

WIND

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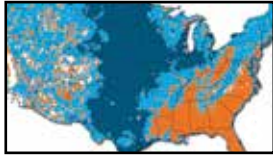
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When you were a kid, how often did you long to grow up? You were convinced things would get better when you reached a point where you could make your own decisions, drive yourself places, and have a place of your own.

Now that you *are* a grown-up, how often do you yearn for the past — the days when you didn't have to make any tough decisions, serve as a chauffer, or make a house payment every month.

Somewhere along the line, there was a monumental shift in your understanding of what it means to be “grown up.”

When we're young, we're told some things are only for grown-ups. We're told that we'll understand when we're older.

At other times, like when we're out for a family dinner at a nice restaurant, we're instructed to be on our best behavior and act like a grown-up. Our parents beam with pride at certain life events (grade school graduations, prom, etc.), commenting on how grown-up we look.

No wonder people get so confused and can't agree on a singular definition.

Still, at some point — most likely unconsciously — we made the decision of what it meant to be a grown up. Perhaps that's when we truly became grown-ups.

In the wind energy industry, we hear those words thrown around a lot — too often, really. It's a favorite tactic of our detractors, used they can't come up with a logical,

coherent argument against wind energy.

The wind energy industry needs to grow up! We've spoon-fed them for too long!

It's sometimes difficult to ignore this kind of senseless rhetoric — especially considering the hefty political and financial weight thrown it carries.

When the wind energy industry was in its infancy, it was easy for our opponents to dismiss wind as novel, fleeting, or even “cute.”

But as wind began to mature, their faces began to redden and their brows began to glisten with sweat. Cockiness gave way to concern. Simple dismissal gave way to baseless lies and schoolyard taunts.

But the person who shouts the loudest is not always the one who is right.

As an industry, let's not base decisions about our own identity on the childish tactics of those who consider themselves to be the real grown-ups. After all, we've all been through this before.

Thanks for reading,



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

Stephen Sisk, editor
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Contributors

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From our Archives

A SITE FOR ENERGY EDUCATION

Ecotech Institute launches a first of its kind campus devoted to renewable energy education, with a special emphasis on preparing students to enter the wind industry.



INNOVATIONS IN WIND ENERGY EDUCATION

Bismarck State College blazes new ground with unique online renewable energy program.



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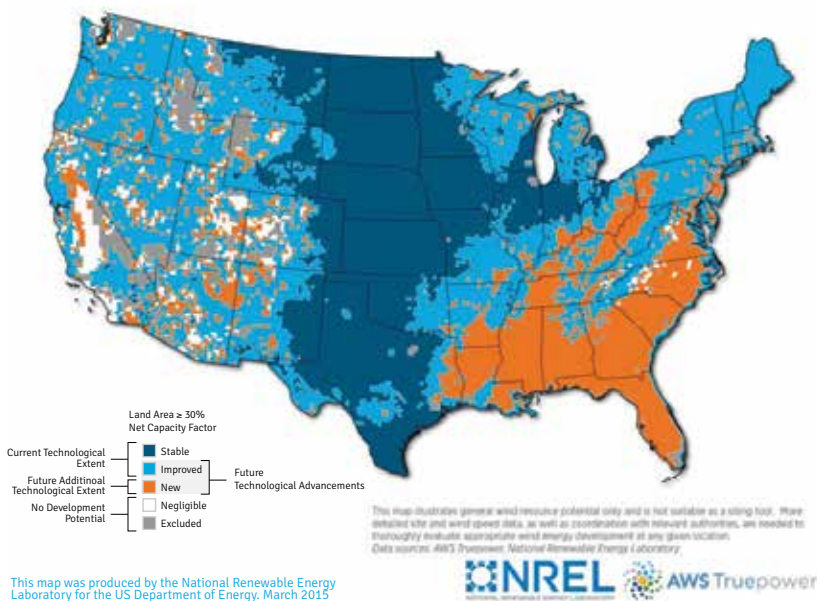
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DIRECTION

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DOE REPORT EYES WIND POTENTIAL THROUGHOUT U.S.

Advanced turbine technologies will unlock wind resources at untapped sites



This map was produced by the National Renewable Energy Laboratory for the US Department of Energy, March 2015

Energy Secretary Ernest Moniz recently announced the release of “Enabling Wind Power Nationwide,” a report showing how the United States can unlock the vast potential for wind energy deployment in all 50 states — made possible through the next generation of larger wind turbines. Announced at the AWEA WINDPOWER Conference in Orlando, the report builds upon the recently released “Wind Vision” report, which quantifies the economic, social, and environmental benefits of a robust wind energy future.

The new report highlights the potential for technical advancements to unlock wind resources in regions with limited wind deployment today, such as the Southeast. These new regions represent an additional 700,000 square miles — or

about one-fifth of the U.S. — bringing the total area of technical wind potential to 1.8 million square miles.

Technological advancements, such as taller wind turbine towers of 110 and 140 meters and larger rotors — currently under development by the Energy Department and its private sector partners — can more efficiently capture the stronger and more consistent wind resources typically found at greater heights above ground level, compared with the average 80-meter wind turbine towers installed in 39 states today.

“Wind generation has more than tripled in the United States in just six years, exceeding 4.5 percent of total generation, and we are focused on expanding its clean power potential to every state

in the country,” Moniz said. “By producing the next generation of larger and more efficient wind turbines, we can create thousands of new jobs and reduce greenhouse gas emissions, as we fully unlock wind power as a critical national resource.”

These advanced wind energy systems will generate more electricity per dollar invested and further drive down the cost of wind energy. The Energy Department supports research and development that has already helped the wind industry install nearly 66GW of wind power capacity — enough to power more than 17 million homes — and has helped decrease the cost of wind energy by more than 90 percent. Continuing this technology development is essential to expanding this clean energy source to every state across the nation. Increasing the amount of land suited to commercial wind development, wind power can also provide local economic development opportunities, including jobs for installers, engineers, and other support personnel, in new communities and whole regions with currently untapped resources.

For more information on the Energy Department’s Office of Energy Efficiency and Renewable Energy, or the Wind Program specifically, please visit www.energy.gov/eere. To learn more about the Wind Vision report released in March, visit the Energy Department’s Wind Vision Web page at www.energy.gov/windvision.

— Source: U.S. Department of Energy

COMPANIES UNITE IN PROTEST OF HOUSE ANTI-WIND BILL

Joint letter to Congress urges defeat of 'PTC Elimination Act'

A threat to the most important federal policy for continued wind energy development in America has led 85 companies to protest to the 21 members of Congress involved.

There are 20 co-sponsors of the "PTC Elimination Act" (H.R. 1901, known as the Marchant-Pompeo bill for its initial two sponsors). The 85 companies today sent each a letter saying that if passed, that bill would "take away an effective, business tax incentive that creates jobs, drives rural economic development and reduces energy costs for Americans across the country."

The legislation unfairly targets just one industry, the letter says, which has invested \$100 billion since 2008:

"[R]ecent PTC expirations have led to dramatic job losses and shuttered manufacturing facilities. These recent examples show that taking away the PTC and making retroactive tax policy changes would threaten an important economic opportunity for workers and their families in your states."

In 2014 alone, the U.S. wind energy industry added 23,000 jobs. But the year before, after the renewable energy Production Tax Credit was allowed to expire even briefly, installations of new wind farms fell 92 percent.

With stable policies, a U.S. Department of Energy report says American wind energy can quadruple by 2030 and supply the U.S. with 20 percent of its electricity. That will support 380,000 jobs; increase tax payments to communities to \$1.8 billion a year; and increase lease payments to farmers and ranchers to \$650 million a year.

The letter notes bipartisan support for continuing the renewable energy Production Tax Credit in Congress and from both Republican and Democratic presidents, as well as a strong majority of Americans.

For example, a March 2015 Gallup poll found 84 percent of American voters want the U.S. to put more emphasis or the same emphasis on producing domestic energy from wind. Two-thirds of Republicans and Independents wanted more emphasis.

— Source: AWEA

CANADA SURPASSES 10,000 MW WIND INSTALLATION MARK

Wind energy is top new generation source over five-year span

Canada has reached the 10,000 MW milestone of installed wind energy capacity through the K2 Wind Power Project in southwestern Ontario and now has enough power to accommodate more than 3 million homes annually.

The Canadian Wind Energy Association recently announced that Canada's wind energy industry has taken another significant leap forward. With the commissioning of the K2 Wind Power Project in southwestern Ontario in June, Canada has now become the seventh country in the world to surpass 10,000 MW of installed wind energy capacity.

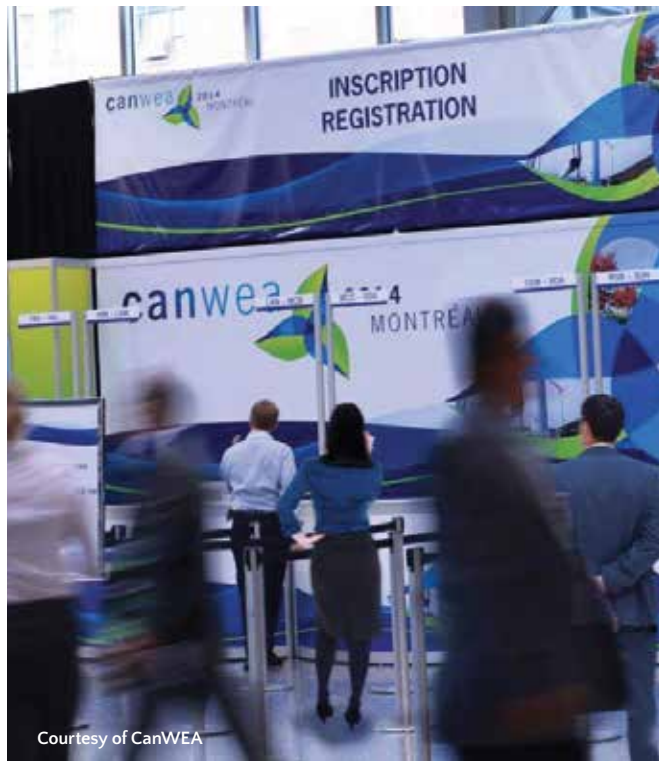
"Meeting the 10,000 MW milestone confirms that Canada is a global leader in wind energy development," said Robert Hornung, president of CanWEA. "Wind energy's cost competitiveness, coupled with the fact that it produces no greenhouse gas emissions, means it is well positioned to continue its rapid growth as a mainstream contributor to Canada's electricity supply."

Over the last five years, more wind energy capacity has been installed in Canada than any other form of electricity generation. The nation has seen three record years for the annual installation of new wind energy capacity, and Canada's wind energy capacity has grown by an average of 1,300 MW, or 24 percent, annually. Installations for 2015 are expected to exceed that average.

Wind turbines are now operating in every province in Canada, and in the Northwest Territories and Yukon, providing clean wind energy to over 100 communities and accounting for nearly 5 percent of domestic Canadian electricity demand. That's enough power to meet the needs of over 3 million average Canadian homes every year.

