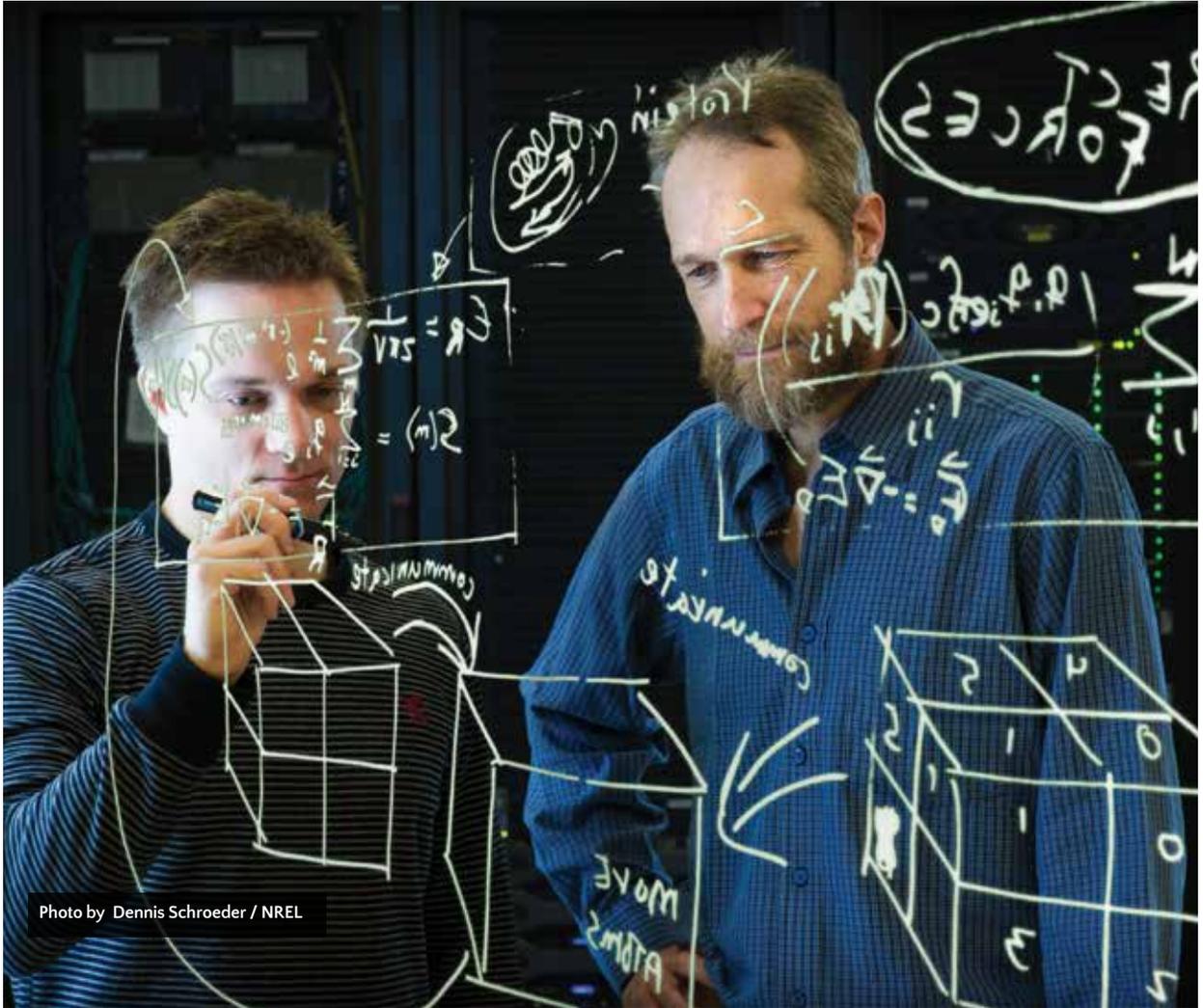


Photo by Dennis Schroeder / NREL

The Energy Department's National Renewable Energy Laboratory (NREL) and the Electric Power Research Institute (EPRI) have launched the Clean Energy Incubator Network. The program, funded by the Energy Department, aims to improve the performance of clean energy business incubators, connect critical industry and energy sector partners, and advance clean energy technologies emerging from universities and federal laboratories.

Through its newly launched website, <http://incubatenergy.org>, networking opportunities, and identifying industry

best practices, the network provides nationwide coordination that addresses the unique challenges facing energy start-ups.

"This website of resources and tools for incubators and entrepreneurs will serve as a focal point of the network," said Matt Ringer, NREL's project manager. "With our past experience building databases for a variety of related energy resources, NREL is well positioned to develop this type of resource for the clean tech industry."