"Wind energy is meeting Canada's demand for new electricity in a clean, reliable and cost-competitive way," Hornung said. "As concerns about global climate change grow, wind energy will also need to play a critical role in Canada's transition to a more flexible and decentralized low carbon electricity system."

Every 100 MW of new wind energy brings 1,000 person-years of employment during the construction



Courtesy of CanWEA

phase of a wind energy project and 350 person-years of work in long-term operations and maintenance. In addition, wind energy is delivering significant economic benefits to local economies through property tax payments, community benefit agreements and land lease contracts. Every megawatt of new wind energy represents an investment of approximately \$2 million.

“We celebrate wind energy as Canada’s success story with another milestone reached,” Hornung said. “The best is yet to come.”

In celebration of the growing contribution that wind energy is making around the world and in Canada, CanWEA is once again proud to launch the annual Power of Wind contest. Students entering or who are in post-secondary education are eligible to submit entries on why harnessing wind power is important to Canada’s energy future. The submission deadline is September 16, and winners will be announced at CanWEA’s Annual Awards Banquet in Toronto on October 7. Additional information, contest rules, and terms and conditions can be found on the Friends of Wind website. ↘

— Source: CanWEA

GOVERNORS PETITION CONGRESS TO EXTEND WIND TAX CREDITS

Joint letter cites manufacturing, job losses as pitfalls of expired tax incentives

The chairman and vice chairman of the bipartisan Governors’ Wind Energy Coalition sent a letter to House and Senate leadership in May urging Congress to approve a multi-year extension of the renewable energy production tax credit (PTC) and investment tax credit (ITC) as soon as possible. The most recently passed extension expired last year.

Washington Governor Jay Inslee and Iowa Governor Terry Branstad told congressional leaders that the recent Wind Vision report emphasized the importance of near-term policy support to prevent an industry slow down and the loss of manufacturing to foreign markets. Without policy support, wind deployment will be minimal and the domestic wind manufacturing sector will likely wither:

“Our assessment of the Department of Energy’s recently released ‘Wind

Vision’ report is that the domestic wind manufacturing industry is likely to stagnate over the next decade without the PTC. We anticipate that wind energy will be truly competitive with traditional energy sources soon given innovation in the industry.”

The governors also highlighted wind energy’s diverse public policy benefits, providing justification for near-term tax incentives:

“We believe it is important to recognize all the public policy benefits of wind energy, including a diversified energy portfolio, public health benefits, domestically-sourced energy, and others. We are also concerned that thousands of manufacturing jobs could be lost without stable federal policy.”

“There also exists enormous potential in the development of our nation’s offshore wind energy resources, and the investment tax credit is a vital tool

for our capturing that opportunity and further developing domestic renewable energy industries,” the governors wrote, with regard to the importance of the ITC.

“These tax credits have made possible the robust growth of the American wind industry and thousands of renewable energy jobs in recent years, with substantial economic returns to our states and the nation. But these gains are at risk...because ongoing federal policy uncertainty continues to hamper the further development of the nation’s wind industry.”

The leaders of the 22-member bipartisan governors’ coalition urged congressional leaders to act promptly to extend the renewable energy production and investment tax credits.

— Source: Governors’ Wind Energy Coalition

SIEMENS TARGETS AMERICAS WITH NEW 2.3MW MODEL

OEM estimates AEP boost of up to 10 percent for medium-to-low wind sites

Siemens recently introduced a new turbine model to its G2 platform at WINDPOWER 2015 in Orlando in May. The Siemens SWT-2.3-120 is the first wind turbine designed by Siemens to specifically meet the demands of its North and South American customers. The powerful new turbine features a 120-meter rotor, enabling it to achieve an industry-leading capacity factor. It is the next step in the evolution of Siemens' proven G2 product platform — one of the bestselling product lines in wind turbine history. Serial production of the SWT-2.3-120 will commence in the U.S. in 2017.



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The product was developed with an eye toward increasing energy production for sites with medium to low wind conditions, which are prevalent in markets within the Americas region. It employs advanced technology including a newly-developed 59-meter-long rotor blade, which has been optimized for enhanced production at medium to low wind speed, while also reducing weights and loads for decreased wear and tear. Siemens' blade factory in Fort Madison, Iowa, and Siemens aerodynamic engineering center in Boulder, Colorado, were heavily involved in the development of the refined product and its aerodynamically tailored blade.

The drive train has been optimized to deliver maximum energy capture in medium to low wind conditions. At wind speeds ranging from 6 to 8.5 meters per second, the Siemens SWT-2.3-120 can yield an increase of nearly 10 percent in AEP compared to its predecessor, the SWT-2.3-108. The results are higher returns and a significant decrease in the projected Levelized Cost of Energy (LCOE). The product design also incorporates several added safety and operational benefits related to the service and maintenance of the turbines, including increased accessibility of key components and access to the weather station from inside the nacelle.

"We designed the SWT-2.3-120 with the requirements of the Americas region in mind," said Markus Tacke, CEO Siemens Wind Power and Renewables Division. "With the SWT-2.3-120, we have been able to achieve an industry-leading capacity factor of over 60 percent and a nearly 10 percent improvement in AEP under design conditions. The SWT-2.3-120 offers excellent returns on investment for years to come. This new wind turbine will ideally serve its home market and also strengthen our export business." ↴

— Source: Siemens

EDF RENEWABLE ENERGY ACQUIRES SALT FORK PROJECT IN TEXAS

Garland Power & Light commits to long-term power purchase agreement for 150 MW

EDF Renewable Energy recently announced the acquisition of the up to 200 MW Salt Fork Wind Project from Cielo Wind Power LP. The achievement comes as a result of 18 months of close collaboration between the two companies to bring about the close of the acquisition transaction and the Power Purchase Agreement with Garland Power & Light.

Salt Fork is located in the Texas Panhandle on approximately 16,700 acres in Donley and Gray Counties, Texas, roughly 45 miles east of Amarillo. The project is expected to achieve commercial operation by the end of 2016, utilizing ERCOT's CREZ transmission infrastructure.

The clean electricity and renewable energy credits generated by 150 MW of the Salt Fork Wind Project will be provided to Garland Power & Light under a long-term power purchase agreement. This agreement follows the PPA the municipal utility signed in early 2014 for a portion of the electricity generated by EDF RE's Spinning Spur 3 Wind Project.

"We are pleased to expand our relationship with Garland Power & Light to include the Salt Fork Wind Project, building upon the Spinning

Spur 3 Wind Project, which is presently under construction and expected to be completed later this year," commented Ryan Pfaff, executive vice president at EDF Renewable Energy. "The diligent collaboration between Cielo and EDF Renewable Energy demonstrates the value of long-term relationships; Salt Fork represents the third wind project we have successfully acquired from Cielo in late-stage development."

"Our investment in wind helps to diversify GP&L's energy portfolio while mitigating risk of volatile fuel prices. With this agreement, we will add another clean resource to the power supply mix that will benefit our customers for years to come," said Jeff Janke, general manager of Garland Power & Light. "We are pleased to once again do business with EDF Renewable Energy."

Since first entering the Texas market in late 2011, EDF Renewable Energy has commissioned 872MW of wind energy capacity. The Salt Fork acquisition increases the Texas portfolio to 1.2 GW operating, under construction or in development.

— Source: EDF Renewable Energy


HEADLINES

GE invests \$25 million in TerraForm Global

GE's renewable energy business recently announced a \$25 million investment in TerraForm Global, LLC. TerraForm Global is a dividend growth-oriented company, or "yieldco," formed by SunEdison to own and operate contracted renewable power generation assets in attractive, high-growth emerging markets.

"This investment is about driving continued global growth for renewable power," said Anne McEntee, president & CEO of GE's renewable energy business. "Together with SunEdison, we will significantly increase wind developments in key growth regions like Latin America, Europe, India, and China."

The agreement is expected to help support new wind pipeline opportunities for TerraForm Global. GE also will provide life cycle operations and maintenance support for TerraForm's international wind fleet. The two companies have agreed to continue exploring additional opportunities for growth-oriented collaboration.



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PROFILE: REDSTONE COLLEGE

Wind Energy Technology program balances classroom instruction with hands-on experience to prepare the next generation of wind turbine technicians for the careers ahead

By Stephen Sisk

Since its founding in 1965, Redstone College in Denver, Colorado has been committed to providing students with quality, skill-based educational opportunities centered around industry demand.

Originally focused on airframe and power plant training, the institution has expanded in the decades since to include avionics and HVAC. In 2010, amid accelerated growth of the wind energy industry in the U.S., Redstone College started its Wind Energy Technology (WET) program with the goal of preparing students for stable, well-paying jobs in the wind sector.

“Our mission is to get the students good jobs so that they can take care of themselves and their families,” said Travis Perko, a former wind energy technician who currently serves as Redstone’s WET program director. “Personally, I went through a wind program. I love wind. And when I physically couldn’t climb anymore, this is a way for me to be able to give back to the industry by putting out qualified techs. That’s really the biggest mission — putting out the best quality product, which is our students, into the industry that we can.”

Considering the nature of the work performed by wind energy technicians, properly training

students for their chosen careers requires an approach that combines classroom instruction with a significant amount of hands-on training.

Striking the proper balance, Perko said, is key to successfully preparing students for the industry.

“When I first started at this school a year ago, there was a lot of hands-on, but there was a lot of academic as well,” he said. “The other schools out there are highly academic, so I’m constantly challenging my instructors to come up with more labs and new ways to give the students hands-on experience for when they get into the field.

The WET program at Redstone is an Associate of Occupational Studies degree program, encompassing 90 credit hours obtained by completing 17 courses taken over six terms. The duration of the program is typically 15 months.

The course curriculum is designed to give students a solid, foundational knowledge of safety, electronics, turbine systems, industrial controls and automation, and maintenance and troubleshooting.

Hands-on experience at Redstone is gained primarily through lab situations using onsite wind-energy specific equipment,



Photos courtesy of Redstone College

including a Vestas V27 nacelle for advanced troubleshooting, and a 35-foot climb tower for climbing safety certification.

“Most of them, when they leave here, they are no longer afraid of electricity and they’re not afraid to climb,” Perko said.

That fact is evidence of Redstone’s core emphasis on work safety.

“One of the biggest focus areas for us is safety — making sure



that when students leave, they have an appreciation for being at-height and for being around rotating machinery,” Perko said. “They also have an appreciation of electricity so that they’re not going to jump into a situation that is not safe.”

The WET program typically has an enrollment of 65-80 students. While each individual student’s motivation for pursuing

a career in wind energy differs, many Redstone WET enrollees enter the program due to the economic advantages over similar skilled professions.

Although most students who graduate from Redstone’s WET program choose to seek employment in the wind energy industry, others find work in industries which require similar skill sets — such as oil & gas and light rail.

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- 26 **Conversation**
Jim Morgan,
Mesalands Community College



Overall, job placement numbers at Redstone are impressive, with over 95 percent of graduates employed at or near graduation.

Additional information about Redstone College's Wind Energy Technology program, including course descriptions, career outlook, program brochure, and course catalog can be found online at www.redstone.edu/wind-energy. For information about admissions and the application process, call (888) 547-4037 or visit www.redstone.edu/admissions. ↴

REDSTONE COLLEGE WIND ENERGY TECHNOLOGY PROGRAM

Location: Denver, Colorado

Degree: Associate of Occupational Studies

Duration: 15 months (6 terms)

Credit Hours: 90

Number of courses: 17 (13 core; 4 general education)

Subjects: wind energy, safety, electronics, motors and generators, controllers, turbine design, turbine systems & components, maintenance, troubleshooting

Equipment: Vestas V27 nacelle (lab setting); 35-foot climb safety training tower

Admissions requirements: High school diploma or equivalent (e.g., GED); admissions interview

Application process: Contact admissions representative. Additional information available online.

CONTACT:

Web:

www.redstone.edu/wind-energy

Phone: (888) 547-4037

REPORT: U.S. CLEAN ENERGY JOB POSTINGS REACH 1.2 MILLION

Ecotech Institute's Clean Jobs Index reported more than 1 million green energy job postings across the nation in the first quarter of 2015. The Clean Jobs Index classifies clean energy jobs based on the Bureau of Labor Statistics description, which says that clean jobs are jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources. The classification also includes jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources.

Ecotech Institute, a school dedicated solely to renewable energy and sustainability, created the Clean Jobs Index to provide objective information about renewable energy jobs and to compare states' use and development of clean and sustainable energy.

"As more businesses look for ways to conserve energy and renewables continue to gain traction, more jobs are becoming available," said Chris Gorrie, Ecotech Institute's president. "States have come to see clean energy sources as an important piece of infrastructure, opening the door to great opportunities in renewable energy."

The total number of U.S. clean jobs postings in the first quarter of 2015 was 1.2 million, according to the report. Additionally, the top-three states with the most clean jobs openings were California with 131,215, Texas with 90,281, and New York with 71,748 openings. Compared to the first quarter of 2014, states with the highest rise in clean jobs openings included Rhode Island, New York, Texas, North Carolina, and Maryland.

Ecotech Institute's Clean Jobs Index is an aggregation of statistics by state. Although it may indicate a greater possibility for employment in the clean economy sector, the Clean Jobs Index in no way indicates the presence or the prom-

ise of any specific job opportunities. Data for the Index is gathered regularly from independent research entities including: American Council for an Energy-Efficient Economy, Database of State Incentives for Renewables & Efficiency, U.S. Energy Information Administra-

tion, U.S. Department of Energy and the U.S. Green Building Council.

For more information about the Clean Jobs Index, visit www.ecotechinstitute.com/CleanJobsIndex.

— Source: Ecotech Institute

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RESPONDING TO STUDENT CONCERNS ABOUT WIND VS. CHEAP OIL

If you read my article last month, you may have enjoyed some of the naïve but entertaining questions prospective wind energy students ask the wind instructors during campus tours. As they approach graduation, their questions take on a more serious tone. One recurring theme as of late is related to falling oil prices.

“Will cheap oil drive wind energy out of the electricity market?” is a question I’ve been asked in various ways. While I feel compelled to highlight the positives while still including the negatives, I have developed a lengthy but compelling answer to this question.

According to the Energy Information Administration (EIA), in 1973 when America’s energy industry was rocked by the first OPEC Oil Embargo, roughly 15 percent of our electrical needs were supplied by oil. This was a large enough percentage that electricity bills ate up a much larger portion of the average monthly household budget. This spurred strong public support for renewable energy development. Nixon supported NASA wind energy research, and Carter installed solar panels on the roof of the White House. Three world-class wind sites — Altamont Pass, Tehachapi, and San Geronio Pass — experienced heavy wind farm development in California beginning in 1979. By 1986, however, Americans settled into the comforts of stable economic growth including relatively stable and cheap oil prices. Renewable energy fell out of favor, although oil played a continuously smaller role in the great pie graph of electrical energy sources as well. In-

stead, cheap coal and natural gas were listed as America’s foundational power sources. Today, only about 0.3 percent of America’s electrical needs are met directly by the burning of oil. Apparently, wind and oil no longer compete with each other in the electrical energy market.

Oil has become almost exclusively a transportation fuel. There is little overlap between the use of oil and wind for the purpose of transportation. Wind is only a transportation fuel to the extent that America’s fleet of electric vehicles recharge from the grid. In an October 2014 blog post, the Sierra Club celebrated when electric vehicle sales hit an all-time high of 0.85 percent of monthly vehicle sales. It may seem like we are seeing Teslas and Nissan Leafs everywhere we go, but they are still a tiny portion of the transportation energy market where petroleum reigns supreme. Clearly, wind and oil do not compete very much in the transportation energy market either.

So does the price of oil have any impact on wind energy? You bet it does! Cheap oil and the resultant cheap transportation fuels it derives have a very favorable impact on wind farm construction budgets including lower costs for manufacturers. According to the American Logistics Association, fuel costs can account for up to 65 percent of an industry’s logistics budget. Lower fuel costs leave more room in the budget for profits for OEMs, wind farm developers, and owners. Every turbine, component, tool, and service truck can move about the country at a lower cost when the price of oil is low. It stands to rea-



By *Walter Christmas*
Ecotech Institute

son that this encourages stronger investment in wind energy as well. However, this leads us into more complicated questions regarding the availability of investment capital.

Energy investors often hedge their bets by diversifying amongst various energy sources and service providers. Losses in upstream oil production revenue leaves some heavy hitter investors with less cash to invest in other energy options. On the other hand, pessimism in oil stocks makes renewable energy stocks look pretty attractive and promising to those who can justify the cash outlay. If British Petroleum had not divested itself of most of its wind holdings a couple of years back, it may have enjoyed the hedge against its 20 percent loss in stock price since May 2014.

Warren Buffett’s Berkshire Hathaway is a mixed bag when

it comes to the drop in oil prices. Burlington Northern Santa Fe railroad, a Berkshire Hathaway holding, profited handsomely from the transport of Bakken petroleum until drilling efforts backed off recently. Soon, rapid decline rates in the production from Bakken wells will result in falling revenue for BNSF. However, Berkshire holdings in retailers such as Walmart will benefit from cheaper logistics. Most importantly, Berkshire Hathaway Energy (BHE) has been making bold investments in renewable energy through holdings like MidAmerican Energy, Pacificorp, and NV Energy. Of these investments, 60 percent of the installed capacity will be in wind energy. It seems Warren Buffett shares my views on the benefits of fixed energy costs that wind energy provides. I'm sure he'll sleep better at night knowing that we agree on this.

The pink elephant in the room cannot be ignored. How is the competition between wind and coal affected by low oil prices? Simply stated, when oil is cheaper, coal is cheaper. Mining and transport costs of coal drop. This certainly does not guarantee increased investment in coal-fired power plants, however. The threat of an eventual carbon tax makes this idea far too risky, but... we must consider how newly installed wind energy must compete with the existing capacity for coal to power our grid with cheap, reliable energy. This competition in coal-rich states does have a negative impact on the risk inherent in any new power plant investment, wind being no exception. To remain optimistic amidst this debate, we must consider the long-term perspective.

Oil, as a nonrenewable resource with proven price instability, will not always help coal maintain its affordability. Coal-fired power plants require lifelong input of its market-priced fuel. Wind energy, on the other hand, is a heavily front-loaded investment. Wind farms require a very large initial investment with relatively inexpensive and predictable O&M costs for the remainder of their service life of 20 to 25 years. Unlike coal, the input fuel for a wind farm is free. If we can cut a sizeable portion of wind energy development costs while oil prices are low, then investors should take advantage of this in the interest of hedging against future increases in oil prices. Profitability of coal will inevitably decline

as oil prices increase, but the cost savings will have already been locked into the levelized cost of energy (LCOE) of wind farms. With or without a power purchase agreement, this adds up to savings that any utility or utility customer will enjoy.

In light of cheap oil, I feel confident in telling my students that their future in wind energy is secure and bright. They will see astronomical growth in our industry in the next decade, and cheap oil only helps us grow even faster than many of us had expected. If oil prices rise again, as I believe most energy economists expect, wind energy will still benefit by offering fixed, predictable costs and profits in an otherwise chaotic energy market. ✎

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WIND ENERGY TECH PROGRAM RESPONDS TO GROWING NEED

Western Iowa Tech prepares the next generation of the wind workforce in the heart of wind country

The state of Iowa has long been connected with agriculture, but today there are new farms — wind farms — sprouting up in America's heartland.

A national leader in wind energy, Iowa generates more than one-quarter of its electricity from wind. As future projects are planned, demand will only grow. For instance, Iowa is currently generating 5,600 megawatts of wind but expects that number to exceed 7,000 megawatts by 2017.

"We anticipate a great need for technicians to take care of wind energy equipment," said Darin Moeller, executive dean of instruction at Western Iowa Tech Community College in Sioux City, Iowa.

Moeller's right. The number of wind turbines in Iowa and the United States continues to increase, as does the need for skilled workers able to install, maintain, service, and operate them.

OPTIONS AND OPPORTUNITIES

To meet the need, the college has built a top-notch wind energy technician program at its satellite campus in nearby Cherokee, Iowa. This field of study trains students as technicians and/or operators based on whether they choose WITCC's one-year diploma option or two-year associate degree.

Students pursue the wind energy technician program for different reasons. For some, it provides practical training that can lead to a good job and a better life. For others, it's a chance to connect with the growing green movement and make a positive impact on the environment.

Course work covers wind energy turbine systems, of course, along with electrical theory, industrial electronics, instrumentation, principles of motors, and more. Also included are credit hours in physical fitness — a valuable foundation since wind techs climb up to 200 feet on the way to their workplace.

At the top of the turbine, they work in a space roughly the size of a small bus and work on high-voltage circuitry amidst some 8,000 parts.

Western Iowa Tech's program prepares them to rise to the challenge.

All wind energy instructors have experience in the field, so they lend a level of expertise that's particularly helpful. "They've been there, done that," said Moeller. "They can really prepare students for issues to expect in the industry."

ULTIMATE HANDS-ON TRAINING

What's more, students gain hands-on experience using an 80-foot turbine installed by wind and solar specialists out of Alta, Iowa.

"This resource provides immediate access for our students," explained Dr. Terry Murrell, WITCC president. "That's key to their training in this area."

College officials hope to one day harvest the energy from this turbine and help power the institution. For now, it's the most visible lab on campus.

"We want to provide all students with realistic experiences similar to the ones they'll find in their jobs," Moeller explained. "For this program, having the turbine that students can climb up and monitor ... it takes their opportunities to a whole new level."

Having a turbine on campus exemplifies the college's commitment level to the cause, noted Moeller. "This was identified as a priority for the wind energy technician program, and it came to fruition through great partnerships."

Students are excited about the turbine, shared Dr. Darla Struck, who directs Western Iowa Tech's campus in Cherokee. "They had a hand in its construction, and they're involved with every facet of running this windmill — all the maintenance, operation, and production that goes along with creating energy for a power grid."

Perhaps the best part, she added, is that wind energy technician students can use those experiences to get jobs in the field.