Over time, the website will include funding, laboratory,

and event resources, in addition to an evaluation toolkit that will recommend resources specifically targeted to guide start-ups, based on their commercialization readiness level.

EPRI aims to serve as the convening force behind building greater success for innovation across the industry by sharing strategies and helping to facilitate connections between leaders in the clean energy incubator space.

“With the issues consistently seen when transferring clean energy technologies to the market, this type of incubation is particularly challenging,” said Beth Hartman, EPRI’s project manager for the new network. “To address these challenges, the network will help leading incubators in the clean energy industry learn from each other how to best find resources for supporting entrepreneurs. This support of entrepreneurs will also include connecting them with innovative partners from established industry leaders.”

Along with the NREL website, EPRI is working to help organize a variety of in-person and virtual events aimed at sharing best practices on both incubation techniques and clean energy technologies. The workshop convening at the ARPA-E Energy

Innovation Summit, Feb. 9-11, marks the first of events focused on convening the incubator and innovation community. Later this year, a national summit will bring together an entire marketplace: start-ups, incubators, clean energy investors, and industry participants.

The Clean Energy Incubator Network also plans to implement a SmartIncubation™ program, in which the network will publish the results of its clean tech start-up analysis every six months, identifying and recommending best practices and strategies.

“Start-ups in the energy industry, unlike other industries, typically require more capital, longer timelines, and intense networking to commercialize workable technologies,” Hartman said. “This community will provide a smart focus on early stage clean tech incubation to meet strategic needs in the energy industry. In the end, our collaboration will support new technologies in energy that add diversity to our energy mix, reduce pollutants and create a more flexible power system for our nation.” ↵

— Source: *National Renewable Energy Laboratory*

## ONLINE CROWDFUNDING PORTAL FUELS RENEWABLES INVESTMENT

*Site allows renewable energy projects to raise debt, equity and/or donations*

GridShare LLC recently announced the launch of its independent crowdfunding platform to help renewable energy projects and cleantech companies raise capital. GridShare is a unique online platform where renewable energy project developers and cleantech companies from around the world post their funding needs. Potential investors can peruse investment opportunities in a variety of renewable energy sectors, including: solar, wind, geothermal, biogas, and small hydropower. GridShare also intends to host funding opportunities for energy efficiency initiatives and early-stage clean technology ventures.

“Raising money has been a huge impediment to the growth of the capital-intensive renewable energy industry,” said Jack Jacobs, CEO and Co-Founder, GridShare. “Now, with GridShare’s help, a project developer or cleantech venture can tap into a new funding channel and, ultimately, spend less time fundraising and more time focusing on their core business.”

There are three different types of investment opportunities that a company may offer through GridShare: debt, equity, and donations. High net-worth individuals, or “accredited investors,” can browse projects online, read pertinent information about the venture, and then pledge funding in exchange for equity or interest. Non-accredited investors can donate funds to a project or company that offers this option. As soon as the JOBS Act crowdfunding rules are finalized, all users will be able to invest freely for equity online.

Posting a project on GridShare is free and easy. Once the GridShare team approves the project, it will be published online. Investors will then have the opportunity to review the project details, and pledge their financial support online. The offeror then contacts the investor to arrange payment and finalize investment terms.

“For too long, large banks have controlled which solar projects can be financed. Finally, project developers like Samba Energy can rely on GridShare to offer high quality solar investments to investors nationwide,” said Michael Hidary, Managing Partner, Samba Energy, a national provider of software and services for clean energy and commercial building energy efficiency. “Samba Energy can now complete more installations and private investors can gain strong, predictable returns from solar power projects.”

GridShare earns a commission from the offeror only if its funding goal is fully achieved. GridShare also offers optional services for users that prefer to sell securities through a registered broker/dealer, conduct legal transactions under the guidance of an experienced law firm, and/or develop their materials with the help of a marketing professional.

— Source: *GridShare LLC*

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## PERFECT TIMING



Courtesy of Josefina Wallace

When it comes to capturing a moment, timing is everything. That was certainly the case for Josefina Wallace, who took this photograph of a whale's fluke extending upward from the ocean.

She photographed the rare event — set on the background of a coastal wind farm — on January 18 while

on a Pacific Whale Foundation sunrise tour.

“I knew my husband would love it,” Josefina said, recalling her inspiration for the dramatic image. Josefina's husband Jack Wallace is Director of Wind Turbine Technical Services for Frontier Pro Services, and a veteran *Wind Systems* contributor. ↴



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