STRONG JOB MARKET

Truth be told, job prospects shouldn't be an issue. After completing the program, students realize virtually endless opportunities in a field that's essentially government-mandated to grow ... and grow quickly.

Wind energy technician grads can pursue careers in operating, maintaining, and repairing wind turbine systems, along with site safety management, project site management, wind farm management, wind site assessment, and system installation.

According to the Bureau of Labor Statistics, the median annual wage for wind turbine service technicians was \$45,970 in May 2012. Employment of wind turbine service technicians is projected to go up 24 percent by 2022 — faster than average for most occupations.

Indeed, wind is the fastest growing energy source in the United States, with production increasing daily at amaz-

ing rates. A recent report by the U.S. Department of Energy suggests wind energy could contribute 20 percent of the nation's electricity by 2030. Job prospects should be excellent for wind energy technician graduates everywhere ... but especially in the Midwest.

"Wind power is very important in the state of Iowa, and we are a leader in wind energy," said Iowa Senator Bill Anderson. Within America's heartland, the wind industry employs at least 6,000 Iowans right now.

"If you're looking for potential jobs and career growth, we are in prime wind country," Moeller noted. "With Iowa being such a leader in wind energy, most of our graduates stay in-state, but this is a program that also offers national opportunities." ✎

HEADLINES

Cloud County Community College holds drone class

The Wind Energy Department of Cloud County Community College (CCCC) recently held a two-day, 12-hour "Introduction to Unmanned Aerial Vehicle (UAV) Community Enrichment" class June 15-16 in Concordia, Kansas.

The class gave anyone in the community interested in enrolling for the course the opportunity to get hands-on experience flying, configuring, and taking photos with the UAVs, as well as experience on current status with FAA rules. Monte Poersch, CCCC Wind Energy instructor, taught the class.

The Wind Energy Department at CCCC has acquired, through a grant, four new UAVs. The program is integrating UAVs for blade inspections and for substation and transmission line inspections. UAVs can be used to inspect wind turbine blades much more efficiently and safely than the process currently used for those inspections. Students are being trained to fly the UAVs and are learning more advanced techniques of video and photography as well as programming completely autonomous flights.

Those attending the two-day training said, "This was exactly what I wanted to learn." And, "I plan to purchase a small drone and learn to fly it and begin a small business with a friend."

Additional comments were, "It was only 2 days," and "It was too short."

— Cloud County Community College

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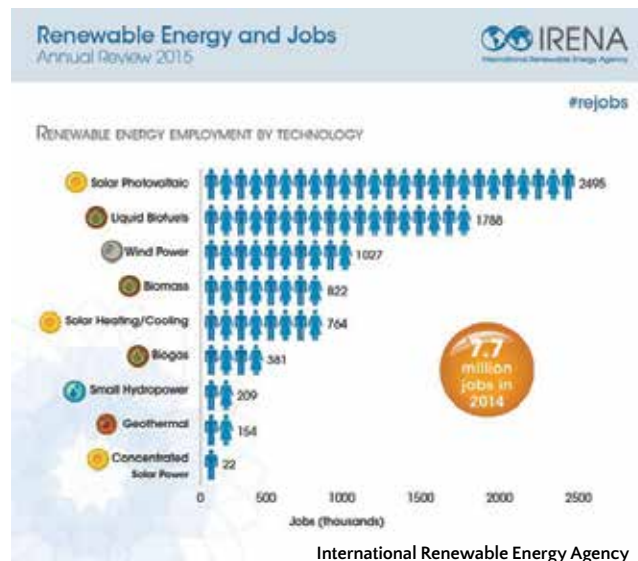
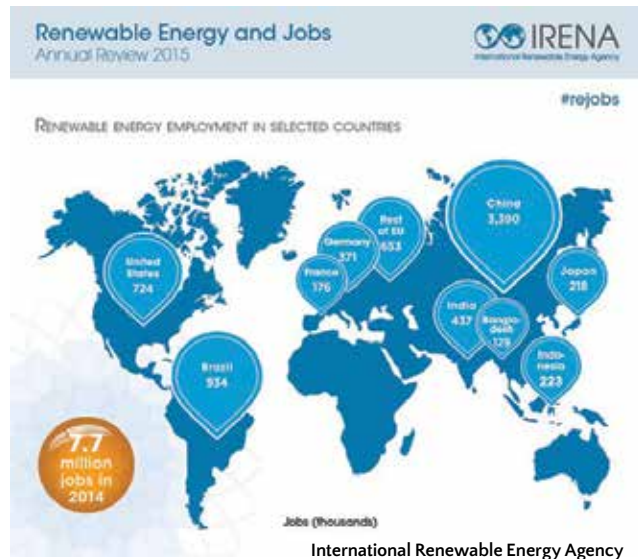
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RENEWABLES INDUSTRY EMPLOYMENT UP 18 PERCENT

IRENA report shows renewable energy added 1 million jobs globally over 2014



More than 7.7 million people worldwide are now employed by the renewable energy industry, according to a new report released by the International Renewable Energy Agency (IRENA). This is an 18 percent increase from last year's figure of 6.5 million. The report, Renewable Energy and Jobs — Annual Review 2015, also provides a first-ever global estimate of the number of jobs supported by large hydropower, with a conservative estimate of an additional 1.5 million direct jobs worldwide.

“Renewable energy continues to assert itself as a major global employer, generating strong economic and social benefits worldwide,” said IRENA Director-General Adnan Z. Amin. “This increase is being driven, in part, by declining renewable energy technology costs, which creates more jobs in installation, operations, and maintenance. We expect this upward trend to continue as the business case for renewable energy continues to strengthen.”

As in previous years, renewable energy employment is shaped by regional shifts, industry realignments, growing competition and advances in technologies and manufacturing processes. Jobs in the renewable energy sector are increasingly being created in Asia, with five of the 10 countries with the most renewable energy jobs now located in the region (China, India, Indonesia, Japan, and Bangladesh). As a result, even with continued jobs growth, the European Union and the United States now represent 25 percent of global renewable energy jobs, compared to 31 percent in 2012.

In the United States, total solar employment

surged 22 percent from 142,700 to 173,800 and overall wind jobs increased 43 percent since last count to 73,000. Data also finds that employment of women in the solar industry is on the rise, increasing from 26,700 to 37,500.

“Here in the United States, a country fast becoming a leader in renewable energy innovation, we are seeing a rapid rise in deployment of solar PV in particular, along with strong investment in wind in several states and a leading focus on development of advanced biofuels,” Amin said. “Overall, wind jobs in the U.S. have increased by almost half — 43 percent — since last count to 73,000, whilst total solar employment surged 22 percent to 173,800 in 2014. We have also found that the employment of women in the U.S. solar industry is on the rise, increasing from 26,700 to 37,500 last year.”

The 10 countries with the largest renewable energy employment figures are China, Brazil, the United States, India, Germany, Indonesia, Japan, France, Bangladesh and Colombia. The solar PV industry is the largest renewable energy employer

HEADLINES

“Renewable energy continues to assert itself as a major global employer, generating strong economic and social benefits worldwide.”

worldwide with 2.5 million jobs, followed by liquid biofuels with 1.8 million jobs, and wind power, which surpassed 1 million jobs for the first time this year. The employment increase spreads across the renewable energy spectrum with solar, wind, biofuels, biomass, biogas, and small hydropower, all seeing increases in employment. ↘

— Source: IRENA

Chevron donates gearbox to Casper College program

The Casper College Renewable Energy Technology Program has received a substantial equipment donation from Chevron Power and Energy Management Company: a Winery gearbox from one of the company’s turbines located near Casper, Wyoming.

“This gearbox will provide Casper College students an opportunity to learn about maintenance technology on a life-size gearbox,” said Lesley Travers, dean for the Casper College School of Business and Industry. “They will also learn about bore scoping, gearbox inspection, troubleshooting, torque specifications, and oils and greases.”

The 55,000-pound gearbox came from a 1.5MW GE wind turbine. “This particular piece of equipment is generally located over 200 feet high in the nacelle of a turbine, so students without proper climb training do not generally have the opportunity to see close up or train on this critical piece of the turbines,” said Chevron’s Policy, Government and Public Affairs Senior Advisor Denise Reed.

Chevron has partnered with Casper College since 2009 with a variety of monetary contributions to the program — most recently, a donation of \$5,000 to support the college’s renewable energy technology program. In addition, Chevron also provides tours, guest speakers, and training equipment to the program.

— Casper College

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Certificate
www.air-streams.com
(661) 822-3963

Northeastern Junior College

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Community College
Associate's
www.njc.edu
(800) 626-4637

Ecotech Institute

Colorado
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Associate's
www.ecotechinstitute.com
(877) 326-5576

Redstone College

Colorado
Career
Associate's
www.redstone.edu
(877) 801-1025

College of Southern Idaho

Idaho
Community College
Certificate; Associate's
agriculture.csi.edu/wind
(208) 732-6403

Danville Area Community College

Illinois
Community College
Associate's
www.dacc.edu
(217) 443-3222

Heartland Community College

Illinois
Community College
Associate's
www.heartland.edu
(309) 268-8860

Highland Community College

Illinois
Community College
Certificate; Associate's
www.highland.edu
(815) 235-6121

Illinois Valley Community College

Illinois
Community College
Certificate (Basic, Advanced)
www.ivcc.edu
(815) 224-2720

Lake Land College

Illinois
Community College
Certificate; Associate's
www.lakeland.cc.il.us
(217) 234-5253

Northern Illinois University

Illinois

University
Certificate; Graduate
www.niu.edu
(815) 753-1000

Sauk Valley Community College

Illinois
Community College
Certificate
www.svcc.edu
(815) 288-5511

Ivy Tech Community College

Indiana
Community College
Certificate; Associate's
www.ivytech.edu
(888) 489-5463

Des Moines Area Community College

Iowa
Community College
Associate's
windenergy.dmacc.edu
(877) 863-6222

Iowa Lakes Community College

Iowa
Community College
Diploma; Associate's
www.iowalakes.edu
(800) 521-5054

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Iowa
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Associate's
www.kirkwood.edu
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Northeast Iowa Community College

Iowa
Community College
Diploma; Associate's
www.nicc.edu
(800) 728-2256

Vatterott College

Iowa
Community College
Certificate
www.vatterott.edu
(888) 202-2636

Western Iowa Tech Community College

Iowa
Community College
Associate's
www.witcc.edu
(800) 352-4649

Iowa State University

Iowa
University
Ph.D.; Undergrad minor; Research
www.engineering.iastate.edu
(515) 294-5933

Cloud County Community College

Kansas
Community College
Certificate; Associate's
www.cloud.edu
(800) 729-5101

Northern Maine

Maine
Community College

Certificate; Associate's
www.nmcc.edu
(207) 768-2700

**University of Massachusetts-
Amherst/Wind Energy Center**

Massachusetts
University
MS; Research
www.umass.edu/windenergy
(413) 545-4359

Delta College

Michigan
Community College
Associate's
www.delta.edu
(989) 686-9000

**Kalamazoo Valley Community
College**

Michigan
Community College
Certificate
grovescenter.kvcc.edu
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and Technical College**

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Community College
Associate's
www.mnwest.edu
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Montana Tech

Montana
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www.mtech.edu
(800) 445-8324

Northeast Community College

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Community College
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www.northeast.edu
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www.wncc.net
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www.mesalands.edu
(575) 461-4413

Clinton Community College

New York
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Hudon Valley Community College

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Certificate; Associate's
energy.bismarckstate.edu
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www.lrsc.edu
(701) 662-1519

Lorain County Community College

Ohio
Community College
Certificate; Associate's
www.lorainccc.edu
(800) 995-5222

Canadian Valley Technology Center

Oklahoma
Career
Certificate
www.cvtech.edu
(405) 262-2629

High Plains Technology Center

Oklahoma
Career
Certificate
www.hptc.edu
(580) 571-6167

Oklahoma State University
Oklahoma City
 Oklahoma
 University
 Certificate; Associate's
www.osuokc.edu/wind
 (800) 560-4099

Columbia Gorge
Community College
Oregon
 Community College
 Certificate; Associate's
www.cgcc.cc.or.us
 (541) 506-6011

Penn State
Pennsylvania
 University
 MPS (Online)
www.wind.psu.edu
 (814) 865-2569

Mitchell Technical Institute
South Dakota
 Community College
 Associate's
www.mitchelltech.edu
 (800) 684-1969

Amarillo College
Texas
 Community College
 Certificate (Basic,
 Advanced); Associate's
www.actx.edu/wind
 (806) 371-5000

Clarendon College
Texas

Community College
 Certificate (Level I,
 Level II); Associate's
www.clarendoncollege.edu
 (800) 687-9737

South Plains College
Texas
 Community College
 Associate's
www.southplainscollege.edu
 (806) 894-9611

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 Certificate; Master's
www.tamu.edu
 (979) 458-1644

Texas Christian University
Texas
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 Bachelor's; Master's
www.tcu.edu
 (817) 257-7000

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Texas
 Community College
 Certificate (I, II); Associate's
www.tstc.edu/harlingenwindtech
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Texas
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www.tstc.edu/westtexaswet
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Madison Area Technical College
Wisconsin
 Community College
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madisoncollege.edu
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Northeast Wisconsin Technical
College
Wisconsin
 Community College
 Associate's
www.nwtc.edu
 (800) 422-6982

Eastern West Virginia Community
and Technical College
West Virginia
 Community College
 Certificate; Associate's
www.easternwv.edu
 (877) 982-2322

Casper College
Wyoming
 Community College
 Certificate; Associate's
www.caspercollege.edu
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Could you give us a general overview of Mesalands' Wind Energy Training program?

The Wind Energy Technology Program at Mesalands Community College provides real-world training experience, on the commercial-grade, 1.5MW GE wind turbine located on campus at the North American Wind Research and Training Center. The Wind Center provides state-of-the-art facilities for training qualified individuals in wind energy technology, as well as ample space to host cutting edge research in commercial wind energy technology. The training center is approximately 25,000-square-feet and includes both mechanical and electronic/electrical laboratories. Both laboratories have simulators to allow students to learn using a hands-on approach. The electrical laboratory contains computers that deliver computerized training as a complement to the laboratory exercises.

Which diplomas or degrees are offered?

Mesalands Community College offers three different wind energy training programs. The first is an Occupational Certificate program, which

includes all of the wind technical courses in the first year for a total of 21 college credits. This is particularly attractive to prospective students that cannot attend the full 2-year program due to family concerns or financial difficulties. Re-entry into the degree program using these credits is at some later date is recommended and approved. The college also offers a one-year Applied Science Certificate in Wind Energy Technology. The Associate of Applied Science Degree in Wind Energy Technology is awarded after 2 years of study for a total of 60 credits.

Could you describe the instructional philosophy behind the program?

A key word for our instructional philosophy is "hands-on." Although the curriculum was in place before the wind turbine was commissioned, the actual wind energy technology classes started in the Fall of 2008, the same semester the turbine was commissioned. That decision was indicative of wanting the students to have experience on a real operational industrial-size turbine. The turbine is always manually shutdown for training two to three times a week for students to train. That training is an integral part of their instruction as they climb and learn about the features and problems associated with the turbine. Troubleshooting is an industry priority and the students here do that on an industrial size wind turbine, not just out of a book.

What are some of the opportunities for students beyond classroom instruction?

The students usually take field trips to one of the local wind farms and also

take field trips to a local transmission sub-station to see and learn about the different operational components required for a sub-station, which is an integral part of wind farms. The College owns a meteorological tower nearby that the students visit to learn about the devices on the tower. The data is collected by the wind program and students are exposed to the criteria and use the data in wind farm economics and strategies.

What are the career opportunities after graduation?

The graduates of the Wind Energy Technology Program are qualified as wind energy technicians and capable of both corrective and preventive maintenance on industrial wind turbines. Students in the degree program in their first year are invited to apply for internships with wind maintenance companies and if selected, can gain field experience and earnings prior to graduation. Since the training includes the elements of an industrial maintenance technician, graduates can transition to other technical fields.

We have several companies regularly requesting to hire our graduates and notifying them of employment opportunities. Starting this upcoming academic year, we will have a new Career Services on campus to help our graduates find future employment.

How much does the program typically cost?

Mesalands Community College was ranked 7th among the "Most Affordable Community Colleges" in the Nation, according to AffordableColleges.com. Mesalands provides federal and state financial aid for qualifying students, in the form of scholarships, grants, and work-study. The average cost of attendance for the Wind Energy Technology Program for one semester (15-credit hours) is approximately \$2,500 per semester. This cost includes non-resident tuition, tuition, fees, and books. ↴

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WANZEK APPLIES LEAN KAIZEN APPROACH TO IMPROVING O&M

Services group eyes long-term improvement as turbines age and warranties expire By Kate Nation



Photos courtesy of Wanzek

The wind industry rebounded in 2014. According to the American Wind Energy Association, the 4,854MW of wind capacity added during 2014 was more than four times the amount installed in 2013. As the wind industry continues to grow, it is also undergoing a significant evolution as turbines are coming out of warranty and maintenance costs shift to owner responsibility. Wind farm operators are increasingly interested in reducing the lifecycle costs of a project — shifting some focus from productivity to maintenance. A smart approach since equipment maintenance directly effects productivity.

Maintaining a wind plant is a complex undertaking. While the integral goal is continued turbine availability, there are many internal and external factors that can take a turbine offline. When blades aren't turning, money is being lost. While scheduled maintenance costs are reflected in budgets and downtime is anticipated, unscheduled maintenance can greatly impact revenue through unexpected equipment replacement or repair and loss of productivity. Owners and operators are beginning to understand the implication of an efficient approach to maintenance.

With this in mind, Wanzek Construction has developed a lean Kaizen process that addresses both scheduled and unscheduled maintenance issues. Kaizen, meaning “change for the better,” refers to the practice of continuous improvement. It is a long-term approach that targets small, incremental changes in processes in order to improve efficiency and quality. Karen Naland, director of quality and development at Wanzek, began implementing a company-wide lean Kaizen approach in 2014 that has since been implemented by the company's Renewable Energy Services group through wind system maintenance. According to Eddy Grunenwald, who handles business development for Wanzek's O&M Services team, “Every operating wind site is under pressure to reduce cost and improve returns. At the same time, wind turbines are larger, more complex their numbers are expanding



quickly.” Grunenwald believes that upping the resources for operations and maintenance requirements is not a sustainable solution. “The future belongs to owners and service providers who make continuous improvement a key factor in their service offerings,” he said.

Grunenwald has put this to practice, earning a yellow belt in continuous improvement through Wanzek’s Operational Excellence initiative. During a client visit, he was made aware of an excess in man-hours per turbine required for maintenance. Wanzek responded immediately with a proposal to conduct a lean event to identify waste in the maintenance process and implement change that would reduce the number of man-hours required. The event also served as a forum for the exchange of ideas and best practices across multiple, client-operated sites.

Preparation for the lean event included a review of the processes and procedures that were in place. Wanzek found that procedures overlapped and that task performance required technicians to move throughout the turbine without regard for the amount of time spent on a task. This led to a focus on the reorganization of crews and responsibilities. Special attention was paid to maintaining safety regulations; allowing the time needed to perform a job safely, while reducing time wasted. One example involved moving a crew from the nacelle into the turbine hub.

“Our crews have completed safety at heights and rescue training and this is not a task that can be hurried,” Grunenwald said. “However, the old process had the crews moving into and out of the hub several times. We changed the process so that while a

crew is in the hub, they perform as many tasks as is safe and practical.”

With Wanzek’s direction, the client developed a maintenance program made up of four crews, performing tasks directly related to the area in which they work. Wanzek followed-up with modifications to ensure standardization of the improvements. The result was a reduction of over 50 percent in man-hours per turbine.

“I knew we would obtain results,” Grunenwald said. “These results really impressed me.”

Given the positive results, Wanzek will continue its lean Kaizen approach, determining areas that waste can be eliminated. Defining a direct approach to efficiency and improvement requires the company to align its quality and development group with its safety program. Arnold Jelinek, vice president of Wanzek,



maintains the need for safety efforts to inform quality initiatives.

“Our interest in Kaizen is due to its focus on small changes to create big impact. This allows us to address our clients’ need for a quick turn-around while promoting our strict safety policy,” he said.

Wanzek has made a commitment to invest in continuous improvement as a way to deliver streamlined services that benefit the client’s bottom line. Within the last year, 110 Wanzek corporate and field personnel have participated in Six Sigma yellow belt training, led by the company’s Six Sigma Master Black Belt quality and development director. This has resulted in refined and value-added processes and procedures.

The Kaizen approach requires employees to contemplate procedures and processes and determine

the outcome. The same is true for Wanzek’s safety program. The company has an established observation program, R4, which provides the opportunity for employees to be engaged in the company’s safety processes through active participation in safety systems and through an employee observation and feedback process.

Jelinek believes this results in sharper employees and better business practices. “Both our quality initiatives and our safety program encourage our employees to stop and think,” he said.

Applied to wind maintenance service, Wanzek’s approach resulted in renewed turbine performance, reduced time resources, substantial procedural improvements and improved daily output. Fueled by his success, Grunenwald

is turning his attention to project start-up. Since much of the project pace is determined in the planning stage, Grunenwald sees an opportunity to apply lean initiatives at the onset.

Jelinek is excited that this innovation is coming from within the company.

“The results achieved by our wind O&M team have been outstanding, Jelinek said. We want each of our employees to be trained in the Kaizen method and to apply it, guided by our director of quality and development, in instances that could result in safe project efficiencies.”

Given AWEA’s release in April that the U.S. now has installed over 48,000 turbines, there should be plenty of opportunity.

For more information, visit them online at www.wanzek.com. ✎

DEEPWATER WIND SELECTS LOCAL FIRM FOR CREW TRANSFER

R.I. ferry company awarded 20-year deal to operate nation's first offshore wind service vessel



Photos courtesy of Seacat Services, Ltd.

Rhode Island Fast Ferry recently signed a 20-year contract with Deepwater Wind for the transfer of maintenance and service crews at the Block Island wind farm off the coast of Rhode Island.

This long-term charter services agreement is the first deal of its kind to be signed in the U.S. and marks another significant milestone in the successful development and deployment of U.S. offshore wind. Expectations within the North American offshore wind market have escalated in recent months and this exclusive first charter services deal provides further tangible proof of the benefits and commercial potential that the wind sector can deliver.

The agreement enables the high-speed catamaran ferry company to commission the first U.S.-built crew transfer vessel to be built by Blount Boats and to launch Atlantic Wind Transfers—its commercial wind support services division.

“We are very excited to be a part of this offshore wind farm project and to work with Deepwater Wind,” said Charles A. Donadio, Jr., president of Rhode Island Fast Ferry. “Launching Atlantic Wind Transfers and building the first crew transfer vessel in the United States with local company Blount Boats is not only good for the State of Rhode Island, but it will also provide for future growth and enhance the



capabilities of our company in the U.S. offshore energy sector.”

As part of the charter agreement with Deepwater Wind Block Island, LLC, a subsidiary of Deepwater Wind, Rhode Island Fast Ferry will build a dedicated wind turbine transfer vessel and develop an extensive training program for its transfer services crew. Rhode Island Fast Ferry will be investing over \$4 million to build the vessel and provide training to meet the needs of the Block Island Wind Farm. The construction of the transfer vessel is being undertaken by local Rhode Island shipyard, Blount Boats, where the contract will secure employment for 70 workers throughout the 12-month build.

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chosen to build the first U.S.-flagged wind farm vessel in the United States,” said Marcia Blount, president of Blount Boats. “The vessel is designed specifically for turbine transfer service. We enthusiastically joined an all Rhode Island team of wind farm, operator, and boat builder.”

As Rhode Island Fast Ferry’s subsidiary brand, Atlantic Wind Transfers will provide crew and equipment support during the construction phase of the Block Island Wind Farm beginning in Spring 2016. Following completion of the 30MW five-turbine site, work will move into operations and maintenance support to encompass a scheduled maintenance program as well as any additional crew transfer support required throughout the 20-year lifecycle of the first U.S. offshore wind farm project.

Thanks in part to the long-term nature of the charter agreement

and the strong working relationship that has already been built between Deepwater Wind and Rhode Island Fast Ferry, this deal will create long-term, local Rhode Island jobs. Each workboat that is chartered to an offshore wind farm typically requires a crew of five to six full-time, skilled employees working year round.

Rhode Island Fast Ferry was awarded the inaugural charter agreement thanks in part to its offshore operating experience, its impeccable safety record, and its catamaran water jet experience. In addition, the firm’s established location and dockage facility at Quonset Point will provide Atlantic Wind Transfers and Deepwater Wind quick and convenient access to the Block Island Wind Farm site using the new crew transfer vessel.

“We’re excited to partner with two veteran Rhode Island companies that will bring their decades

of experience to supporting our Block Island Wind Farm,” said Jeffrey Grybowski, Deepwater Wind CEO. “Most importantly, this will mean more jobs in the marine trades for Rhode Islanders and another way that the Ocean State will lead the growth of this new American offshore wind industry.”

“I’m delighted to support Deepwater Wind’s efforts throughout the wind farm’s offshore construction and operation and to demonstrate our own personal commitment to the offshore wind sector through the launch of our subsidiary brand, Atlantic Wind Transfers,” Donadio said.

An official keel laying ceremony at Blount Boats in Rhode Island, where the workboat will be officially inaugurated is planned for later this summer. ✎

— Source: Rhode Island Fast Ferry

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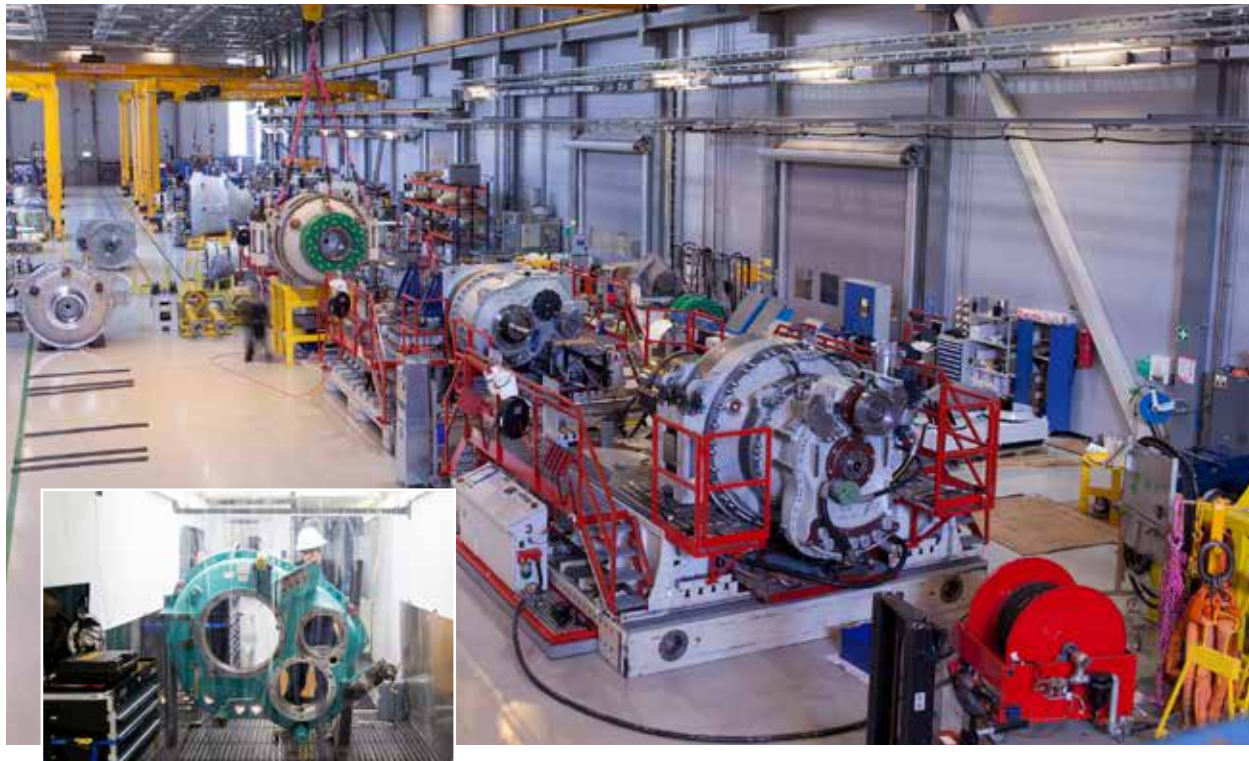
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MOVENTAS MAKES SIGNIFICANT UPDATES TO REPAIR PROGRAM

Streamlined exchange program reduces customer costs and downtime



Moventas recently announced improvements to its Gearbox Pooling Program. With the improvements which include faster delivery, upgraded boxes, leading warranties, and new gearbox availability the program far exceeds competitive offers in the market. In the program, customers receive a refurbished or brand-new replacement gearbox in exchange for their damaged gearbox, which is returned to the pool for refurbishment. Customers only pay the cost of the repair. Downtime and crane usage are minimized.

As the customer notifies Moventas of the type of gearbox, location, and scope of failure, a gearbox or a mainshaft from a secured FIFO inventory is selected and serial numbers are reported to the customer. Next Moventas contacts the site to arrange shipping and installation, and a refurbished or new unit is delivered to the site and installed in the turbine with Moventas coordinating all crane and site work if desired.

“Repairs are much less expensive than new gearbox costs, and, with this program, there is complete visibility of refurbished and new unit inventory,” said Steve Casey, head of Moventas operations. “The traditional repair cycle is virtually eliminated. It’s a win-win for the customer. Availability goes way up and downtime is reduced,”

Moventas stores gearboxes fully accessorized, thus minimizing turbine downtime and exchange costs,

and, in many cases, replacement gearboxes are on-site within days. As the damaged gearbox is removed, the replacement gearbox is installed using the same crane and service team, reducing costs for customers.

“Why settle for participating in a pool that only services half of your fleet,” said Mike Grunow, vice president of sales and marketing at Moventas Americas.

“We’ve spoken to the majority of wind farm owners and the message is clear. Wind farm owners want to participate in a gearbox repair-pooling program that meets the needs of their entire fleet and offers new gearbox options to make up for catastrophic failures. Moventas is the only company that can do that,” cMainshafts can be repaired and pooled with the gearboxes under the same terms and extended warranty options. Should a broken gearbox be deemed unusable, Moventas will credit customers for the usable parts and sell them a brand-new unit that contains industry-leading case-carburized ring gears, that enable maximum life and ensure the feasibility of less expensive uptower repairs.

As a global multi-brand service partner, Moventas also accepts and has successfully reverse-engineered, repaired, overhauled, upgraded, and supplied many popular gearboxes from other manufacturers.

— Source: Moventas

SYMPHONIEPRO™ DATA LOGGER BOASTS ADVANCED FEATURES AND A USER-FRIENDLY DESIGN



Renewable NRG Systems, a designer and manufacturer of decision support tools for the global renewable energy industry, has launched today a new data logger that is specifically engineered to improve the performance of wind and solar measurement campaigns.

Building on RNRG's well-known Symphonie series of user-friendly loggers, the SymphoniePRO logger brings significant upgrades in terms of capability and flexibility.

"This is the data logger our wind and solar energy customers have been asking for," said Michael Fisher, product manager. "It's powerful, versatile, and, as always, it comes with the great support and ease-of-use expected from a Symphonie logger."

SymphoniePRO is a low-power, industrial-grade data logging sys-

tem that is specifically designed for conducting resource assessments for the renewable energy industry. Each of the 26 channels' statistical values are calculated from continuous 1-second data samples and averaged over a user-selectable interval (10-minute default). Collected data are stored efficiently as binary .RLD files on internal Flash memory with a redundant copy on an external SD card, if installed.

Data are communicated and the system is powered via Symphonie iPackGPS communications devices, which only require a firmware upgrade for compatibility with the new data logger. In addition to SMTP email data delivery, SymphoniePRO allows remote, real-time connection capability over RNRG's MetLink protocol for tasks like automated or manual data download,

firmware upgrades, live data viewing, or configuration changes.

Also included is the SymphoniePRO Desktop Application, a new PC software package used to process raw data files as well as configure and communicate with the SymphoniePRO logger and iPack. SymphoniePRO Desktop Application keeps track of site data and produces versatile tab-delimited text files (ASCII) compatible with industry-leading software. Additionally, the software allows the user to view "live" data, apply firmware updates to loggers and iPacks, and preview data files in time series format.

SymphoniePRO is backed by RNRG's two-year warranty and lifetime technical support.

For more information about SymphoniePRO, visit www.renewablenrgsystems.com/symphoniepro.

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GE ENVISIONS THE NEXT GENERATION OF WIND FARMS

Built on big data, the Digital Wind Farm could boost AEP by 20 percent



Illustrations Courtesy of GE

GE recently announced the launch of its Digital Wind Farm, a dynamic, connected, and adaptable wind energy ecosystem that pairs world-class turbines with the digital infrastructure for the wind industry. The technology boosts a wind farm's energy production by up to 20 percent and could help generate up to an estimated \$50 billion of value for the wind industry.

The Digital Wind Farm uses interconnected digital technology — often referred to as the Industrial Internet — to address a long-standing need for greater flexibility in renewable power. The technology will help integrate renewable power into the existing power grid more effectively.

“Every business — including our own at GE — and every industry is being transformed by smarter digital technologies, and the greatest opportunity lies in energy,” said Steve Bolze, president and CEO of GE Power & Water. “The question is not whether to start down this path. It's about knowing how to get the most out of your digital transformation. That's what will separate industry leaders from those left behind.”

GE is leading the transformation of the wind power industry with today's launch of the world's first Digital Wind Farm. This new wind eco-

system pairs world-class turbines with a digital infrastructure to enhance production, reduce costs and boost operating efficiency over the life of the wind farm.

The Digital Wind Farm ecosystem begins with the production of the turbines themselves. With the next generation of “Brilliant” wind turbines, GE's new 2MW platform utilizes a digital twin modeling system to build up to 20 different turbine configurations at every unique pad location across a wind farm in order to generate power at peak efficiency based on the surrounding environment. Additionally, each turbine will be connected



to advanced networks that can analyze turbine operations in real time and make adjustments to boost operating efficiencies.

Once the turbines are built, their embedded sensors are connected and the data gathered from them is analyzed in real time with GE's Predix software, which allows operators to monitor performance from data across turbines, farms, or even entire industry fleets. The data provides information on temperature, turbine misalignments, or vibrations that can affect performance.

As more data is collected, the system actually learns over time, becoming more predictive and

“future-proofing” wind farms by maintaining top performance and avoiding the maintenance issues that typically occur as turbines age. It also reduces costs by customizing maintenance schedules to ensure preventive maintenance is done only when needed.

“GE’s focus on life-cycle operations is consistent with the way we operate our wind farms,” said Michael Polsky, president and CEO of the leading energy company Invenery. “We look forward to working together with GE’s Digital Wind Farm to unlock even more long-term value across our fleet.”

The Digital Wind Farm builds on GE’s Wind PowerUp technology,

which was unveiled 18 months ago. Now, installed in 4,000 units, the technology has improved turbine efficiency up to 5 percent, which translates to up to a 20 percent improvement in profitability for each turbine.

“Big data is worthless without the insight to take action, and our vision for the industry is to use today’s data to predict tomorrow’s outcomes,” Bolze said. “By harnessing the full power of the Industrial Internet, we can create a world where wind farms learn, adapt and perform better tomorrow than they do today.”

— Source: GE

CLEMSON AND NREL WILL COLLABORATE ON TURBINE R&D

Cooperative effort focuses on drivetrain optimization and grid integration



Dennis Schroeder / NREL

Two advanced U.S. wind energy research and testing facilities have joined forces to help the wind energy industry improve the performance of wind turbine drivetrains and better understand how the turbines can integrate more effectively with the electrical grid.

Through a Cooperative Research and Development Agreement (CRADA), the Energy Department's National Renewable Energy Laboratory (NREL) and Clemson University will partner to share resources and capabilities in the operation and development of testing facilities. The CRADA also includes the exchange of staff for training and research and development purposes, including collaborative participation in facility commissioning and testing activities.

"Our partnership with Clemson is an excellent example of how a university and a national laboratory can work together," said Brian Smith, acting center director for NREL's National Wind Technology Center (NWTC). "The collaborative efforts of these two research entities will complement one another for the technical advancement and large-scale deployment of wind and water power."

NREL, with support from the Wind Program in the Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy, leads the way in developing custom facilities and capabilities to enable testing of full-scale integrated wind turbine drivetrain systems in accordance with the needs of the wind industry. NREL currently operates 2.5 MW and 5 MW dynamometers and a controllable grid interface grid simulator that can help engineers better understand how wind turbines will react to grid disturbances.

Supported by a \$45.6 million DOE investment that is cost matched with over \$70 million in funds, Clemson Univ currently operates a drivetrain testing facility with 7.5 MW and 15 MW dynamometers at its SCE&G Energy Innovation Center, as well as a 20 megavolt ampere (MVA) grid emulator the Duke Energy eGrid, which enables mechanical and electrical testing of wind turbines and other multi-megawatt devices bound for the electrical grid. These projects



Clemson University Photo

spurred the development of the \$21 million Zucker Family Graduate Education Center, which will house Clemson's graduate programs in the Charleston, South Carolina, area and is located adjacent to the test facilities. NREL and Clemson are installing hardware-in-the-loop modeling and control capabilities to enhance their testing facilities.

"Clemson University's mission of promoting public-private partnerships to develop new technologies for the energy industry and educate the workforce of the future at the SCE&G Energy Innovation Center and NREL's activities at the NWTC share a lot of common ground," said Dr. Nikolaos Rigas, executive director of the Clemson University Restoration Institute. "This agreement will provide the framework for further collaboration and technical exchanges that benefit both organizations and brings a stronger team together to tackle broader challenges related to energy." ↵

— Source: NREL

SIEMENS INSTALLS 7MW OFFSHORE PROTOTYPE

Generator and electrical system testing currently underway at Denmark site



Siemens Press Picture

Only a few months after its sales launch at the EWEA Offshore trade show in Copenhagen, the new Siemens offshore flagship wind turbine of the type SWT-7.0-154 has now been installed as a prototype. The planned field-testing of the 7MW offshore turbine, installed onshore in Osterild, Denmark, mainly focuses on the upgraded generator and the enhanced electrical system. The majority of other components are equal to the proven technology of the Siemens SWT-6.0-154 - including the 154-meter rotor diameter. This latest edition of the D7 product platform can produce 32 million kWh of clean electricity



DNV GL AWARDS PROTOTYPE CERTIFICATE FOR 7MW SIEMENS TURBINE

DNV GL, the world's largest resource of independent energy experts, has awarded Siemens Wind Power with offshore prototype certification for its new 7MW offshore wind turbine SWT-7.0-154, which will now undergo field testing in Østerild, Denmark.

The prototype certificate confirms the compliance of the wind turbine design with the mandatory prototype requirements of the IEC 61400-22 standard and the Danish Executive Order (DEO). Being granted Prototype Certification confirms all relevant safety features on the turbine and allows installation of the prototype, to demonstrate how it performs. The prototype certification is a major step towards reaching the final Type Certification.

DNV GL has also been contracted to carry out the Type Certification of the SWT-7.0-154 offshore turbine and is currently involved in the design evaluation process.

“Such a demanding project requires not only the best in wind energy expertise, but also state-of-the-art project management in order to deliver this project in a timely manner,” said Steffen Haupt, global head of business development and sales for renewables certification at DNV GL. “Having supported Siemens with type certification of the SWP-6.0-154 last year, and to now see it grow to become the even bigger D7 turbine, DNV GL has been able to guarantee continuity for the certification process not only to Siemens as our customer, but also to their customers and partners.”

under offshore wind conditions — enough energy to supply up to 7,000 households.

In May 2011, Siemens installed the first prototype of its direct drive offshore wind turbine, while in the meantime the direct drive wind turbine has become the benchmark in the offshore wind industry.

“The installation of the 7-MW version is an exciting step in its further development,” said Morten Rasmussen, head of technology at Siemens Wind Power and Renewables division. “Based on the reliable technology and supply chain of our 6MW machine, we have improved our flagship wind turbine with stronger permanent magnets, optimized generator segments and upgraded converter and transformer units. With only these minor changes, we expect to get it ready for serial production within only two years.”

The gearless drive technology allows for a compact design. Using Siemens' direct drive technology, the SWT-7.0-154 is the lightest turbine of its class. The combination of robust design and low weight reduces offshore infrastructure, installation, and maintenance costs. Today's cranes and installation vessels will be sufficient for its installation. ↵

— Source: Siemens

— Source: DNV GL

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GRI RENEWABLE INDUSTRIES TO OPEN TOWER PLANT IN TEXAS

Factory expected to supply 400 towers to U.S. wind market annually



GRI Renewable Industries, the industrial wind division of Gonvarri Steel Industries, is in active negotiations with the Economic Development Corporation of Amarillo (AEDC) Texas regarding its proposed construction of a facility to manufacture wind towers in the U.S.

On June 16th, the AEDC board of directors approved a formal agreement submitted by GRI, that outlined the parameters and scope of the project. Clearance from local taxing authorities is expected by the middle of this month.

The proposed project is expected to employ, approximately 300 people over time and will be sufficient in capacity to supply the U.S. market with approximately 400 wind towers per year.

The facility is expected to be fully operational in late 2016 with the aim of providing wind towers to the U.S. market, thereby contributing to the robust development of renewable energy in the country.

“With this new factory in the U.S. market, GRI will utilize its experience and know-how as a leading global supplier of wind towers,” said Javier Imaz, CEO of GRI. “We initially considered locations in several states as a part of our business strategy to serve the U.S. wind industry. Our decision to select Amarillo included key factors such as the pro- business environment in the state of Texas, Amarillo’s favorable geographical location, and good workforce as well as a package of state and local incentives.”

— Source: GRI Renewable Industries

JANICKI INDUSTRIES AND GLOBAL FIBERGLASS SOLUTIONS ALIGN TO RECYCLE END-OF-LIFE WIND TURBINE BLADES

Janicki Industries has entered into a memorandum of understanding with Global Fiberglass Solutions, Inc. (GFSI) for fiberglass recycling and developing manufacturing technologies and processes. Together Janicki and GFSI will collaborate to successfully advance and develop products with a high content of recycled fiberglass materials. They will utilize these materials in infrastructural and architectural markets.

To implement this partnership, GFSI and Janicki will identify market and product potentials for recycled materials and formulate specific material properties for these applications. One of the initial areas of focus will be large-

scale noise barriers for highways fabricated in part from decommissioned utility scale wind blades.

“Recently, while touring a wind blade factory, I asked myself what happens when these 15-to 25-ton behemoths reach the end of their design life,” said Andy Bridge, vice president of industrial markets for Janicki Industries. “GFSI has a vision and the technology to reclaim fiberglass, and we are excited to develop market-based products and large-scale manufacturing processes customized for the material properties. We can grow our products and services for customers and at the same time reduce waste by recycling fiberglass materials.”

GFSI and its technical partner,

Washington State University, have successfully manufactured a variety of composite products with fiberglass material taken from decommissioned wind blades. Testing conducted for the manufactured products showed overall superior mechanical and physical properties suitable for a whole range of green manufacturing applications.

“Partnering with an industry leader such as Janicki Industries can take GFSI’s patented fiberglass recycling process to a whole new level of manufacturing sustainable high-grade products,” said Don Lilly, CEO of Global Fiberglass Solutions.

— Source: Janicki Industries



GAMESA EXPANDS ITS NACELLE FACTORY IN BRAZIL

Gamesa officially inaugurated its expanded nacelle assembly factory in Camaçari, Brazil in June, from which it will make all the 2.0 – 2.5MW platform turbines earmarked for the Brazilian market. The facility's inauguration ceremony was presided by the governor of Bahia, Rui Costa dos Santos, and the mayor of Camaçari, Ademar Delgado. The executives attending on behalf of Gamesa included Ignacio Martín, chairman and CEO; Xabier Etxeberria, business CEO; José Antonio Miranda, CEO in Latin America; and Edgard Corrochano, managing director in Brazil; among others.

In wake of this expansion work, up and running since September 2014, the factory's productive capacity has increased to 640 MW. The factory has been equipped with a multi-model production line. It currently produces nacelles for the G97-2.0MW turbine and, beginning in January 2016, it will manufacture the G114-2.0MW — a turbine that reduces energy costs by 10 percent. Both turbines are part of Gamesa's 2.0-2.5 MW platform, of which 1,000MW of which have already been installed in Brazil. The growth in Gamesa's operations in this market will enable it to double its headcount to 570 by the year-end 2015.

"The start-up of this facility evidences our industrial pledge in Brazil and our commitment to developing the country's wind power and broader manufacturing infrastructure, Martin said during the inauguration ceremony."

"This expansion reinforces our operations in one of Gamesa's priority markets. In 2014, Brazil accounted for 22 percent of total megawatts sold. Gamesa is one of the leading OEMs in this market thanks to a business strategy that combines global leadership with local know-how along with a strong commitment to local community development in terms of wealth generation, job creation, and purchases from and alliances with local suppliers."

Since it established a manufacturing foothold in Brazil in 2011, Gamesa has

invested over approximately \$39.2 million in the country, nurturing a competitive local supply chain of over 1,000 suppliers in the process.

During the last four years, the company has installed over 1,000MW and has firm orders for the supply of another

1,500MW in the years to come at projects being developed in the country's windiest regions. It also services close to 700MW for various customers under O&M agreements.

— Source: Gamesa

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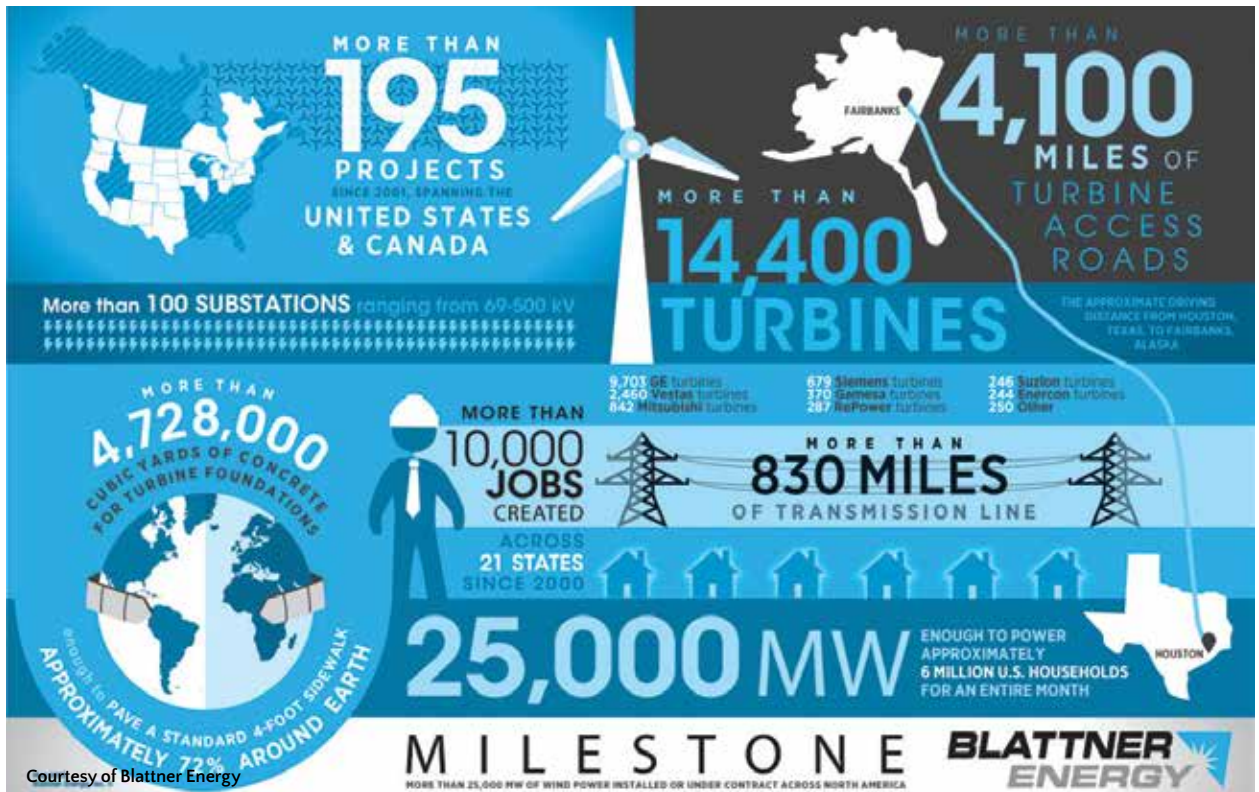
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BLATTNER SETS NORTH AMERICAN WIND INSTALLATION RECORD

Contractor's wind portfolio totals more than 25,000 MW across 195-plus projects



Blattner Energy, a power generation contractor and leading provider of renewable energy construction in North America, announced that it has more than 25,000 megawatts (MW) of wind power installed or under contract across North America, more than any other contractor. This accounts for approximately one-third of all installed wind power capacity in the United States and Canada.

Blattner Energy shares this milestone with the entire wind power industry. According to the American Wind Energy Association, wind power delivered 28 percent of all new generating capacity installed over the past five years and was the

largest source of new generation in 2014.

"Milestones such as these demonstrate to lawmakers that wind power is a significant, growing and long-lasting part of the power mix," said Scott Blattner, president of Blattner Energy. "This accomplishment speaks to the outstanding work and commitment of our teams, and to the strength of the entire wind power industry. We thank our employees, clients and valued vendors for helping us reaching this record."

This milestone is supported by the wind power portfolio of Blattner Energy, its sister company, D.H. Blattner & Sons, Inc., and Canadian

joint-venture operation, Borea Construction, ULC. The Blattner Family of Companies has built more than 195 wind projects since 2001, including the five single-largest wind farms in the United States. The 25,000 MW milestone also includes:

- The creation of more than 10,000 jobs in the U.S. alone
- More than 14,400 turbines installed
- More than 4,100 miles of turbine access roads constructed
- Approximately 830 miles of transmission line installed
- More than 100 substations ranging from 69-500 kV

— Source: Blattner Energy

LONGHORN WIND REACHES COMMERCIAL OPERATION

EDF expands its installation capacity in Texas to 872 MW



EDF Renewable Energy recently announced that the 200 MW Longhorn Wind Project in Texas reached commercial operation on May 1.

The project, spanning 33,000 acres in Floyd and Briscoe counties, is comprised of 100 Vestas V-100 wind turbines with a rated capacity of 2 MW each. Renewable Energy Systems Americas Inc. developed and constructed the project, which utilizes the CREZ transmission infrastructure to deliver the low-cost renewable generation resources of West Texas and the Texas Panhandle to the Electric Reliability Council of Texas market.

“Longhorn represents EDF Renewable Energy’s fifth project to be placed in service in Texas in the past three years bringing our installed capacity in the state to 872 MW,” said Ryan Pfaff, executive vice president of EDF Renewable Energy. “We are particularly pleased to be up and running in Floyd and Briscoe Counties, and look forward to working closely with the local community throughout the life of the Longhorn Wind Project.”

Longhorn Wind will generate enough electricity to power approximately 55,000 homes — according to U.S. Energy Environmental Protection Agency methodology — avoiding approximately 375,000 metric tons of greenhouse gas emissions per year, the equivalent of the annual emissions from approximately 80,000 passenger vehicles. Longhorn’s output is sold to a creditworthy

counterparty under a long-term, fixed-price energy purchase agreement.

“RES continues its commitment to growing the Texas economy by creating many jobs with the construction workforce peaking at 250, 14 permanent jobs for operations and maintenance, and spending nearly \$3.5M in the local community during construction,” said Andrew Fowler, chief operating officer for RES Americas. “Longhorn is our 18th completed project in the Lone Star State and marks our first construction project with EDF RE. We look forward to continuing to work with EDF RE to provide secure and sustainable energy solutions in the future.”

— Source: EDF Renewable Energy

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CHARITY CYCLING EVENT TOURS UK WIND FARMS

Proceeds from Earth, Wind and Tyre race to help bring renewable energy to rural areas of developing nations



On Saturday June 13, and Sunday, June 14, 47 cyclists took part in the inaugural 200-mile Earth, Wind and Tyre cycle ride from Durham, England to Edinburgh, Scotland in order to raise money for energy-poor communities in developing countries.

The ride was a huge success with riders reaching the finishing line at the Cannongate Kirk on the Royal Mile in Edinburgh. They received a huge welcome from volunteers, locals, and sponsors.

The ride was led by the CEO of EDF Energy Renewables Christian Egal. He and cyclists from 12 other renewable energy companies completed the grueling 200-mile ride, which passed 10 iconic wind farms and climbed the equivalent height of Mont Blanc over the course of two days. The cyclists passed through County Durham, Northumberland, the Scottish Borders and East Lothian on their way to Edinburgh. One of the riders, passionate cyclist Paul Errington, became legendary when he rode the whole route in

one day and then set back to Newcastle the next morning.

These epic cyclists were cheered on along the route by a dedicated support team of volunteers and sponsors. Staff at Floors Castle welcomed the cyclists with soup and hot drinks, while the RES team at Duns prepared fresh smoothies using a cycle driven blender.

As well as cycling, the participants have been hard at work fundraising. Through the Earth, Wind and Tyre cycling ride, Renewable World is on track to raise approximately \$55,000 to help families, businesses, and schools in energy-poor communities access life-changing clean energy and water. This target would not be possible without event sponsors Vestas, RES, EDF Energy Renewables and Blackwell, MPI Offshore, Athena PTS, Floors Castle and Cathie Associates.

“I can’t thank the cyclists enough taking on the 200-mile challenge,” said Sarah Donnelly, vice chair for Renewable World. “I’m so proud of

everything that has been achieved this weekend and all the work the cyclists have put into training and fundraising over the past three months. I’ve seen the great work that Renewable World is doing in some of the poorest parts of the world first hand. The funds raised will help us to provide power to encourage self-sufficiency and alleviate poverty.”

Riders were well fed along the route, with all leftovers donated to the Street Work charity who provide meals and support to homeless people in need in Edinburgh.

Renewable World is a charity based in the United Kingdom that works with rural communities in Africa, Asia, and Central America developing and providing simple renewable energy systems to encourage self-sufficiency and alleviate poverty.

For more information about Renewable World, visit them on the web at www.renewable-world.org.

— Source: Renewable World

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